Final Report

Communicating the Nutrition and Health Benefits of Avocados

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Communicating the Nutrition and Health Benefits of Avocados – AV18004

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Contents

Summary: essential information to make nutrition and health claims for adults

This report substantiates nutrition and health claims the Australian Avocado Industry can use for various forms of consumer education (website, social posts, fact sheets, point of sale material).

These first four pages will provide you a list of nutrition and health claims you can make plus the nutrition information panel you will need as substantiation. For a further explanation of how and why these claims can be made, read from page 13 onwards. Table 2 explains how these claims comply with the Australian Food Standards Code.

A list of permitted claims are below:

Nutrient Content Claims

- Avocado has 100kcal in a 50gram serve
- Avocado contains healthy/good fats
- Avocado contains healthy monounsaturated fats/ Avocados like olives are the only fruits to contain healthy monounsaturated fat.
- Avocado contains a high proportion of total fat as unsaturated fats/ Avocado contains mostly unsaturated fats
- Avocado is trans fat free/ free of trans fats
- Avocados are naturally low in sugars with less than 1g per serve
- Avocado is a source of dietary fibre
- Avocado contains soluble fibre
- Avocado is naturally low in sodium with just 2mg per serve.
- Avocado contains potassium
- Avocado is a source of/ contains niacin
- Avocado is a source of/ contains pantothenic acid
- Avocado is a source of/ contains folate
- Avocado is a source of/ contains vitamin C
- Avocado is a source of/ contains vitamin E
- Avocado is a source of/ contains vitamin K
- Avocado contains boron
- Avocado contains polyphenol antioxidants or, Avocado contains 70mgGAE polyphenol antioxidants per 50gram serve.
- Avocado contains colourful carotenoids - beta carotene, cryptoxanthin, lutein and zeaxanthin
- Avocados are naturally gluten free

These nutrient content claims can be presented as a tick list

Avocado:

✓ ~100kcal a serve
✓ Contains healthy/good fats
✓ Contains healthy monounsaturated fats
✓ Contains mostly unsaturated fats
✓ Trans-fat free
✓ Contains fibre
✓ Contains soluble fibre
✓ Naturally low in sugars
✓ Naturally low in sodium
✓ Contains potassium
✓ Source of/ contains niacin
✓ Source of/ contains pantothenic acid
✓ Source of/ contains folate
✓ Source of/ contains vitamin C

✓ Source of/ contains vitamin E
✓ Source of/ contains vitamin K
✓ Contains boron
✓ Contains polyphenol antioxidants
✓ Contains colourful carotenoids - beta carotene, cryptoxanthin, lutein and zeaxanthin
✓ Nutrient booster
✓ Naturally gluten free

General Level Health Claims (GLHCs)

The GLHCs below reflect the wording of pre-approved claims in Schedule 4 of the Australian Food Standards Code. These same claims may be expressed in more consumer-friendly language and friendlier versions are suggested underneath.

Note: a dietary context statement is required to accompany GLHCs, "As part of a healthy varied diet". This could be in the form of a split claim with an asterisk denoting the dietary context statement at the bottom or back of the page/pack, as indicated below:

DIETARY FIBRE

- Avocado is a source of/ contains fibre. Fibre contributes to regular laxation*.
  **As part of a healthy varied diet.*

Consumer-friendly language version:

Fibre helps keep you regular/ is good for bowel function/ is good for bowel health/ is good for gut health*
**As part of a healthy varied diet.*

NIACIN

- Avocado contains niacin and provides 12% RDI. Niacin is necessary for normal energy release from food/ contributes to normal psychological function/ is necessary for normal neurological function/ contributes to the reduction of tiredness and fatigue/ is necessary for normal structure and function of skin and mucous membranes.*
  **As part of a healthy varied diet.*

Consumer-friendly language versions:

Avocado contains niacin. Niacin is important for:
✓ obtaining energy from food
✓ a healthy nervous system
✓ brain function
✓ fighting fatigue
✓ healthy skin*
**as part of a healthy varied diet*

PANTOTHENIC ACID

- Avocado is a source of / contains pantothenic acid. Pantothenic acid: is necessary for normal fat metabolism/ contributes to normal energy production/ contributes to normal mental performance/ contributes to the reduction of tiredness and fatigue/ Contributes to normal synthesis and metabolism of steroid hormones, vitamin D and some neurotransmitters.*

**as part of a healthy varied diet*

Consumer friendly language versions:

Avocados contain pantothenic acid - a B group vitamin which helps the body produce energy from foods containing fats*. That's helpful in a healthy fat-containing food such as avocado.

Pantothenic acid in avocados is needed for keeping the brain sharp and focused and helps fight fatigue.*

Avocado contains pantothenic acid which help the body produce vitamin D.*
**as part of a healthy varied diet*

FOLATE

- Avocado is a source of/ contains folate. A 50gram serve or around a quarter of an avocado provides 15% of the RDI for folate. Folate: helps cells divide and contributes to normal blood and tissue formation during pregnancy/ helps cells divide/ contributes to normal blood formation/ is needed during pregnancy for tissue development/ contributes to normal psychological function/ contributes to the reduction of tiredness and fatigue/ contributes to normal immune system function*
  **As part of a healthy varied diet.*

Consumer-friendly language versions:

Avocado contains folate - essential during pregnancy.*

Avocado is great when you have a baby on board as it contains folate that helps support a healthy pregnancy.*

Avocado contains folate. Folate is needed for:
✓ brain function
✓ a healthy immune system
✓ pregnancy
✓ healthy blood*
**as part of a healthy varied diet*

VITAMIN C

- Avocado is a source of/ contains vitamin C. A quarter of an avocado (50gram) provides 14% of the RDI for vitamin C. Vitamin C: contributes to iron absorption from food/ contributes to cell protection from free radical damage/ necessary for normal connective tissue structure and function/ necessary for normal blood vessel structure and function/ contributes to normal collagen formation for the normal structure of cartilage and bones/ contributes to normal collagen formation for the normal function of teeth and gums/ contributes to normal collagen formation for the normal function of skin/ contributes to normal energy metabolism/ is necessary for normal neurological function/ contributes to normal psychological function/ contributes to the reduction of tiredness and fatigue/ contributes to normal immune system function.*
  **As part of a healthy varied diet.*

Consumer-friendly language versions:

Enjoying more plant foods these days? Add avocado to your meals for vitamin C - it enhances iron absorption.*

Decided to go vego? Add avocado to your meals as it contains vitamin C for enhanced iron absorption.*

Vitamin C in avocado helps absorb iron from plant foods*

Antioxidant vitamin C protects body cells from free radical damage*

Avocado contains vitamin C that helps build strong bones and teeth/ healthy teeth and gums*

Vitamin C in avocado keeps skin looking good*

Avocado contains vitamin C which keeps the brain performing at its best*

Vitamin C-containing avocados maintains a healthy immune system*

Avocado contains vitamin C. Vitamin C is essential for:
✓ iron absorption
✓ Antioxidant effects
✓ Building strong bones and teeth
✓ Healthy teeth and gums
✓ Healthy skin
✓ Brain function
✓ Healthy immune system*
**As part of a healthy varied diet.*

VITAMIN E

- Avocado is a source of/ contains vitamin E. A serve of avocado (50gram) provides 10% RDI. Vitamin E is a natural antioxidant vitamin. Vitamin E contributes to cell protection from free radical damage.*
  **As part of a healthy varied diet.*

Consumer-friendly language version:

Avocado contains vitamin E, a protective antioxidant*
**As part of a healthy varied diet.*

VITAMIN K

- Avocado is a source of/ contains vitamin K. 50gram of avocado provides 14% of the RDI. Vitamin K helps build strong bones/ is necessary for normal blood clotting.*
  **As part of a healthy varied diet.*

Consumer-friendly language versions:

Avocado contains vitamin K that helps keep bones healthy/ helps build strong bones*

Avocado contains bone-building vitamin K*

Avocado contains vitamin K that helps blood to clot*
**As part of a healthy varied diet.*

POTASSIUM

- A 50gram serve of avocado contains 255mg of potassium. Potassium is necessary for normal water and electrolyte balance/ normal functioning of the nervous system/ normal muscle function.*
  **As part of a healthy varied diet.*

Consumer-friendly language versions:

Avocado contains potassium, an important mineral for:
✓ fluid balance
✓ a healthy nervous system
✓ healthy muscle function*
**As part of a healthy varied diet.*

ANTIOXIDANTS

Avocado contains protective antioxidants: vitamin C, vitamin E and polyphenols*

Composite GLHC claims

A number of consumer-friendly nutrient and health-related claims can be made based on grouping several GLHC claims and/or nutrient claims together. A dietary context statement is required, "as part of a healthy varied diet". This can be done as a split claim, whereby an asterisk is used to denote the dietary context statement that can be written separately but close by.

Energy/ vitality

- Avocado is an energy booster /fatigue fighter.* It contains energy boosting nutrients niacin, pantothenic acid, folate & Vitamin C.
- Boost your vitality with avocado - it's a source of energy boosting /fatigue-fighting niacin, pantothenic acid, folate & Vitamin C.*
- Smashed avo on toast for breakfast boosts energy levels and makes a great start to the day.*
- Get energised with avos – a source of energy, niacin, pantothenic acid, folate & vitamin C.*

**as part of a healthy varied diet*

Brain function

- Keep your brain sharp with avocado. It contains niacin, pantothenic acid, folate & vitamin C for a healthy brain and nervous system.*
- Avocado is good mood food – it contains niacin, pantothenic acid, folate & vitamin C for brain and nervous system function.*

**as part of a healthy varied diet*

Skin health

- Avocado looks after your skin from within thanks to its healthy fats, niacin & vitamins C&E.*

**as part of a healthy varied diet*

Strength

- Stay strong with avocados. Avocado contains potassium, vitamin C and vitamin K important for muscles, ligaments, tendons, cartilage and bones.*

**as part of a healthy varied diet*

Bone health

- Avocado contains bone-building nutrients vitamins C and K.*

**as part of a healthy varied diet*

Pregnancy

- Pregnant women have increased nutrient needs and avocado is a nutrient-rich plant food with a range of vitamins, minerals, healthy fats and fibre.*

**as part of a healthy varied diet*

Nutrient absorption

- Avocado is a nutrient booster - the vitamin C in avocados will help absorb iron from plant foods.*
- Avocado is a nutrient booster - the healthy fats in avocado help absorb essential nutrients such as fat-soluble nutrients such as vitamin E and antioxidants.*

*as part of a healthy varied diet

Bowel/gut health

- Avocado is a source of fibre. Fibre is needed for healthy gut function.*

**as part of a healthy varied diet*

Immune system function

- Avocado contains folate and vitamin C that help keep your immune system healthy.*

**as part of a healthy varied diet*

Healthy blood

- Avocados contain folate and vitamin K important for healthy blood.*

**as part of a healthy varied diet*

Antioxidant function

- Avocado contains protective antioxidants.*
- Avocado contains antioxidants: vitamin C, vitamin E and polyphenols.*

**as part of a healthy varied diet*

High Level Health Claims (HLHCs)

(Pre-approved by FSANZ see Table 4 for substantiation)

- A healthy diet containing a high intake of both fruits and vegetables, such as avocado, and a variety of other foods *reduces the risk of heart disease* (or can say - *contributes to heart health)*

- A healthy diet low in sodium [or salt] containing a variety of foods such as avocado reduces blood pressure. A quarter of a large avocado (50gram) is naturally low in sodium with just 2mg of sodium and contains 255mg potassium.

Consumer-friendly HLHC

Heart health

Split claim:
Avocados are a heart healthy food*
Avocados = heart health*
Avocados love your heart*
**A healthy diet containing a high intake of both fruits and vegetables, such as avocado, and a variety of other foods reduces the risk of heart disease (or can say - contributes to heart health)*

Split claim:
Avocados help reduce blood pressure*
Avocados keep blood pressure down*
**A healthy diet low in sodium [or salt] containing a variety of foods such as avocado reduces blood pressure. A quarter of a large avocado (50gram) is naturally low in sodium with just 2mg of sodium and contains 255mg potassium.*

Lifestyle Claims

Avocados are:

- Vegan friendly
- Vegetarian friendly
- Paleo friendly
- Gluten free
- A nutrient rich/dense superfood
- A whole plant food straight from nature
- A whole plant food straight from the tree

Avocados are suitable for:

- Plant based diets
- Paleo diets
- Carbohydrate restricted diets
- Healthy fat diets such as Mediterranean diet
- Gluten free diets
- Low-salt diets such as DASH diet

We need two serves of fruit and five serves of veggies a day – make one avocado.

Technically a fruit, avocados are perfect in salads – adding avos helps absorb fat soluble nutrients from salad vegetables.

The creamy consistency and mild flavour of avocado make it a great first food for baby.
Avocados are a delicious nutrient booster.

Avocado is nutrient-rich and offers good nutrition value for money.

The Australian Dietary Guidelines recommend replacing unhealthy butter with avocado

Smashed avo on toast for breakfast is a great way to start the day

Weekend warriors team avocado with your favourite breakfast toast/ smoothie to achieve your personal best

Storage and usage tips
Test for ripeness by gently pressing the avocado neck if it gives under light pressure it's ripe
Avoiding squeezing the avocado body it will bruise the flesh inside

Store whole avocados in the fridge to slow the ripening process for a couple of days.

After cutting, store the remaining avocado with a sprinkle of lemon juice on the cut edge to stop it from oxidizing and turning brown, and wrap the cut edge firmly in plastic wrap to reduce air exposure. Store in the fridge and use within a day.

Approved Nutrition Information Panel (NIP) for Avocado
When making any nutrient content claim the nutrient in question must also appear in the nutrition information panel – such as the in the examples below.

NUTRITION INFORMATION Servings per package: 4 serves per avocado Serving size: ~50g or ¼ avocado			
	Average Quantity per Serving	Percentage Daily Intake*	Average Quantity per 100g
Energy	430kJ (102Cal)	5%	860kJ (205Cal)
Protein, total	1.0g	2%	2.0g
Fat, total	10.7g	15%	21.4g
– saturated	2.4g	10%	4.8g
– trans	0g		0g
– polyunsaturated	1.4g		2.7g
– monounsaturated	7.4g		12.8g
Carbohydrate	<1g	<1%	<1g
– sugars	<1g	<1%	<1g
Dietary fibre, total	2.5g	5%	5.0g
Sodium	2.0mg	<1%	4.0mg
Potassium	255mg		509mg
Niacin	1.2mg eq	12%	2.4mg eq
Pantothenic acid	0.7mg	14%	1.4mg
Folate	30ug DFE	15%	59ug DFE
Vitamin C	11mg	14%	11mg
Vitamin E	1mg	10%	2mg
Vitamin K	11ug	14%	21ug
Boron	0.72mg		1.43mg
Polyphenols	71mg GAE		142mg GAE
Beta carotene	14ug		27ug
Cryptoxanthin	59ug		117ug
Lutein & zeaxanthin	136ug		271ug
Gluten	0mg		0mg
*based on the average adult diet of 8700kJ “<” means less than			

Alternative approved Nutrition Information Panel (NIP) for Avocado
An alternative table format like this one can also be used.

NUTRITION INFORMATION Servings per package: 4 serves per avocado Serving size: ~50g or ¼ avocado		
	Average Quantity per Serving	Average Quantity per 100g
Energy	430kJ (102Cal)	860kJ (205Cal)
Protein, total	1.0g	2.0g
Fat, total	10.7g	21.4g
– saturated	2.4g	4.8g
– trans	0g	0g
– polyunsaturated	1.4g	2.7g
– monounsaturated	7.4g	12.8g
Carbohydrate	<1g	<1g
– sugars	<1g	<1g
Dietary fibre, total	2.5g	5.0g
Sodium	2mg	4mg
Potassium	255mg	509mg
Niacin	1.2mg eq (12% RDI)	2.4mg eq
Pantothenic acid	0.7mg (14% RDI)	1.4mg
Folate	30ug DFE (15% RDI)	59ug DFE
Vitamin C	5.5mg (14% RDI)	11mg
Vitamin E	1mg (10% RDI)	2mg
Vitamin K	11ug (14% RDI)	21ug
Boron	0.72mg	1.43mg
Polyphenols	71mg GAE	142mg GAE
Beta carotene	14ug	27ug
Cryptoxanthin	59ug	117ug
Lutein & zeaxanthin	136ug	271ug
Gluten	0mg	0mg
"<" means less than		

Health Star Rating

Health stars can be added to avocado stickers and front of packaging. Find the details here.

INFANTS and TODDLERS

There are a rage of nutrition and health claims that can be made about infants and toddler nutrition needs. See Table 5 for substantiated claims and Table 6 for consumer-friendly claims aimed at infants and toddlers.

Why make nutrition and health claims

Nutrition and health claims are a tool to educate consumers, media, health professionals, public health advocates and lifestyle influencers of the nutrition and health benefits of avocado.

Where to use nutrition and health claims

Avocado growers currently use nutrient and health claims in the following forms of consumer education:

- Avocado website; specifically nutrition sections for consumers and health professionals
- Avocado fact sheets/resources on the website and in print
- Social media posts
- Avocado blogs for consumers and health professionals archived on the website
- media releases

Other promotional ideas include:

- point of sale materials/posters etc
- fruit stickers or other packaging
- above the line advertising

Legal requirements

Provided there is no call to action to buy avocados, any nutrition and health claims made on Australian Avocados website or social posts will not breach the Food Act provided they can be substantiated. Any claims made must not contravene the Australian Consumer Law Competition and Consumer Act 2010 for misleading and deceptive conduct.

The Food Standards Code

Although the Food Standards Code (FSC), including Standard 1.2.7 Nutrition and Health Related Claims, are developed by Food Standards Australia and New Zealand, their enforcement is tasked to state and territory health departments and other appointed agencies. In the case of NSW, it is the NSW Food Authority. The NSW Food Authority requires all food businesses to comply with the NSW Food Act (2003), which incorporates the Food Standards Code. The Food Act applies to the sale of food, or the implication of the sale of food, as per Section 21(3) https://www.legislation.nsw.gov.au/inforce/21dd14e3-569d-eb35-e54b-cd410db63d52/2003-43.pdf

Horticulture Innovation Australia does not “sell” product. In most cases avocado is an “unbranded” product and so information controlled by Hort Innovation is unlikely to breach the Food Act, except in certain circumstances that imply the sale of food. For example, point of sale materials such as posters or fruit stickers, or when there is a directive toward a retailer (such as a supermarket). For a sale to be implied, a call to action to purchase must be made.

It is unlikely claims made by Hort Innovation in efforts to educate health professionals and consumers will attract attention by enforcement agencies. Nonetheless, great care has been taken to ensure the claims suggested in this document are compliant with the FSC.

Australian Consumer Law

Under the Australian Consumer Law Competition and Consumer Act 2010 (ACL), businesses are not allowed to make false or misleading statements, or make statements that are incorrect or likely to give a false impression. Breaches of ACL that are successfully prosecuted attract very large fines. Every effort has been made to ensure the claims suggested in this document can be scientifically substantiated as accurate, and moreover are not misleading to the lay person.

What are Nutrition and Health Claims?
Food Standards Australia New Zealand (FSANZ) Australian Food Standard Code Standard 1.2.7 Nutrition, Health and Related Claims and Schedule 4 are the regulations claims must comply with https://www.legislation.gov.au/Details/F2017C01048. There are three types of claims as outlined below.

Nutrient Content Claims

Nutrient content claims describe a nutrient and the amount found in a serve of a food. For example:
Avocado is a source of vitamin C

To make nutrient content claims the following are needed:

- Nutrient composition of avocado per 100gram and per serve
- A standard serving size
- Regulatory Recommended Dietary Intakes (RDIs) from Food Standards Code Schedule 1 https://www.legislation.gov.au/Details/F2017C00315
- Macronutrient nutrient criteria in Food Standards Code Schedule 4 https://www.legislation.gov.au/Details/F2017C00711
- Percentage Daily Intake Reference values for macronutrients in Standard 1.2.8 for use in the nutrition information panel https://www.legislation.gov.au/Details/F2017C00311

For vitamins and minerals a minimum 10% of the RDI for that vitamin or mineral must be present in a serve of avocado to make a “source of X” or “contains X” claim

To make a higher claim – “a good source of X” or “rich in X” a minimum of 25% of the RDI for that vitamin or mineral in a serve of avocado is needed.

For macronutrients e.g. protein/ fibre/ fat – Schedule 4 has particularly nutrient criteria for each of these nutrients.

For nutrients with no RDI or %DI reference value Standard 1.2.7 Clause 13 states you can make a claim of the presence of the nutrient in the food and the amount it contains but no high level descriptors can be made. For example, there is no RDI for polyphenol antioxidants therefore you can only state the amount of polyphenol antioxidants avocados contain and not that it is “rich in” or “contains high levels of” polyphenol antioxidants, e.g.

Avocado contains 70mg GAE of polyphenol antioxidants

However you could make a “Contains antioxidant vitamins C and E” claim since there is more than 10% of the RDI for vitamin C and vitamin E in a 50gram serve of avocado and the antioxidant action of vitamin C and vitamin E is a pre-approved general level health claim.

It’s important to note just because avocado may contain a bioactive substance or nutrient doesn’t mean it should be claimed. It could be misleading and deceptive if the amount of that substance is so small it would not be biologically relevant. Table 2 lists all the possible nutrients in avocado and determines where claims can and cannot be made.

The data and RDIs themselves could also be misleading. For example, for folate.
The FSANZ regulatory RDI for folate is 200ug a day. However, the National Health and Medical Research Council (NH&MRC) states women of children bearing age need 400ug folate a day and 600ug a day during pregnancy. So while folate claims may be compliant under FSANZ they may imply a higher level of folate than what pregnant women actually need and hence mislead pregnant women. This report has taken care to avoid misleading pregnant women through the use of RDIs.

General Level and High Level Health Claims

General level health claims (GLHCs) are also known as nutrient function claims. They describe the function of a nutrient in a food. There are over 100 pre-approved GLHCs in Schedule 4. https://www.legislation.gov.au/Details/F2017C00711

For example:
Avocado is a source of vitamin C. Antioxidant vitamin C protects cells from free radical damage.

High level health claims (HLHCs) go one step further and link a food or nutrient with a disease or a biomarker for a disease. There are fewer pre-approved HLHCs in Schedule 4 because they require FSANZ approval and amendments to the legislation before they are approved.

For example

A healthy diet containing a high intake of fruits and vegetables, such as avocado, and a variety of other foods reduces the risk of heart disease (or can say - contributes to heart health)

Standard 1.2.7 Schedule 4 lists general level and high level health claims that have already been approved by FSANZ and are available for use provided the criteria are met.

There are wording conditions required to make GLHC and HLHCs. For example, a dietary context statement "as part of a healthy varied diet" is needed, e.g.

"As part of a healthy diet with a variety of foods such as avocado…"

To save space and repetition the dietary context statement can be in the form of split claim with an asterisk after the claim denoting the dietary context statement at the bottom or back of the page/pack: **As part of a healthy varied diet.*

Note: a dietary context statement is not needed for "small packages" (Standard 1.2.7 Clause 4). Small Packages are labels under 100cm^2 such as a fruit sticker.

9 steps to making nutrient and health claims

To make nutrient and health claims there are nine steps to complete:

STEP 1: Determine the nutrient composition of avocado per 100gram

STEP 2: Determine if avocado passes the FSANZ Nutrient Profile Scoring Calculator

STEP 3: Find an agreed standard industry serving size for avocado

STEP 4: Calculate the nutrient composition of avocado per serve

STEP 5: Compare the vitamin and mineral content per serve with the Regulatory Recommended Dietary Intakes (RDIs) from Food Standards Code Schedule 1

STEP 6: Compare the macronutrient content per serve with the nutrient criteria in Food Standards Code Schedule 4

STEP 7: Choose appropriate language for permitted claims

STEP 8: Calculate the Percentage Daily Intake Reference values for macronutrients in Standard 1.2.8 for use in the nutrition information panel

STEP 9: Develop the Nutrition Information Panel (NIP).

STEP 1 Food Composition Databases

There are several ways to source nutrition composition data for avocados. Table 1 contains the nutrient content of raw avocado per 100grams from FSANZ NUTTAB2010 Nutrient Composition of Foods online database analysed in 1983/4.
http://www.foodstandards.gov.au/science/monitoringnutrients/nutrientables/nuttab/pages/default.aspx

Where there are gaps in the NUTTAB data the USDA Nutrient Reference database Software National Agricultural Library_v.3.9.5.1_2018-09-23 https://ndb.nal.usda.gov/ndb/search/list and other published data from journal papers has been used and footnoted.

Growers may also have their own crops nutritionally analysed and could use this as the basis for claims and NIPs.

Table 2 contains the permitted claims for avocado and the nutrient composition data for a standard 50gram serve required to substantiate each claim.

This data also appears in the NIPs.

STEP 2 Nutrient Profile Scoring Calculator

In order to make general level and high level health claims, foods/products must meet a Nutrient Profile Scoring Calculator requirement. Points are given for positive and negative nutrients and if the final score is less than but not equal to 4 then that food or product will be eligible to make general level and high level claims.

Using NUTTAB 2010 composition data for avocados, avocado meets this requirement (see right) and therefore avocados are approved to make general level and high level health claims.

Avocado, raw			
Category 2			
Monday, 5 November 2018			
Baseline Points:			
Nutrient Information		***Amount Entered***	***Points earned***
Energy		860	2
Saturated Fatty Acids		4.8	4
Sugars		1.0	0
Sodium		4.0	0
Total Baseline Points			**6**
Modifying Points:		**Amount Entered**	**Points earned**
fvnl	Non *fvnl* ingredients	0%	8
	Non-concentrated *fvnl* ingredients	100%	
	Concentrated fruit and vegetable ingredients	0%	
Protein		2.0	1
Dietary Fibre		5.0	5
Total Modifying Points			**14**
Final Score			**-8**
Important			
Check Standard 1.2.7 for conditions that apply for making a health claim.			
Please print this page for your records.			

(http://www.foodstandards.gov.au/industry/labelling/Pages/nutrientprofilingcalculator/Default.aspx)

STEP 3 Standard Serving Size

In 2014 a project undertaken by Lisa Yates funded by Horticulture Australia and Avocados Australia determined the average serving size for avocado to be:

- 50gram or ~¼ cup mashed or 1/3 of a small avocado or ¼ of a large avocado

For the following reasons summarised below:

- Market research in 2013/14 of avocados sold in common supermarkets and green grocers found the edible portion of an avocado is 200g or less depending on size so 1/4 of a large equals 50gram.
- The Australian Dietary Guidelines recommends 150gram fruit serves and 75gram vegetable serves, equating to 100-350kJ per serve. NUTTAB lists avocado under its "vegetables" category with an energy content of 430kJ per 50gram serve. Avocados are exceptional in being botanically a fruit, and more energy dense than other vegetables so a smaller serve size is appropriate. As primary produce, variability in energy content is

expected and other International data has found avocados with lower energy content around 300kJ per serve. This small overrun in energy using a 50gram serve size is acceptable within the vegetable food group.

- 50grams or a quarter is a credible and acceptable serving size to health professionals (GPs and Dietitians) and they would easily recommend it to patients/clients over ½ an avocado with 860kJ. This is based on market research conducted during the 2011-2016 Avocado Nutrition Program project funded by Horticulture Australia/Hort Innovation and Avocados Australia/ avocado growers.
- International governments and health authorities recommend serving sizes that vary from 30-80gram and described as ¼ - ½ an avocado
- Research and clinical trials use serving sizes of 75-200gram a day described as anywhere from a ¼ to a whole avocado

STEP 4: Nutrient composition per 50gram serve
Another reason for a 50gram serving size is it is easier for non-nutritionists to calculate nutrient content claims. They need only divide the nutrient content for a 100gram serve in half. This is also needed for a nutrition information panel.

STEP 5 Regulatory Recommended Dietary Intakes (RDIs)

The claims for vitamins and minerals in Table 2 are based on the regulatory RDIs for vitamins and minerals found in FSANZ Schedule 1 https://www.legislation.gov.au/Details/F2017C00315
These "one size fits all" RDIs are not always the same as the RDIs for individuals published by the NHMRC in the Nutrient Reference Values (NRVs www.nrv.org.au), which are calculated based on age and sex.

STEP 6 Calculate claims and compare to nutrient criteria Schedule 4

Schedule 4 of the Australian Food Standards Code contains the nutrient criteria required to make claims specifically for the macronutrients (fats, protein, fibre, sugars). https://www.legislation.gov.au/Details/F2017C00711

Table 2 provides the calculations of the amount of these macronutrients in a 50gram serve of avocado and compares this to the nutrient criteria and determines what claims can be made.

Where no RDI exists for some nutrients/phytochemicals/bioactives Standard 1.2.7 Clause 13 states can make a claim that they are present in a food and the amount it contains plus, include that amount in a NIP https://www.legislation.gov.au/Details/F2017C01048
In this case other references have been used to substantiate claims footnoted below Table 2.

STEP 7 Appropriate language

Once the calculations have been completed and a list of nutrients that can be claimed are made, the next step is developing the language of the claim.

While FSANZ does not prescribe specific wording or language for nutrient content and general level health claims they do provide guidelines and conditions. High level health claims have more specific wording conditions.

The meaning and intent of pre-approved general level health claims must remain the same as found in Schedule 4.

General level health claims should refer to:

- a "requirement for" or
- "contributes to" or
- "supports" or

- “maintenance of”
- a “normal” function.

Verbs like "inhibit", "reduce", "boost", "increase" all imply either inhibition or acceleration of a normal physiological function and sound more like high level health claims.

Words like "treatment of", "relief from", "prevention of", "symptoms" suggest a therapeutic claim and should not be used at all.

The claims in Table 2 use language that provides the basic meaning and intent from Schedule 4. Table 2 also contains claims using more consumer-friendly language. Table 3 includes composite claims combining a number of nutrients and Table 4 outlines HLHCs avocados are permitted to use.

In general it is good practice when drafting claims to image what the everyday average Australian could infer from your claim to ensure claims are not vague, ambiguous and potentially misleading.

STEP 8 Percentage Daily Intake (%DI) Reference Values

Percentage Daily Intake (%DI) is a voluntary column that can appear in a NIP on pack for the mandatory nutrients (energy, protein, fats, carbohydrates, sugars, fibre and sodium). Reference values for Percent Daily Intakes for these nutrients are found in Standard 1.2.8 (clause 8) https://www.legislation.gov.au/Details/F2017C00311
For example, the reference value for energy is 8700kJ per day, and for fat is 70g per day. One serve (50gram) of avocado provides 5%DI for energy and 15%DI for fat.

One of the following statements must appear at the bottom of the NIP when %DI is used:

** Percentage daily intakes are based on the average adult diet of 8700kJ.*
** based on an average adult diet of 8700 kJ';*

STEP 9 Nutrition Information Panels (NIPs)

When making any claim on pack or in forms of advertising a nutrition information panel (NIP) must be easily accessed as the information in the panel substantiates the statements being made.

There are requirements for developing NIPs in Standard 1.2.8 of the food standards code and Schedule 12 provides information on the design formats for NIPs.
https://www.legislation.gov.au/Details/F2017C00311 (Standard 1.2.8)
https://www.legislation.gov.au/Details/F2017C00342 (Schedule 12)

Not only is the NIP mandatory but there are a set of nutrients that are also mandatory per 100gram and per serve: energy, protein, total fat, saturated fat, carbohydrates, sugars and sodium.

Dietary fibre is also mandatory if using the Health Star Rating on pack/website etc.

Any claim that mentions any one of the fat types requires that all fat types appear in the NIP: total fat, saturated fat, trans fat, monounsaturated fat, polyunsaturated fat (and omega 3 fats if claimed).

Note only those nutrients that meet food standard code criteria can be used to make claims or appear in a nutrition information panel. The presence of a nutrient in the NIP is itself a nutrient content claim and must comply with Standard 1.2.7 and Schedule 4.

When making claims about vitamins and minerals the percentage of the RDI must be included. The Percentage Daily Intake of the macronutrients can also be included as noted in Step 8 above.

Based on this and the data and claims made in Table 2 the NIP here can be used for raw avocado.

For small packages less 100cm^2 (a fruit sticker) that may also include a nutrient content claim the NIP is not required on a sticker but must appear on a website or point of sale material.

STEP 1 Nutrient composition of avocado
The table below provides the nutrient composition of raw avocado from two databases and other sources where noted.

Table 1: Nutrient composition of raw avocado per 100gram

Nutrients per 100gram	NUTTAB 2010 Online*	USDA^	Other sources
Macronutrients			
Water	71g	73g	
Energy	860kJ	670kJ	
Energy	205kcal	160kcal	
Protein	2.0g	2g	
Fat total	21.4g	14.7g	
Trans fat	*n/a*	*0g*	
Saturated fat	*4.8g*	*2.1g*	
Monounsaturated fat	*12.8g*	*9.8g*	
Polyunsaturated fat	*2.7g*	*1.8g*	
Omega 3 – Alpha Linoleic Acid (ALA)	*0g*	*111mg*	
Plant sterols	n/a	83mg	
Carbohydrate	0.5g	8.5g carb by difference	
Sugars	*0.5g*	*0.7g*	
Dietary fibre	2.8g	6.7g	5.1g+ 5.5g++
Soluble fibre	*n/a*	*n/a*	*2g***
Vitamins			
Thiamin (Vitamin B1)	0.08mg	0.07mg	
Riboflavin (Vitamin B2)	0.14mg	0.13mg	
Niacin (Vitamin B3)	2.4mg eq	1.7mg	
Vitamin B6	0.11mg	0.26mg	
Vitamin B12	n/a	0μg	
Biotin	4.9μg	n/a	
Pantothenic acid		1.39mg	
Folate	59μgDFE	81μg DFE	
Vitamin A	28μgRAE	7μg RAE	
Vitamin C (ascorbic acid)	11mg	10mg	
Vitamin D	n/a	0μg	
Vitamin E	2mg	2.0mg	
Vitamin K	n/a	21μg	
Choline	n/a	14.2mg	
Carotenoid pigments			
Beta carotene Beta carotene equivalents	27μg n/a	62μg 170μg	
Cryptoxanthin	117μg	28μg	
Lycopene	n/a	0μg	
Lutein/ Zeaxanthin	n/a	271μg	
Minerals			
Sodium	4mg	7mg	
Potassium	509mg	485mg	
Magnesium	27mg	29mg	
Calcium	14mg	12mg	
Phosphorus	48mg	52mg	
Iron	0.64mg	0.55mg	
Zinc	0.56mg	0.64mg	
Iodine	0μg	n/a	
Copper	0.271mg	0.190mg	
Manganese	0.232mg	0.142mg	
Selenium	0μg	0.4μg	
Chromium	0.3μg	n/a	
Molybdenum	0.5μg	n/a	
Boron	n/a	n/a	1.43mg+++
Other bioactives			

Nutrients per 100gram	NUTTAB 2010 Online*	USDA^	Other sources
Arginine	n/a	0.088mg	
Co-enzyme Q10	n/a	n/a	0.95mg^^
Total polyphenols	n/a	142 mg GAE#	
Flavonoids (Flavan-3-ols)	n/a	0.5mg^	

Table 1 References

*NUTTAB 2010 http://www.foodstandards.gov.au/science/monitoringnutrients/nutrientables/nuttab/Pages/default.aspx

^USDA National Nutrient Database for Standard Reference 1 Release April, 2018 https://ndb.nal.usda.gov/ndb/

+ The Concise New Zealand Food Composition Tables 12th Edition 2016 https://www.foodcomposition.co.nz/foodfiles/concise-tables/

++Li BW et al Individual Sugars, Soluble, and Insoluble Dietary Fiber Contents of 70 High Consumption Foods *J Food Comp Anal* 2002(15):715-723

** Brown L et al Cholesterol-lowering effects of dietary fiber: a meta-analysis. *Am J Clin Nutr*. 1999;69(1):30-42

+++Meacham S et al. Boron in Human Health: Evidence for Dietary Recommendations and Public Policies. *The Open Mineral Processing Journal,* 2010;3;36-53.

^^ Pravst I, Zmitek K, Zmitek J. Coenzyme Q10 contents in foods and fortification strategies. *Crit Rev Food Sci Nutr.* 2010 Apr;50(4):269-80.

USDA Database for the Oxygen Radical Absorbance Capacity (ORAC) of Selected Foods, Release 2 2010

STEPS 4-8 as noted above have been undertaken in Table 2 below. Nutrient content is based on NUTTAB 2010 database unless otherwise indicated by footnotes.

Table 2: Nutrient composition of raw avocado per 50gram serve and all permitted Nutrient Content and General Level Health Claims

Nutrient	Nutrient content	FSANZ RDI/%DI¤	% of FSANZ RDI/ %DI	Nutrient Content Claim and General Level Health claim where permitted	FSANZ Substantiation
Macronutrients					
Water	36g				
Energy	103kcal			100kcal a serve	
Energy	430kJ	8700kJ	5%	No claim	%DI Std 1.2.8 reference value for energy 8700kJ NB an additional statement must be included underneath the NIP when using %DI *"based on an average adult diet of 8700 kJ"* Note energy can only be expressed to three significant figures (Std 1.2.8) GLHC Schedule 4 needs a minimum 420kJ per serve
Protein	1.0g	50g	2%	No claim not enough present	%DI Std 1.2.8 reference value for protein 50g Sch 4 states minimum 5g protein per serve to make a source of protein claim
Fat total	10.7g	70g	15%	Avocado contains healthy/good fats. Avocados like olives are the only fruits to contain healthy fats. Avocado contains mostly unsaturated fats.	%DI Std 1.2.8 reference value for fat 70g When making claims about any type of fats needs to include all types of fats (total. saturated, trans, monounsaturated, polyunsaturated fats) in the NIP
Trans fat	0g^			Avocado is free of trans fat. (<28% of total fat as saturated fat)	Free of claim requires no detectable trans fat AND less than 1.5g saturated fat per 100g for solid food or less than 28% of total fat as saturated fat. When making claims about any type of fats needs to include all types of fats (total. saturated, trans, monounsaturated, polyunsaturated fats) in the NIP
Saturated fat	2.4g	*24g*	*10%*	Could make: "Avocado has a low proportion of total fat as saturated fat" claim but it is unappealing. "Avocado contains mostly healthy unsaturated fats" Note 22% of total fat is saturated fat	%DI Std 1.2.8 reference value for saturated fat 24g Sch 4 states "low in saturated fat" needs to be less than 1.5g saturated fat per 100g food however for low proportion of saturated fats needs less than 28% of total fat as saturated fat and trans fat When making claims about any type of fats needs to include all types of fats (total. saturated, trans, monounsaturated, polyunsaturated fats) in the NIP

Nutrient	Nutrient content	FSANZ RDI/%DI¤	% of FSANZ RDI/ %DI	Nutrient Content Claim and General Level Health claim where permitted	FSANZ Substantiation
Monounsaturated fat	6.4g			Avocado contains healthy/good monounsaturated fats. Avocados like olives are the only fruits to contain healthy monounsaturated fats. Note 59% of total fat is monounsaturated fat	Sch 4 states need less than 28% of total fat as saturated fat and greater than 40% of total fat a monounsaturated fat to make a mono fat claim When making claims about any type of fats needs to include all types of fats (total. saturated, trans, monounsaturated, polyunsaturated fats) in the NIP
Polyunsaturated fat	1.4g			No claim only 13% of total fat as polyunsaturated fat need 40% or more	Schedule 4 states need less than 28% of total fat as saturated fat and greater than 40% of total fat as polyunsaturated fat
Omega 3 - Alpha Linoleic Acid (ALA)	56mg^	1300mg men 800mg women (NRV)		No claim not enough present	Schedule 4 states minimum 200mg ALA per serve but can only say a source of ALA not good source however not enough in avocado to make claim Also note 1% of ALA is converted into long chain EPA like those in fish so plant omega 3s works differently to marine sources RDI www.nrv.org.au
Plant sterols	42mg^			No claim not enough present	Schedule 4 states needs minimum 0.8g or 800mg plant sterols per serving of food
Carbohydrates	0.25g	310g	<1%	No claim	%DI Std 1.2.8 reference value for carbohydrate 310g, Std 1.2.7 Clause 13 can state presence or absence in a food
Sugars	0.25g	90g	<1%	Avocados are naturally low in sugars with less than 1g per serve.	%DI Std 1.2.8 reference value for sugars 90g Schedule 4 states low in sugar less than 5g sugars per 100g of food Std 1.2.8 states in the NIP anything less than 1g can be expressed as LESS THAN 1g
Dietary fibre	2.5g+	30g	8%	Avocado is a source of/ contains fibre. Fibre contributes to regular laxation. **Consumer friendly language versions:** Avocado contains fibre. Fibre helps keep you regular/ good for bowel function/ bowel health/ gut health/ a healthy functioning gut *as part of a healthy varied diet	%DI Std 1.2.8 reference value for fibre 30g Schedule 4 need minimum 2g fibre per serve of food to be a source of fibre GLHC from Std 1.2.7 Schedule 4
Soluble fibre	*1g++*	*2-10g***	*10-50%*	Avocado contains soluble fibre	Std 1.2.7 Clause 13 can only state its presence in a food. Note given so small a level of total fibre, it could be misleading to suggest that ~50% of the total fibre is soluble fibre when Li et all suggests it more like 35%

Nutrient	Nutrient content	FSANZ RDI/%DI✖	% of FSANZ RDI/ %DI	Nutrient Content Claim and General Level Health claim where permitted	FSANZ Substantiation
Vitamins					
Thiamin (Vitamin B1)	0.04mg	1.1mg	4%	No claim not enough present	RDI Sch 1, Schedule 4 states need minimum 10% of RDI for nutrient per serving of food to make a vit/min claim
Riboflavin (Vitamin B2)	0.07mg	1.7mg	4%	No claim not enough present	RDI Sch 1, Schedule 4 states need minimum 10% of RDI for nutrient per serving of food to make a vit/min claim
Niacin (Vitamin B3)	1.2mgeq	10mgeq	12%	Avocado is a source of/ contains niacin Niacin: -is necessary for normal energy release from food or -contributes to normal psychological function or -is necessary for normal neurological function or -contributes to the reduction of tiredness and fatigue or -is necessary for normal structure and function of skin and mucous membranes **Consumer-friendly language versions:** Avocado contains niacin. Niacin is important for: ✓ obtaining energy from food ✓ a healthy nervous system ✓ brain function ✓ fighting fatigue ✓ healthy skin *as part of a healthy varied diet	RDI Sch 1, Schedule 4 states need minimum 10% of RDI for nutrient per serving of food to make a “source of” vit/min claim GLHCs Schedule 4
Vitamin B6	0.06mg	1.6mg	3%	No claim not enough present	RDI Sch 1, Schedule 4 states need minimum 10% of RDI for nutrient per serving of food to make a vit/min claim
Vitamin B12	0μg^	2.0μg	0%	No claim not present	RDI Sch 1, Schedule 4 states need minimum 10% of RDI for nutrient per serving of food to make a vit/min claim
Biotin	2.5μg	30μg	8%	No claim not enough present	RDI Sch1, Schedule 4 states need minimum 10% of RDI for nutrient per serving of food to make a vit/min claim

Nutrient	Nutrient content	FSANZ RDI/%DI¤	% of FSANZ RDI/ %DI	Nutrient Content Claim and General Level Health claim where permitted	FSANZ Substantiation
Pantothenic acid	0.7mg^	5.0mg	14%	Avocado is a source of / contains pantothenic acid. Pantothenic acid is Necessary for normal fat metabolism/ Contributes to normal energy production/ Contributes to normal mental performance/ Contributes to the reduction of tiredness and fatigue/ Contributes to normal synthesis and metabolism of steroid hormones, vitamin D and some neurotransmitters *as part of a healthy varied diet **Consumer friendly language versions:** Avocados contain pantothenic acid - a B group vitamin which helps the body produce energy from foods containing fats. No wonder it's in a healthy fat-containing food such as avocado. Pantothenic acid in avocados is needed for keeping the brain sharp and focused. Avocado contains pantothenic acid which help the body produce vitamin D. *as part of a healthy varied diet	RDI Sch 1,Schedule 4 states need minimum 10% of RDI for nutrient per serving of food to make a vit/min claim
Folate	30µg DFE	200µg FSANZ	15%	Avocado is a source of/ contains folate. Folate: -helps cells divide or -contributes to normal blood formation or -is needed during pregnancy for tissue development or - Contributes to normal psychological function or - Contributes to the reduction of tiredness and fatigue or - Contributes to normal immune system function. **Consumer-friendly language versions:** Avocado contains folate - essential during pregnancy. Avocado is great when you have a baby on board as it contains folate that helps support a healthy pregnancy. Avocado contains folate. Folate is needed for:	RDI 200ug Sch 1, Schedule 4 states need minimum 10% of RDI for nutrient per serving of food to make a "source of" vit/min claim Note pregnant/lactating women need 400-600ug folate a day – 2-3 times the regulatory RDI of 200ug. Should explain this for any claims aimed at pregnant women or women wanting to conceive to avoid being misleading GLHC from Std 1.2.7 Schedule 4

				✓ brain function ✓ a healthy immune system ✓ pregnancy ✓ healthy blood *as part of a healthy varied diet	
Nutrient	**Nutrient content**	**FSANZ RDI/%DI✖**	**% of FSANZ RDI/ %DI**	**Nutrient Content Claim and General Level Health claim where permitted**	**FSANZ Substantiation**
Vitamin A	14μg RAE	750μg RAE	2%	No claim not enough present	RDI Sch 1, Schedule 4 states need minimum 10% of RDI for nutrient per serving of food to make a vit/min claim
Vitamin C (ascorbic acid)	5.5mg	40mg	14%	Avocado is a source of/ contains vitamin C. Vitamin C -helps absorb iron from plant foods or - Antioxidant vitamin C contributes to cell protection from free radical damage or - Necessary for normal connective tissue structure and function or - Necessary for normal blood vessel structure and function or - Necessary for normal neurological function or - Contributes to normal collagen formation for the normal structure of cartilage and bones or - Contributes to normal collagen formation for the normal function of teeth and gums or - Contributes to normal collagen formation for the normal function of skin or - Contributes to normal energy metabolism or - Contributes to normal psychological function or - Contributes to the reduction of tiredness and fatigue or - Contributes to the normal immune system function. **Consumer-friendly language versions:** Enjoying more plant foods these days? Add avocado to your meals for vitamin C - it enhances iron absorption. Decided to go vego? Add avocado to your meals as it contains vitamin C for enhanced iron absorption. Vitamin C in avocado helps absorb iron from	RDI Sch 1, Schedule 4 states need minimum 10% of RDI for nutrient per serving of food to make a “source of” vit/min claim GHLC from Std 1.2.7 schedule 4

				plant foods Antioxidant vitamin C protects body cells from free radical damage Avocado contains vitamin C that helps build strong bones and teeth/ healthy teeth and gums Vitamin C in avocado keeps skin looking good Avocado contains vitamin C which keeps the brain performing at its best Vitamin C-containing avocados maintains a healthy immune system *As part of a healthy varied diet. Avocado contains vitamin C. Vitamin C is essential for: ✓ iron absorption ✓ Antioxidant effects ✓ Building strong bones and teeth ✓ Healthy teeth and gums ✓ Healthy skin ✓ Brain function ✓ Healthy immune system *As part of a healthy varied diet.	
Nutrient	**Nutrient content**	**FSANZ RDI/%DI✖**	**% of FSANZ RDI/ %DI**	**Nutrient Content Claim and General Level Health claim where permitted**	**FSANZ Substantiation**
Vitamin D	0µg^	10µg	0%	No claim not present	RDI Sch 1, Schedule 4 states need minimum 10% of RDI for nutrient per serving of food to make a vit/min claim
Vitamin E	1mg	10mg	10%	Avocado is a source of/ contains vitamin E. Vitamin E is a natural antioxidant vitamin. Vitamin E contributes to cell protection from free radical damage. **Consumer-friendly language version:** Avocado contains vitamin E, a protective antioxidant *As part of a healthy varied diet.	RDI Sch 1, Schedule 4 states need minimum 10% of RDI for nutrient per serving of food to make a “source of” vit/min claim GLHC from Std 1.2.7 Schedule 4
Vitamin K	11µg^	80µg	14%	Avocado is a source of /contains vitamin K. Vitamin K is necessary for normal blood coagulation/ contributes to normal bone structure. *As part of a healthy varied diet.	RDI Sch 1, Schedule 4 states need minimum 10% of RDI for nutrient per serving of food to make a vit/min claim GLHC from Std 1.2.7 Schedule4

				Consumer-friendly language versions: Avocado contains vitamin K that helps build strong bones Avocado contains bone-building vitamin K Avocado contains vitamin K that helps blood to clot *As part of a healthy varied diet.	
Nutrient	**Nutrient content**	**FSANZ RDI/%DI✖**	**% of FSANZ RDI/ %DI**	**Nutrient Content Claim and General Level Health claim where permitted**	**FSANZ Substantiation**
Choline	7.1mg^	550mg NRV No RDI	1%	No claim not enough present	Std 1.2.7 Clause 13 can only state its presence in a food however so little here misleading RDI nrv.org.au
Carotenoid pigments					
Beta carotene	*14µg*			Avocado contain colourful carotenoid - beta carotene	Std 1.2.7 Clause 13 can only state its presence in a food
Cryptoxanthin	*59µg*			Avocado contain colourful carotenoid - cryptoxanthin	Std 1.2.7 Clause 13 can only state its presence in a food
Lycopene	*0µg^*			No claim not present	Std 1.2.7 Clause 13 can only state its presence in a food
Lutein/ Zeaxanthin	*136µg^*			Avocado contain colourful carotenoid - lutein and zeaxanthin	Std 1.2.7 Clause 13 can only state its presence in a food
Minerals					
Sodium	2.0mg	2300mg	<1%	Avocado is naturally low in sodium with just 2mg per serve.	%DI Std 1.2.8 reference value for sodium 2300mg Schedule 4 states for “low in sodium” need less than 120mg sodium per 100g of food Must also include the potassium and sodium content in the NIP (Std 1.2.8 Clause 12) Can also express sodium as LESS THAN 5mg in NIP (Std 1.2.8)
Potassium	255mg			Avocado contain potassium. Potassium is necessary for -normal water and electrolyte balance -normal functioning of the nervous system -normal muscle function *as part of a healthy varied diet **Consumer-friendly language versions:** Avocado contains potassium, an important mineral for: ✓ fluid balance ✓ a healthy nervous system ✓ healthy muscle function *As part of a healthy varied diet.	RDI nrv.org.au no regulatory RDI set by FSANZ Schedule 4 states can include in NIP with sodium GLHC Schedule 4 requires minimum 200mg potassium per serve Include potassium and sodium content in NIP

Nutrient	Nutrient content	FSANZ RDI/%DI¤	% of FSANZ RDI/ %DI	Nutrient Content Claim and General Level Health claim where permitted	FSANZ Substantiation
Calcium	7mg	800mg	<1%	Not claim not enough present	RDI Sch 1, Schedule 4 states need minimum 10% of RDI for nutrient per serving of food to make a vit/min claim
Chromium	0.15μg	200μg	<1%	No claim not enough present	RDI Sch1, Schedule 4 states need minimum 10% of RDI for nutrient per serving of food to make a vit/min claim
Copper	0.14mg	3.0mg	5%	No claim not enough present	RDI Sch 1, Schedule 4 states need minimum 10% of RDI for nutrient per serving of food to make a vit/min claim
Iodine	0μg	150μg	0%	No claim not present	RDI Sch 1, Schedule 4 states need minimum 10% of RDI for nutrient per serving of food to make a vit/min claim
Iron	0.32mg	12mg	3%	Not claim not enough present	RDI Sch 1, Schedule 4 states need minimum 10% of RDI for nutrient per serving of food to make a vit/min claim
Magnesium	14mg	320mg	4%	Not claim not enough present	RDI Sch1, Schedule 4 states need minimum 10% of RDI for nutrient per serving of food to make a vit/min claim
Manganese	0.12mg	5.0mg	2%	Not claim not enough present	RDI Sch 1, Schedule 4 states need minimum 10% of RDI for nutrient per serving of food to make a vit/min claim
Molybdenum	0.25μg	250μg	<1%	No claim not enough present	RDI Sch 1, Schedule 4 states need minimum 10% of RDI for nutrient per serving of food to make a vit/min claim
Phosphorus	24mg	1000mg	2%	Not claim not enough present	RDI Sch 1, Schedule 4 states need minimum 10% of RDI for nutrient per serving of food to make a vit/min claim
Selenium	0.2μg^	70μg	<1%	No claim not enough present	RDI Sch 1, Schedule 4 states need minimum 10% of RDI for nutrient per serving of food to make a vit/min claim
Zinc	0.28mg	12mg	2%	Not claim not enough present	RDI Sch 1, Schedule 4 states need minimum 10% of RDI for nutrient per serving of food to make a vit/min claim
Boron	0.72mg++			Avocado contains boron. Avocado contains 0.7mg boron per 50gram serve.	Std 1.2.7 Clause 13 can only state its presence in a food. +Reference shows boron content of avocado higher than other foods tested. No GLHC for boron in Schedule 4
Other bioactives					
Arginine	0.044mg^			Avocado contains the amino acid arginine.	Std 1.2.7 Clause 13 can only state its presence in a food
Coenzyme Q10	0.48mg^^			No claim not enough present	Std 1.2.7 Clause 13 can only state its presence in a food – but given such a small amount compared to other higher fat foods^^ it would be

					misleading to claim it
Nutrient	**Nutrient content**	**FSANZ RDI/%DI✖**	**% of FSANZ RDI/ %DI**	**Nutrient Content Claim and General Level Health claim where permitted**	**FSANZ Substantiation**
Total polyphenols	71mg GAE#			Avocado contains polyphenol antioxidants. Antioxidants contribute to cell protection from free radical damage. Avocado contains 70mgGAE polyphenol antioxidants per 50gram serve.	Std 1.2.7 Clause 13 can only state its presence in a food GLHC similar to other antioxidant vitamins and minerals in Sch 4 Similar amounts to other fruits and vegetables#
Flavonoids (Flavan-3-ols)	0.25mg^			No claim not enough present	Std 1.2.7 Clause 13 can only state its presence in a food – very small amount could be misleading to claim it
Gluten				Avocados are naturally gluten free	Std 1.2.7 Clause 13 can only state its presence or absence in a food

Table 2 References

*NUTTAB 2010 http://www.foodstandards.gov.au/science/monitoringnutrients/nutrientables/nuttab/Pages/default.aspx

^USDA National Nutrient Database for Standard Reference 1 Release April, 2018 https://ndb.nal.usda.gov/ndb/

+ An average of NUTTAB, USDA and New Zealand data The Concise New Zealand Food Composition Tables 12th Edition 2016 https://www.foodcomposition.co.nz/foodfiles/concise-tables/

✖FSANZ Schedule 1 Regulatory Recommended Daily Intakes or Standard 1.2.8 for %Daily Intake reference values.

++Li BW et al Individual Sugars, Soluble, and Insoluble Dietary Fiber Contents of 70 High Consumption Foods *J Food Comp Anal* 2002(15):715-723

** Brown L et al Cholesterol-lowering effects of dietary fiber: a meta-analysis. *Am J Clin Nutr*. 1999;69(1):30-42

+++Meacham S et al. Boron in Human Health: Evidence for Dietary Recommendations and Public Policies. *The Open Mineral Processing Journal,* 2010;3;36-53.

^^ Pravst I, Zmitek K, Zmitek J. Coenzyme Q10 contents in foods and fortification strategies. *Crit Rev Food Sci Nutr.* 2010 Apr;50(4):269-80.

USDA Database for the Oxygen Radical Absorbance Capacity (ORAC) of Selected Foods, Release 2 2010 (Note only total polyphenol content is used)

STEP 7 required the use of appropriate language to develop claims. Table 3 below provides alternative claims using consumer friendly language for health conditions which can be substantiated using a number of nutrients.

Table 3 Composite nutrient and health claims

Health function	Wording of claim (consumer friendly)	Substantiation See Table 2 for specific nutrients
Energy/ vitality	• Avocado is an energy booster /fatigue fighter. It contains energy boosting nutrients niacin, pantothenic acid, folate & Vitamin C • Boost your vitality with avocado - it's a source of energy boosting /fatigue-fighting niacin, pantothenic acid, folate & Vitamin C • Smashed avo on toast for breakfast boosts energy levels and makes a great start to the day • Get energised with avos – a source of energy, niacin, pantothenic acid, folate & vitamin C *as part of a healthy varied diet	Niacin, pantothenic acid, folate and vitamin C levels all more than 10% of regulatory RDI in a 50g serve GLHCs Schedule 4
Brain function	• Keep your brain sharp with avocado. It contains niacin, pantothenic acid, folate & vitamin C for a healthy brain and nervous system. • Avocado is good mood food – it contains niacin, pantothenic acid, folate & vitamin C for brain and nervous system function *as part of a healthy varied diet	Niacin, pantothenic acid, folate and vitamin C levels all more than 10% of regulatory RDI in a 50g serve GLHCs Schedule 4
Skin health	• Avocado looks after your skin from within thanks to its healthy fats, niacin & vitamins C&E. *as part of a healthy varied diet	Niacin, vitamins C and E levels all more than 10% of regulatory RDI in a 50g serve Healthy fats (less than 28% total fat as saturated fat and more than 40% total fat as monounsaturated fat) GLHCs Schedule 4
Strength	• Stay strong with avocados. Avocado contains potassium, vitamin C and vitamin K important for muscles, ligaments, tendons, cartilage and bones. *as part of a healthy varied diet	Vitamins C and K levels more than 10% of regulatory RDI in a 50g serve Potassium more than 200mg per serve GLHCs Schedule 4
Bone health	• Avocado contains bone-building nutrients vitamins C and K *as part of a healthy varied diet	Vitamins C and K levels more than 10% of regulatory RDI in a 50g serve GLHCs Schedule 4
Pregnancy	• Pregnant women have increased nutrient needs and avocado is a nutrient-rich plant food with a range of vitamins, minerals, healthy fats and fibre. *as part of a healthy varied diet	See table 2 for vitamins and minerals more than 10% of regulatory RDI in a 50g serve More than 2g fibre per serve Healthy fats (less than 28% total fat as saturated fat and more than 40% total fat as monounsaturated fat)
Nutrient absorption	Avocado is a nutrient booster - the vitamin C in avocados will help absorb iron from plant foods. Avocado is a nutrient booster - the healthy fats in avocado help absorb essential nutrients such as fat-soluble nutrients such as vitamin E and antioxidants. *as part of a healthy varied diet	

Health function	Wording of claim (consumer friendly)	Substantiation See Table 2 for specific nutrients
Bowel/gut health	• Avocado contains fibre. Fibre helps keep you regular/ good for bowel function/ bowel health/ gut health/ a healthy functioning gut *as part of a healthy varied diet	More than 2g fibre per serve GLHCs Schedule 4
Immune system function	• Avocado contains folate and vitamin C that help keep your immune system healthy *as part of a healthy varied diet	Folate and vitamin C levels more than 10% of regulatory RDI in a 50g serve GLHCs Schedule 4
Healthy blood	• Avocados contain folate and vitamin K important for healthy blood. *as part of a healthy varied diet	Folate and vitamin K levels more than 10% of regulatory RDI in a 50g serve GLHCs Schedule 4
Antioxidant function	• Avocado contains protective antioxidants • Avocado contains antioxidants: vitamin C, vitamin E and polyphenols. *as part of a healthy varied diet	Vitamins C and E levels more than 10% of regulatory RDI in a 50g serve, polyphenols present GLHCs Schedule 4

Table 4: High Level Health Claims for raw avocado

There are several FSANZ pre-approved high level health claims in the Australian Food Standards Code Schedule 4. Avocado growers are able to use two of these: linking avocado to reductions in blood pressure and contributing to heart health/ reducing heart disease risk. Note there is specific criteria and wording conditions required.

	Sodium and Blood Pressure	**Fruits and vegetables contributing to heart health/ reducing heart disease risk**
Criteria	The food must meet the conditions for making a nutrition content claim about low sodium or salt i.e. The food contains no more sodium than: (a) 120 mg/100 mL for liquid food; or (b) 120 mg/100 g for solid food. (Schedule 4) Include potassium and sodium content in NIP	The food must contain no less than 90% fruit or vegetable by weight. (Schedule 4)
Wording conditions	Sodium [or salt] Reduces blood pressure (Schedule 4)	"A high intake of fruit and vegetables" or "Increased intake of fruit and vegetables" "Reduces risk of coronary heart disease" Or "Contributes to heart health" (Schedule 4)
Dietary context statement	"Diet low in salt or sodium" (Schedule 4) "A healthy diet involving the consumption of a variety of foods" (Std 1.2.7 Clause 6(a))	"Diet containing a high amount of both fruit and vegetables" or "Diet containing an increased amount of both fruit and vegetables" (Schedule 4) A healthy diet involving the consumption of a variety of foods (Std 1.2.7 Clause 6(a))
Final wording	A healthy diet low in sodium [or salt] containing a variety of foods such as avocado reduces blood pressure. A quarter of a large avocado (50gram) is naturally low in sodium with just 2mg of sodium and contains 255mg potassium.	A healthy diet containing a high intake of both fruits and vegetables, such as avocado, and a variety of other foods *reduces the risk of heart disease* (or can say - *contributes to heart health as a GLHC)*

STEP 9 Nutrition Information Panels

Step 9 involved developing nutrition information panels for packaging, website or other promotional materials. The following two designs can be used

Approved Nutrition Information Panel (NIP) for Avocado

Includes the voluntary %DI column for macronutrients and the mandatory %RDI to substantiate vitamin and mineral claims.

NUTRITION INFORMATION
Servings per package: 4 serves per avocado
Serving size: ~50g or ¼ avocado

	Average Quantity per Serving	Percentage Daily Intake*	Average Quantity per 100g
Energy	430kJ (102Cal)	5%	860kJ (205Cal)
Protein, total	1.0g	2%	2.0g
Fat, total	10.7g	15%	21.4g
– saturated	2.4g	10%	4.8g
– trans	0g		0g
– polyunsaturated	1.4g		2.7g
– monounsaturated	7.4g		12.8g
Carbohydrate	<1g	<1%	<1g
– sugars	<1g	<1%	<1g
Dietary fibre, total	2.5g	8%	5.0g
-*Soluble fibre*	1.0g		2.0g
Sodium	2.0mg	<1%	4.0mg
Potassium	255mg		509mg
Niacin	1.2mg eq	12%	2.4mg eq
Pantothenic acid	0.7mg	14%	1.4mg
Folate	30ug DFE	15%	59ug DFE
Vitamin C	11mg	14%	11mg
Vitamin E	1mg	10%	2mg
Vitamin K	11ug	14%	21ug
Boron	0.72mg		1.43mg
Polyphenols	71mg GAE		142mg GAE
Beta carotene	14ug		27ug
Cryptoxanthin	59ug		117ug
Lutein & zeaxanthin	136ug		271ug
Gluten	0mg		0mg

*based on the average adult diet of 8700kJ “<” means less than

Alternative approved Nutrition Information Panel (NIP) for Avocado

This format saves space since the %DI column for macronutrients is voluntary but the %RDI is required for vitamins and minerals that are the subject of claims (Standard 1.2.8 -9). To save space the %RDI could follow the amount of the nutrient in the serving column as designed below.

NUTRITION INFORMATION Servings per package: 4 serves per avocado Serving size: ~50g or ¼ avocado		
	Average Quantity per Serving	Average Quantity per 100g
Energy	430kJ (102Cal)	860kJ (205Cal)
Protein, total	1.0g	2.0g
Fat, total	10.7g	21.4g
– saturated	2.4g	4.8g
– trans	0g	0g
– polyunsaturated	1.4g	2.7g
– monounsaturated	7.4g	12.8g
Carbohydrate	<1g	<1g
– sugars	<1g	<1g
Dietary fibre, total	2.5g	5.0g
Soluble fibre	1.0g	2.0g
Sodium	2mg	4mg
Potassium	255mg	509mg
Niacin	1.2mg eq (12% RDI)	2.4mg eq
Pantothenic acid	0.7mg (14%RDI)	1.4mg
Folate	30ug DFE (15% RDI)	59ug DFE
Vitamin C	5.5mg (14% RDI)	11mg
Vitamin E	1mg (10% RDI)	2mg
Vitamin K	11ug (14% RDI)	21ug
Boron	0.72mg	1.43mg
Polyphenols	71mg GAE	142mg GAE
Beta carotene	14ug	27ug
Cryptoxanthin	59ug	117ug
Lutein & zeaxanthin	136ug	271ug
Gluten	0mg	0mg
"<" means less than		

Health Star Rating

Another tool that can be used to indicate the healthiness of avocado is Health Stars.

While the Health Star ratings were not designed for horticultural produce many supermarkets are adding Stars to all food products.

To determine the health stars of avocado the nutrient composition must be entered into the Health Star Rating calculator as indicated by the image below http://healthstarrating.gov.au/internet/healthstarrating/publishing.nsf/Content/calculator

Avocado scores 4.5 health stars out of a total of 5 stars

Avocado loses 0.5 star due to its higher saturated fat and energy content compared to other fruits/ vegetables.

The Health Star Rating for your product Avocado, raw is : **4.5**

Food Name : Avocado, raw

Company Name :

Date of Calculation : 4/11/2018 09:08:37

Email :

FoPL Category : 2

Baseline Nutrient Results		
Nutrient	Amount Entered	Points Earned
Energy (KJ)	860	2
Saturated Fat (g)	4.8	4
Total Sugars (g)	1	0
Sodium (mg)	4.0	0
Calcium (mg)		0
Total Baseline Points		6

Modifying Points Results		
Nutrient	Amount Entered	Points Earned
FVNL content (%)	100	8
Concentrated Fruit and Vegetable content (%)	0	
Protein (g)	2.0	1
Fibre (g)	5.0	5
Total Modifying Points		14
FINAL HSR Score		-8

Use of the health star icons (sample artwork below) is flexible and can include

- Using the star circle only
- Using the star circle and energy thumbnail
- Using the full icon – star circle and all four “negative” nutrient thumbnails
- Using the full icon – star circle, all four “negative” nutrient thumbnails, plus a positive nutrient

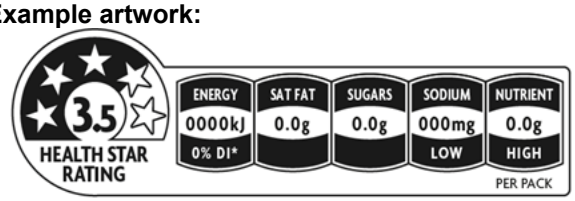
The full icon can also be used horizontally and vertically and while there is little prescription around colours they do request the colour scheme is contrasting to be easily legible for those with poor vision.

The Health Star Rating artwork can be downloaded from:
http://healthstarrating.gov.au/internet/healthstarrating/publishing.nsf/Content/calculator

The style guide can be found here
http://healthstarrating.gov.au/internet/healthstarrating/publishing.nsf/Content/style-guide

Values to be entered into the full health star rating icon below:

Example artwork:



Change PER PACK to PER 100g

Stars – 4.5 stars

Energy – 860kJ (Note: %DI in the icon example above not required on per 100gram)

Sat Fat – 4.8g

Sugars – <1g LOW

Sodium – 4mg LOW

Folate – 30ug (Note: only one positive nutrient can be included, any nutrient included here is a nutrient content claim and needs to appear in the NIP)

PART 2. Nutrient and health claims for infants and toddlers

Avocado for infants and toddlers

The creamy consistency and mild flavour of avocado makes it a perfect first food for infants when introducing solids, and an easy food for toddlers to eat. The nutrition and health benefits of avocado for infants and toddlers will be of interest to parents and carers.
To make nutrient and health claims aimed at infants and toddlers FSANZ has a separate regulatory RDIs for each age groups in Schedule 1. Below is a summary of permitted claims, followed by the substantiation information in Table 5 and Table 6. Note claims for infants assumes older than 6months of age for introducing solids and the serving size remains 50gram or about 2 heaped tablespoons or ¼ cup.

Some claims can be made for both infants and toddlers while others can only be claimed for infants.

Consumer friendly claims for infants and toddlers

These claims include nutrient content claims, general level health claims (GLHC) and composite claims that combine several together. More can be found in Table 5. As per adult claims, a dietary context statement is required, “as part of a healthy varied diet”. This can be done as a split claim, whereby an asterisk is used to denote the dietary context statement that can be written separately but close by.

Energy, growth and development

Avocado helps little ones to grow. It contains energy which fuels **babies’ and toddlers’** growth and development.*

Avocado helps **babies** on the move. It contains nutrients that help release energy from food such as B group vitamins B1,B2, B3 and B6, pantothenic acid, vitamin C, magnesium, manganese and biotin.*

Avocado helps **toddlers** on the move. It contains nutrients that help release energy from food such niacin, pantothenic acid, vitamin C, magnesium and biotin.*

Babies and toddlers are good to go with avos. They contain energy, healthy fats, vitamins and minerals they need for growth and development.*

**as part of a healthy varied diet*

Brain function

Avocado is **baby and toddler** brain food. It is rich in biotin and folate needed for their brain development.*

Avocado is **baby and toddler** brain food. It contains nutrients needed for brain development such as biotin, pantothenic acid, folate, vitamin C, magnesium and copper.*

Avocado is **baby** brain food. It contains nutrients needed for brain development such as niacin, Vitamin B6, biotin, pantothenic acid, folate, vitamin C, magnesium and copper.*

Avocado is a perfect first food for **babies** because it contains iron. Avocado also contains Vitamin B2, B6 and C plus copper which help absorb and transport iron, At around 6 months of age they need more iron for brain development.*

**as part of a healthy varied diet*

Muscle and nerve function
Avocado helps your **baby/ toddler** grow strong. It contains potassium and magnesium needed for muscle development and movement.*

**as part of a healthy varied diet*

Bones and teeth
Build your **baby's** bones with avocado. Each 50gram serve or 2 heaped tablespoons contains 100% of the RDI for bone-building vitamin K.*

Build **baby's/ toddler's** bone with avocado. It's a source of bone-building nutrients Vitamins C& K, magnesium and manganese.*

Build **toddler's** bone with avocado. It's a source of bone-building nutrients Vitamins C& K and magnesium.*

Support **baby's/ toddler's** teeth and gums with vitamin C and magnesium in avocado.*

**as part of a healthy varied diet*

Vision
Help your **baby** see clearly with avocado. The riboflavin in avocado helps to develop normal vision.

**as part of a healthy varied diet*

Skin and hair health
Keep your **baby's** skin healthy with avocado. It contains riboflavin, niacin, Vitamin C and biotin important for healthy skin.*

Feed **baby's** skin from within with avocado. It contains important nutrients for healthy skin including healthy fats, B-group vitamins, vitamin C and copper.

Feed **toddler's** skin from within with avocado. It contains important nutrients for healthy skin including healthy fats, niacin, biotin and vitamin C*.

Help **baby's / toddler's** hair grow with avocado. It contains biotin and copper important for heathy hair.*

**as part of a healthy varied diet*

Bowel/ Gut function
Keep your **baby/toddler** regular with avocado. It's a source of fibre

Avocado keeps little tummies happy. It provides fibre **babies and toddlers** need for a healthy gut.

**as part of a healthy varied diet*

Immune system function
Avocado contains a range of immune-supportive nutrients for **baby** such as Vitamins B6 & C, folate and copper.*

Build **baby's** immunity with avocado. It contains Vitamins B6 & C, folate and copper important for a healthy immune system.*

Support **young infant's** immune system with vitamin C, folate, iron and copper found in avocados.*

Build **toddler's** immunity with avocado. It contains folate, vitamin C and copper for a healthy immune system.*

**as part of a healthy varied diet*

Nutrient absorption (iron and healthy fats)
Avocado is a nutrient booster for **babies**. Iron is needed for growth and development and Vitamins B2, B6 and C plus copper found in avocado helps absorb and transport iron around the body.*

Avocado is a nutrient booster for **toddlers**. Iron is needed for growth and development and Vitamin C and copper found in avocado helps absorb and transport iron around the body.*

Avocado is a nutrient booster for **babies and toddlers**. They need iron and several nutrients in avocado help iron absorption and transport such as vitamin C, and copper.*

Avocado is a nutrient booster for **babies and toddlers**. They need iron for growth and development and the vitamin C in avocados will help them absorb iron from plant foods.*

Avocado is a nutrient booster for **babies and toddlers**. The healthy fats in avocado help them absorb essential nutrients such as fat-soluble vitamin E and carotenoid antioxidants.*

**as part of a healthy varied diet*

Low salt, low sugar
Avocado is an ideal food for **babies and toddlers** because are naturally low in sugar and salt.

Avocado is naturally low in sodium. **Babies and toddlers** have more sensitive taste buds and don't need any added salt to flavour their foods.

Approved Nutrition Information Panel (NIP) for Avocado for infants

NUTRITION INFORMATION Servings per package: 4 serves per avocado Serving size: ~50g or ¼ avocado		
	Average Quantity per Serving	Average Quantity per 100g
Energy	430kJ (102Cal)	860kJ (205Cal)
Protein, total	1.0g	2.0g
Fat, total	10.7g	21.4g
– saturated	2.4g	4.8g
– trans	0g	0g
– polyunsaturated	1.4g	2.7g
– monounsaturated	7.4g	12.8g
Carbohydrate	<1g	<1g
– sugars	<1g	<1g
Dietary fibre, total	2.5g	5.0g
Sodium	2mg	4mg
Potassium	255mg	509mg
Thiamin	0.04mg (11% RDI)	0.08mg
Riboflavin	0.07mg (12% RDI)	0.14mg
Niacin	1.2mg eq (40% RDI)	2.4mg eq
Vitamin B6	0.06mg (13% RDI)	0.12mg
Biotin	2.5ug (42% RDI)	5.0ug
Pantothenic acid	0.7mg (39% RDI)	1.39mg
Folate	30ug DFE (40% RDI)	59ug DFE
Vitamin C	5.5mg (18% RDI)	11mg
Vitamin E	1mg (25% RDI)	2mg
Vitamin K	11ug (110% RDI)	21ug
Copper	0.14mg (22% RDI)	0.28mg
Iron	0.32mg (11% RDI)	0.64mg
Magnesium	14mg (23% RDI)	28mg
Manganese	0.12mg (15% RDI)	0.24mg
Boron	0.72mg	1.43mg
Polyphenols	71mg GAE	142mg GAE
Beta carotene	14ug	27ug
Cryptoxanthin	59ug	117ug
Lutein & zeaxanthin	136ug	271ug
Gluten	0mg	0mg
"<" means less than		

Approved Nutrition Information Panel (NIP) for Avocado for toddlers

NUTRITION INFORMATION Servings per package: 4 serves per avocado Serving size: ~50g or ¼ avocado		
	Average Quantity per Serving	Average Quantity per 100g
Energy	430kJ (102Cal)	860kJ (205Cal)
Protein, total	1.0g	2.0g
Fat, total	10.7g	21.4g
– saturated	2.4g	4.8g
– trans	0g	0g
– polyunsaturated	1.4g	2.7g
– monounsaturated	7.4g	12.8g
Carbohydrate	<1g	<1g
– sugars	<1g	<1g
Dietary fibre, total	2.5g	5.0g
Sodium	2mg	4mg
Potassium	255mg	509mg
Niacin	1.2mg eq (24% RDI)	2.4mg eq
Biotin	2.5ug (31% RDI)	5.0ug
Pantothenic acid	0.7mg (35% RDI)	1.39mg
Folate	30ug DFE (30% RDI)	59ug DFE
Vitamin C	5.5mg (18% RDI)	11mg
Vitamin E	1mg (20% RDI)	2mg
Vitamin K	11ug (73% RDI)	21ug
Copper	0.14mg (18% RDI)	0.28mg
Magnesium	14mg (18% RDI)	28mg
Boron	0.72mg	1.43mg
Polyphenols	71mg GAE	142mg GAE
Beta carotene	14ug	27ug
Cryptoxanthin	59ug	117ug
Lutein & zeaxanthin	136ug	271ug
Gluten	0mg	0mg
"<" means less than		

Table 5: Nutrient composition of raw avocado (50gram, 2 heaped tablespoons or ¼ cup) and associated nutrient content and general level health claims for infants/toddlers

(Note nutrient content based on NUTTAB 2010 unless otherwise indicated - all footnotes referenced at the end of the table)

Nutrient	Nutrient Content	FSANZ RDI/ NRV¤	%RDI/ NRV	Nutrient Content Claim and General Level Health claim where permitted	FSANZ Substantiation
Macronutrients					
Water	36g				
Energy	430kJ (103kcal)			Avocado contributes energy for normal metabolism* Infants and toddlers need energy for growth and development. **Consumer friendly language versions:** Avocado helps little ones to grow. It contains energy which helps fuels babies' and toddlers' growth and development.* *as part of a healthy varied diet	%DI Std 1.2.8 reference value for energy 8700kJ NB an additional statement must be included underneath the NIP when using %DI *"based on an average adult diet of 8700 kJ"* GLHC Schedule 4 needs a minimum 420kJ per serve Note energy can only be expressed to three significant figures (Std 1.2.8)
Protein	1.0g	10g 0-6mths (NRV) 14g 7mth-3yrs (NRV)	10% 7%	No claim; not enough present under Schedule 4	%DI Std 1.2.8 reference value for protein 50g Sch 4 states minimum 5g protein per serve to make a source of protein claim NRV RDI www.nrv.org.au
Fat total	10.7g	30g total fat/day (0-12mths) (NRV) No NRV for total fat for over 1 yr	30%	Avocado contains healthy fats. Infants and toddlers need healthy fats for growth and development.* Healthy fats in avocado help absorb fat soluble vitamins such as vitamin E and colourful carotenoids/antioxidants. **Consumer friendly language versions:** Avocado contain healthy fats to support babies' and toddlers' growth and development.* Babies and toddlers need healthy fats like those in avocado to help absorb essential fat soluble nutrients such as vitamin E. *as part of a healthy varied diet	%DI Std 1.2.8 reference value for fat 70g When making claims about any type of fats needs to include all types of fats (total. saturated, trans, monounsaturated, polyunsaturated fats) in the NIP NRV RDI www.nrv.org.au
Trans fat	0g^			No claim as not relevant in this age group.	Free of claim requires no detectable trans fat AND less than 1.5g saturated fat per 100g for solid food or less than 28% of total fat as saturated fat. When making claims about any type of fats needs to include all types of fats (total. saturated, trans, monounsaturated,

					polyunsaturated fats) in the NIP
Nutrient	**Nutrient Content**	**FSANZ RDI/ NRV¤**	**%RDI/ NRV**	**Nutrient Content Claim and General Level Health claim where permitted**	**FSANZ Substantiation**
Saturated fat	2.4g			No claim not relevant Infants and toddlers do not require a low-saturated fat diet.	%DI Std 1.2.8 reference value for saturated fat 24g Sch 4 states "low in saturated fat" needs to be less than 1.5g saturated fat per 100g food however for low proportion of saturated fats needs less than 28% of total fat as saturated fat and trans fat When making claims about any type of fats needs to include all types of fats (total. saturated, trans, monounsaturated, polyunsaturated fats) in the NIP
Monounsaturated fat	6.4g			Avocado contains healthy/good monounsaturated fats. Necessary for growth and development of babies and toddlers. *as part of a healthy varied diet Note 59% of total fat is monounsaturated fat	Sch 4 states need less than 28% of total fat as saturated fat and greater than 40% of total fat a monounsaturated fat to make a mono fat claim When making claims about any type of fats needs to include all types of fats (total. saturated, trans, monounsaturated, polyunsaturated fats) in the NIP
Polyunsaturated fat	1.4g			No claim as only 13% of total fat as polyunsaturated fat need 40% or more	Schedule 4 states need less than 28% of total fat as saturated fat and greater than 40% of total fat as polyunsaturated fat
Omega 3 - Alpha Linoleic Acid (ALA)	56mg^	Total omega 3 incl long chain for 0-12mths 0.3g or 300mg/day 0.5g or 500mg for ALA for 1-3yo	11%	No claim as no DHA/EPA in avocado While 10% of NRV present for ALA Schedule 4 requires 200mg/serve – not enough in avocado	Schedule 4 states minimum 200mg ALA per serve but can only say a source of ALA not good source however not enough in avocado to make claim Also note 1% of ALA is converted into long chain EPA like those in fish so plant omega 3s works differently to marine sources NRV RDI www.nrv.org.au
Plant sterols	42mg^			No claim as not relevant	Schedule 4 states needs minimum 0.8g or 800mg plant sterols per serving of food
Carbohydrates	0.25g			No claim as not enough present	%DI Std 1.2.8 reference value for carbohydrate 310g, Std 1.2.7 Clause 13 can state presence or absence in a food
Sugars	0.25g			Avocados are a naturally low in sugar with less than 1g per serve.	%DI Std 1.2.8 reference value for sugars 90g Schedule 4 states low in sugar less than 5g sugars per 100g of food Std 1.2.8 states in the NIP anything less than 1g can be expressed as LESS THAN 1g
Dietary fibre	2.5g+	No NRV set for 0-12mths		No claim no fibre NRV for infants	%DI Std 1.2.8 reference value for fibre 30g for adults Schedule 4 need minimum 2g fibre per serve of

		14g 1-3yo (NRV)	18%	Avocado is a source of fibre for toddlers helping to keep them regular/ needed for normal bowel/gut function or for bowel/gut health* **Consumer friendly language claims:** Keep your baby or toddler regular with avocado*. It's a source of fibre. Avocado keeps little tummies happy, It provides fibre for babies and toddlers needed for a healthy gut.* *as part of a healthy varied diet	food to be a source of fibre NRV RDI www.nrv.org.au GLHCs Schedule 4
Nutrient	**Nutrient Content**	**FSANZ RDI/ NRV¤**	**%RDI/ NRV**	**Nutrient Content Claim and General Level Health claim where permitted**	**FSANZ Substantiation**
Vitamins					
Thiamin (Vitamin B1)	0.04mg	0.35mg infants	11%	Avocado is a source of/ contains thiamin that infants/ babies need for growth and development.* Thiamin helps release energy from foods especially carbohydrates giving babies energy to grow.* *as part of a healthy varied diet **Consumer friendly language versions:** B group vitamins found in avocado help babies release energy from food for growth.* *as part of a healthy varied diet	RDI Sch 1, Schedule 4 states need minimum 10% of RDI for nutrient per serving of food to make a vit/min claim GLHCs Schedule 4
		0.5mg toddlers 1-3yo	8%	No claim not enough present	
Riboflavin (Vitamin B2)	0.07mg	0.6mg infants	12%	Avocado is a source of/ contains riboflavin that infants/ babies need for growth and development particularly vison, skin and nervous system. Riboflavin contributes to iron transport and help release energy from food.* *as part of a healthy varied diet **Consumer friendly language versions:** B group vitamins found in avocado help babies release energy from food for growth.* Babies need iron for growth and development and riboflavin helps transport iron around their bodies.*	RDI Sch 1, Schedule 4 states need minimum 10% of RDI for nutrient per serving of food to make a vit/min claim GLHCs Schedule 4

		0.8mg toddlers 1-3yo	9%	Avocado's riboflavin helps develop normal vision in babies.* Help your baby see clearly with avocado. The riboflavin in avocado helps develop normal vision.* B group vitamin riboflavin is needed for maintaining baby's healthy skin.* *as part of a healthy varied diet No claim as not enough riboflavin	
Nutrient	**Nutrient Content**	**FSANZ RDI/ NRV¤**	**%RDI/ NRV**	**Nutrient Content Claim and General Level Health claim where permitted**	**FSANZ Substantiation**
Niacin (Vitamin B3)	1.2mg eq	3.0mg Infants 5.0mg toddlers 1-3yo	40% 24%	Avocado is a rich/excellent source of niacin for infants/babies. Avocado is a source of niacin for toddlers Niacin: - needed for normal growth and development particularly neurological and psychological function and skin formation* - reduction in tiredness and fatigue and helps release energy from food* **Consumer friendly language versions:** Avocado is rich in niacin which helps release energy from food giving babies energy to go and grow.* Avocado contains niacin which helps release energy from food giving toddlers energy to go and grow.* Toddlers are good to go with avocado. It contains niacin which helps release energy from food.* B group vitamin niacin is needed for healthy skin in babies and toddlers. *as part of a healthy varied diet	RDI Sch 1, Schedule 4 states need minimum 10% of RDI for nutrient per serving of food to make a "source of" vit/min claim GLHCs Schedule 4

Nutrient	Nutrient Content	FSANZ RDI/ NRV¤	%RDI/ NRV	Nutrient Content Claim and General Level Health claim where permitted	FSANZ Substantiation
Vitamin B6	0.06mg	0.45mg infants	13%	Avocado is a source of vitamin B6 for infants/babies. Vitamin B6: - contributes to normal growth and development particularly nervous system, psychological function, immune system and blood formation. - necessary for protein and energy metabolism - reduction in tiredness and fatigue –necessary for iron transport **Consumer friendly language versions:** Babies need iron for growth and development and Vitamin B6 found in avocado helps transport iron around their bodies.* Vitamin B6 found in avocado help babies release energy from food for growth.* Avocado contains vitamin B6 necessary for a baby's strong immune system.* Avocado contains vitamin B6 needed for baby's brain development.* *as part of a healthy varied diet	RDI Sch 1, Schedule 4 states need minimum 10% of RDI for nutrient per serving of food to make a vit/min claim GLHCs Schedule 4
		0.7mg toddlers 1-3yo	9%	No claim not enough for toddlers	
Vitamin B12	0μg^	0.7μg infants	0%	No claim as not present	RDI Sch 1, Schedule 4 states need minimum 10% of RDI for nutrient per serving of food to make a vit/min claim
		1.0μg toddlers 1-3yo	0%		
Biotin	2.5μg	6μg infants	42%	Avocados are rich in/ excellent source of biotin for infants and toddlers. - contributes to normal growth and development particularly nervous system and psychological function* - Contributes to normal fat metabolism and energy production* -Contributes to maintenance of normal hair and skin*	RDI Sch1, Schedule 4 states need minimum 10% of RDI for nutrient per serving of food to make a vit/min claim GLHCs Schedule 4
		8μg toddlers 1-3yo	31%		

				Consumer friendly language versions: Biotin found in avocado help babies and toddlers release energy from food for growth.* Avocado is rich in biotin needed for babies and toddlers brain development.* Biotin-rich avocado helps develop skin and hair in babies and toddlers.* *as part of a healthy varied diet	
Nutrient	**Nutrient Content**	**FSANZ RDI/ NRV¤**	**%RDI/ NRV**	**Nutrient Content Claim and General Level Health claim where permitted**	**FSANZ Substantiation**
Pantothenic acid	0.7mg^	1.8mg infants 2.0mg toddlers 1-3yo	39% 35%	Avocado is a rich source of pantothenic acid for infants/toddlers. - contributes to normal growth and development* -necessary for normal fat metabolism and energy production* -contributes to normal mental performance* -contributes to normal synthesis and metabolism of steroid hormones, vitamin D and some neurotransmitters* -contributes to the reduction of tiredness and fatigue* **Consumer friendly language versions:** Pantothenic acid in avocado help babies and toddlers release energy from food for growth/ give babies/toddlers energy to go and grow.* Avocado contains pantothenic acid needed for brain development in babies and toddlers.* *as part of a healthy varied diet	RDI Sch 1,Schedule 4 states need minimum 10% of RDI for nutrient per serving of food to make a vit/min claim GLHCs Schedule 4
Folate	30μg DFE	75μg infants 100μg toddlers 1-3yo	40% 30%	Avocado is a rich/excellent source of folate for infants and toddlers Folate: -helps cells divide* -contributes to normal blood formation* - Contributes to normal psychological function* - Contributes to the reduction of tiredness and fatigue* -Contributes to normal immune system function* -contributes to normal growth and	RDI 200ug Sch 1, Schedule 4 states need minimum 10% of RDI for nutrient per serving of food to make a “source of” vit/min claim Note pregnant/lactating women need 400-600ug folate a day: 2-3 times the regulatory RDI of 200ug. Should explain this for any claims aimed at pregnant women or women wanting to conceive to avoid being misleading GLHC from Std 1.2.7 Schedule 4

				development* **Consumer friendly language versions:** Folate-rich avocado help babies and toddlers grow, assists brain development and supports a healthy immune system.* *as part of a healthy varied diet	
Nutrient	**Nutrient Content**	**FSANZ RDI/ NRV¤**	**%RDI/ NRV**	**Nutrient Content Claim and General Level Health claim where permitted**	**FSANZ Substantiation**
Vitamin A	14μg RAE	300μg RAE both infants and toddlers 1-3yo	5%	No claim as not enough present	RDI Sch 1, Schedule 4 states need minimum 10% of RDI for nutrient per serving of food to make a vit/min claim
Vitamin C (ascorbic acid)	5.5mg	30mg both Infants and toddlers 1-3yo	18%	Avocado is a source of/ contains vitamin C. Vitamin C -helps absorb iron from plant foods* - Antioxidant vitamin C contributes to cell protection from free radical damage* - Necessary for normal connective tissue structure and function* - Necessary for normal blood vessel structure and function* - Necessary for normal neurological function* - Contributes to normal collagen formation for the normal structure of cartilage and bones* - Contributes to normal collagen formation for the normal function of teeth and gums* - Contributes to normal collagen formation for the normal function of skin* - Contributes to normal energy metabolism* - Contributes to normal psychological function* - Contributes to the reduction of tiredness and fatigue* - Contributes to the normal immune system function* -Contributes to normal growth and development* **Consumer friendly language versions:** Help grow and develop your baby's/toddler's brain with avocado vitamin C.* Keep your baby's and toddler's skin healthy with avocado. It contains vitamin C.*	RDI Sch 1, Schedule 4 states need minimum 10% of RDI for nutrient per serving of food to make a "source of" vit/min claim GHLC from Std 1.2.7 schedule 4

				Feed your baby's/ toddler's skin from within with avocado. It contains vitamin C need for healthy skin.* Vitamin C-containing avocados will help develop strong bones, teeth and gums for babies and toddlers. Support baby's/ toddler's healthy teeth and gums with vitamin C in avocado.* Support your baby's/toddler's immune system with vitamin C-containing avocados.* Babies and toddlers need iron for growth and development. The vitamin C in avocados helps absorb iron from plant foods.* Avocado is good for baby's/ toddler's brain development due to vitamin C.* *as part of a healthy varied diet	
Nutrient	**Nutrient Content**	**FSANZ RDI/ NRV¤**	**%RDI/ NRV**	**Nutrient Content Claim and General Level Health claim where permitted**	**FSANZ Substantiation**
Vitamin D	0μg^	5.0μg both infants and toddlers 1-3yo	0%	No claim as not present	RDI Sch 1, Schedule 4 states need minimum 10% of RDI for nutrient per serving of food to make a vit/min claim
Vitamin E	1mg	4mg infants 5mg toddlers 1-3yo	25% 20%	Avocado is an excellent source of antioxidant vitamin E for infants/ babies. Avocado is a source of antioxidant vitamin E for toddlers Vitamin E: -is a natural antioxidant vitamin* - contributes to cell protection from free radical damage.* -contributes to normal growth and development* *as part of a healthy varied diet	RDI Sch 1, Schedule 4 states need minimum 10% of RDI for nutrient per serving of food to make a "source of" vit/min claim GLHC from Std 1.2.7 Schedule 4
Vitamin K	11μg^	10μg infants 15μg toddlers 1-3yo	110% 73%	Avocado can provide over 100% of the RDI for bone building vitamin K for infants.* Avocado is an excellent source of bone building vitamin K for infants and toddlers.*	RDI Sch 1, Schedule 4 states need minimum 10% of RDI for nutrient per serving of food to make a vit/min claim GLHC from Std 1.2.7 Schedule4

				Vitamin K: -contributes to normal growth and development* -Contributes to normal bone structure* -Necessary for normal blood coagulation* **Consumer friendly language versions:** Build your baby's bones with avocado. Each 50gram serve of 2 heaped table spoons contains 100% of the RDI for bone building vitamin K.* Avocado is an excellent source of bone building vitamin K for infants and toddlers.* Vitamin K-rich avocado help bone formation and normal blood clotting in infants and toddlers.* *as part of a healthy varied diet	
Nutrient	**Nutrient Content**	**FSANZ RDI/ NRV¤**	**%RDI/ NRV**	**Nutrient Content Claim and General Level Health claim where permitted**	**FSANZ Substantiation**
Choline	7.1mg^	125mg 0-6mths 150mg 7-12mths 200mg 103yo NRV	6% 5% 4%	No claim as not enough present	Std 1.2.7 Clause 13 can only state its presence in a food however so little here misleading NRV RDI www.nrv.org.au
Carotenoid pigments					
Beta carotene	14μg			Avocado contain colourful carotenoid - beta carotene	Std 1.2.7 Clause 13 can only state its presence in a food
Cryptoxanthin	59μg			Avocado contain colourful carotenoid - cryptoxanthin	Std 1.2.7 Clause 13 can only state its presence in a food
Lycopene	0μg^			No claim not present	Std 1.2.7 Clause 13 can only state its presence in a food
Lutein/ Zeaxanthin	136μg^			Avocado contain colourful carotenoid - lutein and zeaxanthin	Std 1.2.7 Clause 13 can only state its presence in a food
Minerals					
Sodium	2.0mg	No FSANZ RDI for infants or toddlers		Avocado is naturally low in sodium with just 2mg per serve. Babies and toddlers have more sensitive taste buds and don't need any added salt to flavour their foods.	%DI Std 1.2.8 reference value for sodium 2300mg Schedule 4 states for "low in sodium" need less than 120mg sodium per 100g of food Must also include the potassium and sodium content in the NIP (Std 1.2.8 Clause 12) Can also express sodium as LESS THAN 5mg in

					NIP (Std 1.2.8)
Nutrient	**Nutrient Content**	**FSANZ RDI/ NRV¤**	**%RDI/ NRV**	**Nutrient Content Claim and General Level Health claim where permitted**	**FSANZ Substantiation**
Potassium	255mg	No FSANZ RDI for infants or toddlers		Avocado contain potassium. Potassium is necessary for -normal water and electrolyte balance* -normal functioning of the nervous system* -normal muscle function* -contributes to normal growth and development* **Consumer friendly language versions:** Avocado helps babies and toddlers grow strong as they contains potassium needed for muscle movement.* *as part of a healthy varied diet	RDI nrv.org.au no regulatory RDI set by FSANZ Schedule 4 states can include in NIP with sodium GLHC Schedule 4 requires minimum 200mg potassium per serve Include potassium and sodium content in NIP
Calcium	7mg	550mg infants 700mg toddlers 1-3yo	1% 1%	Not claim as not enough present	RDI Sch 1, Schedule 4 states need minimum 10% of RDI for nutrient per serving of food to make a vit/min claim
Chromium	0.15μg	40μg infants 60μg toddlers 1-3yo	<1% <1%	No claim as not enough present	RDI Sch1, Schedule 4 states need minimum 10% of RDI for nutrient per serving of food to make a vit/min claim
Copper	0.14mg	0.65mg Infants 0.8mg toddlers 1-3yo	22% 18%	Avocado is source of/contains copper for infants and toddlers Copper: -Contributes to normal connective tissue structure* -Contributes to normal iron transport and metabolism* -Contributes to cell protection from free radical damage* -Necessary for normal energy production* -Necessary for normal neurological function* -Necessary for normal immune system function* -Necessary for normal skin and hair colouration* **Consumer friendly language versions:** Copper in avocados supports your baby's/toddler's immune system.* The copper in avocado helps keep your baby's/toddler's skin healthy*	RDI Sch 1, Schedule 4 states need minimum 10% of RDI for nutrient per serving of food to make a vit/min claim GLHC from Std 1.2.7 Schedule4

				Avocado is a baby and toddler brain food – it contains copper.* *as part of a healthy varied diet	
Nutrient	**Nutrient Content**	**FSANZ RDI/ NRV¤**	**%RDI/ NRV**	**Nutrient Content Claim and General Level Health claim where permitted**	**FSANZ Substantiation**
Iodine	0μg	60μg infants 70μg toddlers 1-3yo	0% 0%	No claim as not present	RDI Sch 1, Schedule 4 states need minimum 10% of RDI for nutrient per serving of food to make a vit/min claim
Iron	0.32mg	3mg Under 6mths	11%	Avocado is a source of iron for young infants/babies. Iron: -Contributes to normal growth and development* -Contributes to normal cognitive development* -Necessary for normal oxygen transport* -Contributes to normal energy production* -Necessary for normal immune system function* -Contributes to normal blood formation* - -Contributes to normal cognitive function* -Contributes to the reduction of tiredness and fatigue* -Necessary for normal cell division* **Consumer friendly language versions:** At around 4-6months of age babies need more iron so avocado is a perfect first food. Iron is needed for normal brain development.* Avocado is a nutrient booster for babies. Babies need iron and several nutrients in avocado help iron absorption and transport such as vitamins B2, B6 and C, and copper. Avocado is a nutrient booster for toddlers. Toddlers need iron and vitamin C and copper in avocado help iron absorption and transport.* *as part of a healthy varied diet	RDI Sch 1, Schedule 4 states need minimum 10% of RDI for nutrient per serving of food to make a vit/min claim GLHC from Std 1.2.7 Schedule4
		9mg from 6mths	4%	No claim as not enough present	
		6mg toddlers 1-3yo	5%	No claim as not enough present	

Nutrient	Nutrient Content	FSANZ RDI/ NRV¤	%RDI/ NRV	Nutrient Content Claim and General Level Health claim where permitted	FSANZ Substantiation
Magnesium	14mg	60mg infants 80mg Toddlers 1-3yo	23% 18%	Avocado is a source of magnesium for infants and toddlers Magnesium is: -Necessary for normal cell division* -Contributes to normal growth and development* -Contributes to normal energy metabolism* -Necessary for normal electrolyte balance* -Necessary for normal nerve and muscle function* - Necessary for teeth and bone structure* -Contributes to normal psychological function* -Contributes to a reduction of tiredness and fatigue* -Necessary for normal protein synthesis* **Consumer friendly language versions:** Avocado contains magnesium that babies and toddlers needed to release energy from food.* Avocado contains bone building magnesium for babies and toddlers.* Avocado contains magnesium which help babies and toddlers muscle development.* Avocado contains magnesium needed for baby and toddler's brain development.* *as part of a healthy varied diet	RDI Sch1, Schedule 4 states need minimum 10% of RDI for nutrient per serving of food to make a vit/min claim GLHC from Std 1.2.7 Schedule4
Manganese	0.12mg	0.8mg infants	15%	Avocado is a source of manganese for infants/ babies Manganese: -Contributes to normal growth and development* -Contributes to normal bone formation* -Contributes to normal energy metabolism* -Contributes to cell protection from free radical damage* -Contributes to normal connective tissue structure*	RDI Sch 1, Schedule 4 states need minimum 10% of RDI for nutrient per serving of food to make a vit/min claim GLHC from Std 1.2.7 Schedule4

		1.5mg toddlers 1-3yo	8%	**Consumer friendly language versions:** Avocado is a source of manganese which is needed for baby's normal growth and development.* Avocado contains manganese that helps release energy from food – a natural energy booster for babies.* Avocado contains bone building manganese for babies.* *as part of a healthy varied diet Not claim as not enough present	
Nutrient	**Nutrient Content**	**FSANZ RDI/ NRV¤**	**%RDI/ NRV**	**Nutrient Content Claim and General Level Health claim where permitted**	**FSANZ Substantiation**
Molybdenum	0.25μg	30μg infants 50μg toddlers 1-3yo	<1% <1%	No claim as not enough present	RDI Sch 1, Schedule 4 states need minimum 10% of RDI for nutrient per serving of food to make a vit/min claim
Phosphorus	24mg	300mg infants 500mg toddlers 1-3yo	8% 5%	Not claim as not enough present	RDI Sch 1, Schedule 4 states need minimum 10% of RDI for nutrient per serving of food to make a vit/min claim
Selenium	0.2μg^	15μg infants 20μg toddlers 1-3yo	1% 1%	No claim as not enough present	RDI Sch 1, Schedule 4 states need minimum 10% of RDI for nutrient per serving of food to make a vit/min claim
Zinc	0.28mg	4.5mg for both infant and toddlers 1-3yo	6%	Not claim as not enough present	RDI Sch 1, Schedule 4 states need minimum 10% of RDI for nutrient per serving of food to make a vit/min claim
Boron	0.72mg+++	No FSANZ RDI or NRV		Avocado contains boron. Avocado contains 0.7mg boron per 50gram serve.	Std 1.2.7 Clause 13 can only state its presence in a food. +Reference shows boron content of avocado higher than other foods tested. No GLHC for boron in Schedule 4
Other bioactives					
Arginine	0.044mg^			Could claim "Avocado contains the amino acid arginine" but not relevant to infants and toddlers	Std 1.2.7 Clause 13 can only state its presence in a food
Coenzyme Q10	0.48mg^^			No claim as not enough present	Std 1.2.7 Clause 13 can only state its presence in a food – but given such a small amount compared to other higher fat foods^^ it would be misleading to claim it
Total polyphenols	71mg GAE#			Could claim "Avocado contains polyphenol antioxidants. Antioxidants contribute to cell protection from free radical damage" but not relevant to infants and toddlers. *as part of a healthy varied diet	Std 1.2.7 Clause 13 can only state its presence in a food GLHC similar to other antioxidant vitamins and minerals in Sch 4 Similar amounts to other fruits and vegetables#

Nutrient	Nutrient Content	FSANZ RDI/ NRV✖	%RDI/ NRV	Nutrient Content Claim and General Level Health claim where permitted	FSANZ Substantiation
Flavonoids (Flavan-3-ols)	0.25mg^			No claim not relevant to infants and toddlers	Std 1.2.7 Clause 13 can only state its presence in a food – very small amount misleading to claim it
Gluten				Avocados are naturally gluten free	Std 1.2.7 Clause 13 can only state its presence or absence in a food

Table 5 References

*NUTTAB 2010 http://www.foodstandards.gov.au/science/monitoringnutrients/nutrientables/nuttab/Pages/default.aspx

^USDA National Nutrient Database for Standard Reference 1 Release April, 2018 https://ndb.nal.usda.gov/ndb/

+ An average of NUTTAB, USDA and New Zealand data The Concise New Zealand Food Composition Tables 12th Edition 2016 https://www.foodcomposition.co.nz/foodfiles/concise-tables/

✖FSANZ Schedule 1 Regulatory Recommended Daily Intakes (FSANZ RDI)

++Li BW et al Individual Sugars, Soluble, and Insoluble Dietary Fiber Contents of 70 High Consumption Foods *J Food Comp Anal* 2002(15):715-723

+++Meacham S et al. Boron in Human Health: Evidence for Dietary Recommendations and Public Policies. *The Open Mineral Processing Journal,* 2010;3;36-53.

^^ Pravst I, Zmitek K, Zmitek J. Coenzyme Q10 contents in foods and fortification strategies. *Crit Rev Food Sci Nutr.* 2010 Apr;50(4):269-80.

USDA Database for the Oxygen Radical Absorbance Capacity (ORAC) of Selected Foods, Release 2 2010 (Note only total polyphenol content is used)

Table 6 Composite claims for infants and toddlers

Health condition	Wording of claim	FSANZ Substantiation See Table 5 for specific nutrients
Energy, growth and development	Avocado helps little ones to grow. It contains energy which fuels babies' and toddlers' growth and development.* Avocado helps babies on the move. It contains nutrients that help release energy from food such as B group vitamins B1,B2, B3 and B6, pantothenic acid, vitamin C, magnesium, manganese and biotin.* Avocado helps toddlers on the move. It contains nutrients that help release energy from food such niacin, pantothenic acid, vitamin C, magnesium and biotin.* Babies and toddlers are good to go with avos. They contain energy, healthy fats, vitamins and minerals they need for growth and development.* *as part of a healthy varied diet	Where listed specifically for infants or toddlers Vitamins B1,B2, B3 & B6, pantothenic acid, vitamin C, magnesium, manganese and biotin levels all more than 10% of FSANZ RDI in a 50g serve GLHCs Schedule 4 Nutrients above plus healthy fats <28% saturated fats and >40% monounsaturated fats
Brain function	Avocado is baby and toddler brain food. It is rich in biotin and folate needed for their brain development.* Avocado is baby and toddler brain food. It contains nutrients needed for brain development such as biotin, pantothenic acid, folate, vitamin C, magnesium and copper.* Avocado is baby brain food. It contains nutrients needed for brain development such as niacin, Vitamin B6, biotin, pantothenic acid, folate, vitamin C, magnesium and copper.* Avocado is a perfect first food for babies because it contains iron. Avocado also contains Vitamin B2, B6 and C plus copper which help absorb and transport iron, At around 6 months of age they need more iron for brain development.* *as part of a healthy varied diet	Biotin and folate more than 25% FSANZ RDI in a 50g serve. Where listed specifically for infants or toddlers Biotin, pantothenic acid, B group vitamins, vitamin C, magnesium and copper levels all more than 10% of FSANZ RDI in a 50g serve GLHCs Schedule 4
Muscle and nerve function	Avocado helps your baby/ toddler grow strong. It contains potassium and magnesium needed for muscle development and movement.* *as part of a healthy varied diet	Magnesium more than 10% of FSANZ RDI in a 50g serve Potassium more than 200mg per serve GLHCs Schedule 4

Health condition	Wording of claim	FSANZ Substantiation See Table 5 for specific nutrients
Bones, teeth and gums	Build your baby's bones with avocado. Each 50gram serve or 2 heaped tablespoons contains 100% of the RDI for bone-building vitamin K.* Build baby's/ toddler's bone with avocado. It's a source of bone-building nutrients Vitamins C& K, magnesium and manganese.* Build toddler's bone with avocado. It's a source of bone-building nutrients Vitamins C& K and magnesium.* Support baby's/ toddler's teeth and gums with vitamin C and magnesium in avocado.* *as part of a healthy varied diet	Where listed specifically for infants or toddlers Vitamin C& K, magnesium and manganese levels all more than 10% of FSANZ RDI in a 50g serve GLHCs Schedule 4
Vision	Help your baby see clearly with avocado. The riboflavin in avocado helps to develop normal vision. *as part of a healthy varied diet	Riboflavin level more than 10% of FSANZ RDI in a 50g serve GLHCs Schedule 4
Skin and hair health	Keep your baby's skin healthy with avocado. It contains riboflavin, niacin, Vitamin C and biotin important for healthy skin.* Feed baby's skin from within with avocado. It contains important nutrients for healthy skin including healthy fats, B-group vitamins, vitamin C and copper. Feed toddler's skin from within with avocado. It contains important nutrients for healthy skin including healthy fats, niacin, biotin and vitamin C*. Help baby's / toddler's hair grow with avocado. It contains biotin and copper important for heathy hair.* *as part of a healthy varied diet	Where listed specifically for infants or toddlers Riboflavin, niacin, biotin, vitamin C, copper levels all more than 10% of FSANZ RDI in a 50g serve GLHCs Schedule 4 Healthy fats <28% saturated fats and >40% monounsaturated fats
Immune system function	Avocado contains a range of immune-supportive nutrients for baby such as Vitamins B6 & C, folate and copper.* Build baby's immunity with avocado. It contains Vitamins B6 & C, folate and copper important for a healthy immune system.* Support young infant's immune system with vitamin C, folate, iron and copper found in avocados.*	Where listed specifically for infants or toddlers Vitamin B6, folate, vitamin C, copper levels all more than 10% of FSANZ RDI in a 50g serve GLHCs Schedule 4

	Build toddler's immunity with avocado. It contains folate, vitamin C and copper for a healthy immune system.* *as part of a healthy varied diet	
Health condition	**Wording of claim**	**FSANZ Substantiation** **See Table 5 for specific nutrients**
Nutrient absorption	Avocado is a nutrient booster for babies. Iron is needed for growth and development and Vitamins B2, B6 and C plus copper found in avocado helps absorb and transport iron around the body.* Avocado is a nutrient booster for toddlers. Iron is needed for growth and development and Vitamin C and copper found in avocado helps absorb and transport iron around the body.* Avocado is a nutrient booster for babies and toddlers. They need iron and several nutrients in avocado help iron absorption and transport such as vitamin C, and copper.* Avocado is a nutrient booster for babies and toddlers. They need iron for growth and development and the vitamin C in avocados will help them absorb iron from plant foods.* Avocado is a nutrient booster for babies and toddlers. The healthy fats in avocado help them absorb essential nutrients such as fat-soluble vitamin E and carotenoid antioxidants.* *as part of a healthy varied diet	Where listed specifically for infants or toddlers Riboflavin, Vitamins B6, C and E, copper levels all more than 10% of FSANZ RDI in a 50g serve GLHCs Schedule 4
Low salt, low sugar	Avocado is an ideal food for babies and toddlers because it's naturally low in sugar and salt. Avocado is naturally low in sodium. Babies and toddlers have more sensitive taste buds and don't need any added salt to flavour their foods.	Less than 5g sugars per 100g Less than 120mg sodium per 100g

Communicating the health and nutritional benefits of avocados
Project AV18004 (CON-001551)

Health Professional Fact Sheet Background Report

Prepared for
Horticulture Innovation Australia

November 2018

Executive summary

Project summary:

1. To provide key messages about the nutritional properties and health benefits of avocados to educate key influencer audiences, specifically health and fitness professionals.
2. To assist industry stakeholder to communicate accurate, responsible and compliant messages pertaining to the nutrition and health benefits of avocados.

Project outputs

1. Five avocado fact sheets: weight management; type 2 diabetes; nutrient booster; cardiovascular health; maternal health (see Appendices for copy of fact sheets)
2. **Industry background report**- a review of the scientific literature that underpins the above five fact sheets including referencing.
3. Avocado nutrition and health claims substantiation report (to support stakeholders in developing compliant communication to consumers).

This report constitutes the 2nd project deliverable: **Industry background report**.

This report is an internal document for Hort Innovation. The purpose of this report is to provide a summary of the approach taken to write the fact sheets, and provide the scientific references to be used for substantiation for the information presented in the fact sheets, should anyone ask for it (such as health professionals). The copy of the fact sheets in their raw, un-designed form can be found in the appendices.

Fact sheets: summary of approach

The contents of the series of 5 fact sheets follow a similar formula:

- Summarise the nutrients in avocado that pertain to the condition/life stage
- Summarise how the nutrients address the risk factors/specific need of the condition/life stage (nutrient functions)
- Summarise the latest (last 5 years) published research/public health nutrition recommendations on the condition/life stage
- Provide the relevant Nutrition Information Panel to substantiate the nutrient claims
- Provide appropriate and practical suggestions to incorporate avocado in the diet and combining them with other healthy foods; including healthy recipe ideas and buying and storage tips.

Where appropriate, the claims suggested in the Avocado Nutrition and Health Claims Substantiation Report were used to generate messages in the fact sheets.

A healthy heart with avocados

This fact sheet builds on previous messages provided to health professionals by Australian Avocados in 2015. Heart health is core territory for avocado and there is a large and expanding body of evidence relating to CVD risk factors, and the reduction of CVD risk from a plant-based diet. The literature is particularly strong in the area of lipid management. Fortunately, two Systematic Reviews and Meta-analyses were published on avocado (refs 19 & 20). The Peou paper was the most positive in their results and conclusions, whereas the Mahmassani paper was less so as they only found HDL increase rather than total and LDL cholesterol reduction. The reason for this is the research groups used different questions and methods in their analyses.

Avocado is also a good fit with the therapeutic DASH diet shown to lower blood pressure as it requires high intakes of fruits and vegetables.

Emerging research is finding additional metabolic benefits from avocado, including anti-inflammatory effects and reductions in oxidative stress. Also of interest is the positive effects of avocado in meals and post-prandial glycemic and insulin responses.

The heart-healthy nutrients in avocado messages were derived from the Nutrition and Health Claims Substantiation Report. The nutrients chosen for the list are based on claimable nutrients (eligible to make nutrient content claims)

Several hyperlinks are embedded in the document, referring readers to the Heart Foundation health professional information referred to in the copy, and background information about the Mediterranean diet that is also mentioned.

Heart Foundation Australia, Health professional information, Food and nutrition. Available at URL https://www.heartfoundation.org.au/for-professionals/food-and-nutrition/heart-healthy-eating-principles Accessed 4 Oct 2018

Dietary Patterns and CVD prevention Available at URL https://www.heartfoundation.org.au/images/uploads/main/Dietary_Patterns_and_CVD_outcomes_presentation_-_Clare_Collins.pdf accessed 4 October 2018

The Mediterranean diet definition and how-to
https://oldwayspt.org/traditional-diets/mediterranean-diet

See appendix 1 for the Heart Health fact sheet and reference list.

Healthy mums & bubs with avocados

This fact sheet is unique in this series because it covers both maternal and infant health.

Maternal health

The information builds on previous information for health professionals on maternal health that had a strong focus on folate. Unfortunately, the messages regarding to folate needed to be softened because the new Nutrition Information Panel (NIP) is based a different data source with a smaller folate figure and therefore a downgrade in the type of claim to “a source” rather than a “good source”. Nonetheless folate is an important public health story to tell and important for health professionals to know. Importantly, the increased needs for folate during pregnancy is for dietary folate, and a supplement is recommended in addition to diet. Because women often do not eat adequate folate, avocado is a useful food to include.

The maternal health messages were derived from the Nutrition and Health Claims Substantiation Report. As well as permitted folate claims, composite claims were used that are a combination of nutrient function claims. Composite claims that related to the health and wellbeing issues during pregnancy were chosen: nutrient boosting and fatigue-fighting.

The fact that women are not consuming adequate amounts of fruits and vegetables is also an opportunity to recommend avocado in the maternal diet. Fortunately, two articles on the benefits of avocado for both the maternal and infant transitional diet were published in the journal *Nutrients* in 2016 (12,13).

Infant health

The positive story about avocado for babies is their nutrient density to support growth and development, and their ideal texture and flavour for transitional feeding.

The benefit statements and messages about avocado for babies are from the Nutrient and Health Claims Substantiation Report, and specifically the infant and toddler section. Infants and toddlers were not a key target during the previous health professional communication activities by Australian Avocados (2015). However, since Food Standards Australia and New Zealand (FSANZ) have Recommended Dietary Intakes (RDIs) for infants and toddlers it seemed a good opportunity to develop nutrition and health claims for this age group. Newly developed composite claims were developed for the Nutrient and Health Claims Substantiation Report and these were used in this fact sheet. Composite claims were chosen for their relevance to infant growth and development and their appeal to mothers/parents and health professionals.

See appendix 2 for the Mums and Bubs fact sheet and reference list.

A healthy weight with avocados

This fact sheet builds on information presented to health professionals by Australian avocados in 2015. There were only three studies reported then, and fortunately there have been more studies published since.

Compared to the other fact sheets, this fact sheet does not focus so much on the nutrients in avocados as much as the effects of the whole food in the diet. The positive story about avocados and weight has several aspects that address the complex etiology of weight status and weight management.

The main message is around the idea that fat is not necessarily fattening, and the weight gain potential very much depends on the food source. In the case of avocado - a whole food with mostly monounsaturated fats - the evidence suggests a low weight gain potential, especially in the context of a healthier dietary pattern such as the Mediterranean eating pattern. This is supported by epidemiological studies. Intervention studies show avocado can be included in a successful weight loss diet. The reasons for this may be the increased satisfaction (satiety) of avocado (perhaps due to their healthy fat content), that has advantages for compliance to a kilojoule-restricted diet for weight loss and maintenance of a healthier diet over time. Emerging research shows avocado enhances self-rated satiety and positively effects gut hormones that influence satiety.

Newer research also identifies beneficial effects of avocado on insulin response: as higher insulin levels can cause weight gain, avocados may assist with weight management via this mechanism. In-vitro studies demonstrate avocado extracts affect carbohydrate metabolism.

Obesity is a metabolic disturbance and has adverse metabolic effects. New studies showing improvements in inflammation and oxidative stress from avocado show they exhibit positive metabolic effects that may assist healthy weight status and overall metabolic health.

As following fad diets is a common approach in the community to manage weight, the almost universal acceptance of avocado in popular diet regimes (Low-carb, paleo, plant-based etc) is good aspect to communicate to health professionals who see people likely to be on such diets and can reassure them that avocado can be included.

See appendix 3 for the Weight fact sheet and reference list.

Avocado nutrient booster

This fact sheet takes a broad approach similar to the information developed previously for avocado website, resources and social media. Avocados are a nutrient dense fruit. This fact sheet outlines the nutrient composition of avocado and highlights those nutrients that are present in sufficient quantities per 50g serve to make claims that comply with the FSANZ Food Standard Code (at least 10% RDI): healthy fats, dietary fibre, folate, vitamins C, E, K, niacin and pantothenic aid. Potassium and sodium are included because of their importance for heart health, while phytochemicals were included as they have benefits for many aspects of health and wellness, and because of the link between carotenoids and eye health.

General Level Health Claims or nutrient function claims help explain why those nutrients are needed and these key messages have been taken from the Nutrition and Health Claims Substantiation Report. A nutrition information panel is included to substantiate these claims.

This fact sheet highlights research that avocado eaters have better quality diets than non-eaters (ref.1), and how avocados can boost the absorption of other fat-soluble nutrients, such as carotenoids, when consumed at the same time as other colourful vegetables (refs.14,15).

Eye health was highlighted as a benefit because of emerging research about the importance of nutrition for prevention of eye conditions. Carotenoids are needed for vision particular the macula required for central vision, so this fact sheet includes how avocado may help with eye health via this nutrient. (7-13) Avocados also help in the conversion of the carotenoid beta carotene into provitamin A which is needed for vision. These carotenoids travel to the eye on HDL cholesterol and avocado also boosts HDL cholesterol. Avocado may be important for the prevention of aged relation macular degeneration.

Healthy aging is a key trend shown in consumer research in the food industry, so this eye health benefit will be of interest to the patients and clients of health professionals.

Avocado appears to provide nutrients particularly beneficial for eye health, and this represents a good news story for health professionals.

See appendix 4 for the Nutrient Booster fact sheet and reference list.

Avocado for diabetes

Australians are developing Type 2 diabetes (T2D) in epidemic proportions and there are many more that are not yet aware they have the condition (and many more at risk). Type 2 diabetes, heart disease and weight management are an interconnected triangle of chronic diseases that affect many Australians and represent ‘core business’ for many health professionals. This common condition represents an opportunity to promote avocado in a prudent diet.

Avocado has positive impacts for all three conditions. The nutrients present in avocado can specifically assist people with T2D because they have increased needs for some nutrients such as vitamins C and E, fibre and healthy fats.

While there are only a couple of studies that examine the impact of avocado directly in those with T2D (refs.24,25), other studies showcase the positive impact avocado has on blood glucose and insulin levels that are likely to have beneficial implications for T2D (refs.26-29). The combination of fat and fibre in avocado is likely to reduce the rise in blood glucose following a meal containing carbohydrate as it has shown to do for peanut butter and hummus (refs.19,20).

People with T2D are more likely to be overweight and at greater risk of heart disease so the benefits of avocado for managing weight and cholesterol are included in the fact sheet. Good advice for heart health applies to people with T2D.

More research is needed in this space especially mechanistic studies to help explain how avocado impacts T2D but for now animal studies provide some insight into avocado effects on carbohydrate metabolism. (refs.30-35)

See appendix 5 for the Diabetes fact sheet and reference list.

Appendix 1

Avocado Health and Nutrition Update
Avocado for a healthy heart

(Breakout box: summary)
Avocado is a delicious and versatile prescription for better heart health. Enjoying avocado daily is a good way to improve risk factors such as high blood lipids and blood pressure and helps to achieve a cardioprotective eating pattern.

Heart-healthy nutrients in avocados
Avocados provide a helpful collection of nutrients and phytochemicals important for heart health.

(Call out)
Avocado = Good fats + Folate + Phytochemicals + Fibre + Vitamins + minerals

- mostly unsaturated fats and no trans fats
- naturally low in sodium and sugars
- dietary fibre, including soluble fibre
- potassium
- folate
- antioxidant vitamins C and E
- polyphenol antioxidants
- colourful antioxidant carotenoids - beta carotene, cryptoxanthin, lutein and zeaxanthin

With all these nutritional goodies it's no wonder the Australian Dietary Guidelines recommend swapping foods high in saturated fats, such as butter, for foods with mostly unsaturated fats such as avocado.

How avocados help the heart
Blood lipids: A diet with a mostly unsaturated fatty acid profile (1), combined with plenty of fibre - including soluble fibre (2) - can optimise blood lipids. Avocados contain monounsaturated fat and soluble fibre and improve lipid profiles in human intervention studies (3).

(Call out)
The addition of 75-300g of avocado to a variety of healthy diets has been shown to lower total and LDL cholesterol while maintaining HDL cholesterol. These benefits have been observed in participants with a range of health profiles (4,5,6,7,8,9,10,11)

Blood pressure: The DASH diet (Dietary Approaches to Stop Hypertension) offers a good evidence-based approach to the management of high blood pressure. Including at least 2 serves of fruit and 5 serves of vegetables a day and limiting sodium (salt) can lower blood pressure. Avocados help meet the 2 & 5 target and are naturally low in sodium.

Body fat: Diets with monounsaturated fats from plant sources are associated with less weight gain over time (12). Avocado with a meal has been shown to increase perceived post-meal satiety (13.14) and better satiety makes a restricted-kilojoule diet easier to sustain over time.

Inflammation: Chronic, low-level metabolic inflammation (also coined *metaflammation)* is a contributor to metabolic disease and nutrition strategies can help (15). Generally saturated fats are pro-inflammatory

while unsaturated fats are anti-inflammatory (16). Avocados have unsaturated fats plus the bonus of anti-inflammatory (17) phytochemicals. And avocados also reduce oxidative stress (18), another contributor to cardiovascular disease.

Latest research on avocados

Reviews

Studies on avocado published over the past five years reaffirm their health benefits, especially for cardiovascular health. In particular, two systematic reviews and meta-analyses demonstrate helpful effects for lipid management. The first by Peou (19) and colleagues found avocado lowered total cholesterol, LDL cholesterol and triglycerides. A second by Mahmassani and colleagues (20) found avocado increased 'good' HDL cholesterol.

More generally, a review paper (21) describes how fruits - such as avocado (botanically a fruit) - can help in the prevention and treatment of cardiovascular disease via a variety of mechanisms.

Intervention studies

A study in overweight and obese adults (22) showed a moderate fat, cholesterol-lowering diet with one avocado a day had additional effects on lipoproteins compared to a matched moderate fat diet with no avocado. The avocado was especially effective at reducing the atherogenic small, dense LDL particles. Positive metabolic effects of avocado in the post-prandial period have also been described (23). Substituting some carbohydrate with avocado in overweight and obese subjects reduced glycemic and insulin responses, improved endothelial function, reduced triglyceride rich lipoproteins and increased HDL compared to a control meal.

A systematic review and dose-response meta-analysis of prospective studies of dietary intake and blood concentrations of antioxidants and the risk of cardiovascular disease, total cancer and all-cause mortality found higher dietary intake or blood concentrations of vitamin C, carotenoids and vitamin E were associated with reduced risk of all three outcomes. Avocado is a source of all three. The authors concluded the results support recommendations to increase fruit and vegetable intake for chronic disease prevention, but not antioxidant supplement use (24).

Epidemiological studies

In an analysis of the large US NHANES (National Health and Nutrition Examination Survey) cohort, consumers of avocado were found to have a fifty percent lower risk of metabolic syndrome (25) than non-consumers, as well as higher HDL cholesterol levels and higher diet quality.

An investigation (26) by the Harvard group using data from the Nurses Health and Health Professional Follow Up studies found monounsaturated fats from plant sources, such as those found in avocados, were associated with a reduced risk of cardiovascular disease. The risk reduction was 19% when monounsaturated fats from plants were used to replace saturated fats and monounsaturated fats from animal sources.

(Call out)

These latest studies confirm the value of avocado in cardio-protective eating patterns in both healthy weight and overweight people

Everybody loves avos

Another great thing about avocados are they on the 'include' list for all the popular diets. Whether it's the Mediterranean diet, DASH, low-carb, paleo, plant-based or vegan, avocados get a big tick. While avocado may not be the cheapest fruit, it does contain 4 x 50g serves per piece. Avocado is nutrient dense and offers excellent nutritional value for money.

Buying and storage tips

Ripe avocados are firm but yield slightly when pressed gently near the top. If not eaten straight away, they're best stored in the fridge. If they are hard, store next to the bananas in the fruit bowl to assist ripening.

If you're not using a whole avocado at once and have some left over, sprinkle the cut edge with lemon juice or vinegar to stop it from browning, press plastic wrap to the surface to remove air (or place in an avocado saver) and store in the fridge for a day or so. Even after that you can trim the browned edge and the flesh underneath will still be okay for a few days.

Avocado for a healthy heart; a delicious prescription

Avocado is a good choice at any time of the day. For maximum benefit, Enjoy avo with other cardio-protective foods such as wholegrains, legumes, nuts, seeds and seafood.

6 ways to enjoy avocado in heart-friendly meals

1. Smashed avo on wholegrain toast – try a poached egg or smoked salmon on top
2. Avocado in sandwiches, wraps and burgers– choose wholegrain bread, and plenty of vegetables, plus some seafood (eg tuna, salmon or prawns), egg or legumes (white beans, tofu or hummus)
3. Rice and noodle bowls with avocado - use brown rice and wholegrain/wholemeal noodles, different coloured veggies, legumes (eg lentils, black beans), nuts (eg almonds, cashews or pistachios) and seeds (sunflower, pumpkin or chia), plus some egg, seafood or chicken
4. Salads with avocado such as green salad, pasta salad or salad with lean meat or seafood (eg prawn and avocado salad)
5. Guacamole or avocado salsa with lean meat, chicken, seafood, eggs, beans or vege-burgers
6. Avocado in shakes and smoothies and better-for-you sweet treats such as chocolate mousse (yes really, try it!).

Check out more delicious recipes at australianavocados.com.au

NUTRITION INFORMATION Servings per package: 4 serves per avocado Serving size: ~50g or ¼ avocado		
	Average Quantity per Serving	Average Quantity per 100g
Energy	430kJ (102Cal)	860kJ (205Cal)
Protein, total	1.0g	2.0g
Fat, total	10.7g	21.4g
– saturated	2.4g	4.8g
– trans	0g	0g
– polyunsaturated	1.4g	2.7g
– monounsaturated	7.4g	12.8g
Carbohydrate	<1g	<1g
– sugars	<1g	<1g
Dietary fibre, total	2.5g	5.0g
Dietary fibre, soluble*	1g	2g

Sodium	2mg	4mg
Potassium	255mg	509mg
Folate	30ug DFE (15% RDI)	59ug DFE
Vitamin C	5.5mg (14% RDI)	11mg
Vitamin E	1mg (10% RDI)	2mg
Polyphenols	71mg GAE	142mg GAE
Beta carotene	14ug	27ug
Cryptoxanthin	59ug	117ug
Lutein & zeaxanthin	136ug	271ug

*(27)

References

1. Martin N et al. Reduction in saturated fat intake for cardiovascular disease. *Cochrane Database Syst Rev.* 2015 Jun 10;(6):CD011737. doi: 10.1002/14651858.CD011737. https://www.ncbi.nlm.nih.gov/pubmed/26068959
2. Brown L et al. Cholesterol-lowering effects of dietary fiber: a meta-analysis. *Am J Clin Nutr.* 1999 Jan;69(1):30-42. https://www.ncbi.nlm.nih.gov/pubmed/9925120
3. Peou S et al. Impact of avocado-enriched diets on plasma lipoproteins: A meta-analysis. *J Clin Lipidol.* 2016 Jan-Feb;10(1):161-71. doi: 10.1016/j.jacl.2015.10.011. https://www.ncbi.nlm.nih.gov/pubmed/26892133
4. Grant, W. C. Influence of avocados on serum cholesterol. *Proc. Soc.Exp. Biol. Med*. 1960;104:45–47. https://journals.sagepub.com/doi/abs/10.3181/00379727-104-25722?journalCode=ebma
5. Colquhoun DM et al. Comparison of the effects on lipoproteins and apolipoproteins of a diet high in monounsaturated fatty acids, enriched with avocado, and a high-carbohydrate diet. *Am J Clin Nutr*. 1992 Oct;56(4):671-7. https://academic.oup.com/ajcn/article/56/4/671/4715560
6. Alvizouri-Muñoz M et al. Effects of avocado as a source of monounsaturated fatty acids on plasma lipid levels. *Arch Med Res.* 1992 Winter;23(4):163-7. Available at https://www.ncbi.nlm.nih.gov/pubmed/1308699 .
7. Lerman-Garber I et al. Effect of a high-monounsaturated fat diet enriched with avocado in NIDDM patients. *Diabetes Care.* 1994 Apr;17(4):311-5. Available from https://www.ncbi.nlm.nih.gov/pubmed/8026287
8. Carranza J et al. Effects of avocado on the level of blood lipids in patients with phenotype II and IV dyslipidemias. *Arch Inst Cardiol Mex*. 1995 Jul-Aug;65(4):342-8. Available from https://www.ncbi.nlm.nih.gov/pubmed/8561655
9. López Ledesma R et al. Monounsaturated fatty acid (avocado) rich diet for mild hypercholesterolemia. *Arch Med Res*. 1996;27(4):519-23. Available at https://www.ncbi.nlm.nih.gov/pubmed/8987188
10. Carranza-Madrigal J et al. Effects of a vegetarian diet vs. a vegetarian diet enriched with avocado in hypercholesterolemic patients. *Arch Med Res.* 1997 Winter;28(4):537-41. https://www.ncbi.nlm.nih.gov/pubmed/9428580
11. Wang L, et al, Effect of a moderate fat diet with and without avocados on lipoprotein particle number, size and subclasses in overweight and obese adults: a randomized, controlled trial. *J Am Heart Assoc.* 2015 Jan 7;4(1). pii: e001355. doi: 10.1161/JAHA.114.001355. https://www.ncbi.nlm.nih.gov/pubmed/25567051
12. Li Y et al. Changes in Types of Dietary Fats Influence Long-term Weight Change in US Women and Men. *J Nutr*.2018 Nov 1;148(11):1821-1829. doi: 10.1093/jn/nxy183. https://www.ncbi.nlm.nih.gov/pubmed/30247611
13. Wien M et al. A randomized 3×3 crossover study to evaluate the effect of Hass avocado intake on post-ingestive satiety, glucose and insulin levels, and subsequent energy intake in overweight adults. *Nutr J.* 2013 Nov 27;12:155 https://www.ncbi.nlm.nih.gov/pubmed/24279738
14. Haddad E et al. Postprandial gut hormone responses to Hass avocado meals and their association with visual analog scores in overweight adults: A randomized 3 × 3 crossover trial. *Eat Behav.* 2018 Dec;31:35-40. doi: 10.1016/j.eatbeh.2018.08.001. https://www.ncbi.nlm.nih.gov/pubmed/30096700
15. Botchlett R et al. Nutritional approaches for managing obesity-associated metabolic diseases. *J Endocrinol*. 2017;233(3):R145-R171. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5511693/
16. Rocha DM et al. The role of dietary fatty acid intake in inflammatory gene expression: a critical review. *Sao Paulo Med J*.2017 Mar-Apr;135(2):157-168. doi: 10.1590/1516-3180.2016.008607072016. https://www.ncbi.nlm.nih.gov/pubmed/28076613
17. Li Z et al. Hass avocado modulates postprandial vascular reactivity and postprandial inflammatory responses to a hamburger meal in healthy volunteers. *Food Funct.* 2013 Feb 26;4(3):384-91. doi: 10.1039/c2fo30226h. https://www.ncbi.nlm.nih.gov/pubmed/23196671
18. Khor A et al. Postprandial oxidative stress is increased after a phytonutrient-poor food but not after a kilojoule-matched phytonutrient-rich food. Nutr Res. 2014 May;34(5):391-400. https://www.ncbi.nlm.nih.gov/pubmed/24916552
19. Peou S et al. Impact of avocado-enriched diets on plasma lipoproteins: A meta-analysis. *J Clin Lipidol.* 2016 Jan-Feb;10(1):161-71 https://www.ncbi.nlm.nih.gov/pubmed/26892133
20. Mahmassani HA et al.. Avocado consumption and risk factors for heart disease: a systematic review and meta-analysis. *Am J Clin Nutr.* 2018 Apr 1;107(4):523-536 https://www.ncbi.nlm.nih.gov/pubmed/29635493
21. Zhao CN et al. Fruits for Prevention and Treatment of Cardiovascular Diseases. *Nutrients.* 2017 Jun 13;9(6). https://www.ncbi.nlm.nih.gov/pubmed/28608832

22. Wang L et al. Effect of a moderate fat diet with and without avocados on lipoprotein particle number, size and subclasses in overweight and obese adults: a randomized, controlled trial. *J Am Heart Assoc.* 2015 Jan 7;4(1) https://www.ncbi.nlm.nih.gov/pubmed/25567051
23. Park E et al. Avocado Fruit on Postprandial Markers of Cardio-Metabolic Risk: A Randomized Controlled Dose Response Trial in Overweight and Obese Men and Women. *Nutrients.* 2018 Sep 12;10(9). https://www.ncbi.nlm.nih.gov/pubmed/30213052
24. Fulgoni VL 3rd, et al. Avocado consumption is associated with better diet quality and nutrient intake, and lower metabolic syndrome risk in US adults: results from the National Health and Nutrition Examination Survey (NHANES) 2001-2008. *Nutr J*. 2013 Jan 2;12:1 https://www.ncbi.nlm.nih.gov/pubmed/23282226
25. Zong G et al. Monounsaturated fats from plant and animal sources in relation to risk of coronary heart disease among US men and women. *Am J Clin Nutr.* 2018 Mar 1;107(3):445-453 https://www.ncbi.nlm.nih.gov/pubmed/29566185
26. Aune D, Keum N, Giavannucci E et al. Dietary intake and blood concentrations of antioxidants and the risk of cardiovascular disease, total cancer, and all-cause mortality: a systematic review and dose-response meta-analysis of prospective studies. *Am J Clin Nutr* 2018; 108 (5):1069-1091 https://academic.oup.com/ajcn/article/108/5/1069/5201459
27.Li BW et al Individual Sugars, Soluble, and Insoluble Dietary Fiber Contents of 70 High Consumption Foods *J Food Comp Anal* 2002(15):715-723 https://www.ncbi.nlm.nih.gov/pubmed/19255919

Appendix 2

Avocado Health and Nutrition Update
Healthy mums & bubs with avocado

The first thousand days of life are thought to be critical in the health of a child and may even determine their risk of disease in adulthood (1). Avocado can help optimize nutrition in the key life stages of pregnancy and infancy.

AVOCADO IS A NUTRIENT-RICH FOOD THAT SUPPORTS MATERNAL AND CHILD HEALTH

Avocado for healthy pregnancy

Pregnant women have increased nutrient needs and avocado is a nutrient-rich plant food with a range of vitamins, minerals, healthy fats and fibre.
The Australian Dietary Guidelines (2) recommends an increase in fruit and vegetables serves during breastfeeding

Pregnancy: 5 serves vegetables & 2 serves of fruit
Breastfeeding: 7 ½ serves of vegetables & 2 serves of fruit

Australian research suggests only 7% of pregnant women meet recommended vegetable intake and 13% meet recommended fruit intake (3).

Nutrient boosting
Avocado is not only nutrient-rich but the healthy fats in avocado help enhance the absorption of antioxidants from other foods eaten with it (4).

Fatigue-fighting
Pregnancy and breastfeeding can be tiring, and avocado contains energy boosting nutrients niacin, pantothenic acid, folate & Vitamin C to fight fatigue.

Folate
Avocados are a source of the B group vitamin folate that is important for a healthy pregnancy. It is an essential nutrient for cell division and blood and tissue formation and folate needs are higher during pregnancy and in the peri-conceptual period. A quarter of an avocado (50g) contributes 30ug of folate.

Unfortunately, research has found that most women of child-bearing age do not get nearly enough folate in their diets (5) (AIHW 2011).

The Recommended Dietary Intake (RDI) for women is 400µg of folate per day and the RDI during pregnancy is 600µg per day (NH&MRC 2006). This RDI is for dietary folate and does not include folic acid supplements required to prevent neural tube defects.

A DAILY FOLIC ACID SUPPLEMENT IS RECOMMENDED AT LEAST ONE MONTH BEFORE AND THREE MONTHS AFTER CONCEPTION TO PREVENT NEURAL TUBE DEFECTS SUCH AS SPINA BIFIDA. THE RECOMMENDED DOSE IS 400UG DAILY (6)

(Breakout box): **Folate or folic acid?**

Folate is the nutrient found naturally in foods. Folic acid is the term used for this nutrient when added to foods and in supplements (7)

Avocado for healthy babies

Avocado is a nutrient-rich whole food that contains energy, healthy fats, vitamins and minerals babies need for growth and development.
The NH&MRC Infant Feeding Guidelines (8) underline the importance of exclusive breastfeeding for 6 months and the introduction of nutritious solid foods of appropriate texture at around 6 months of age. The Guidelines say sugar or salt should not be added to foods during the transitional period. Avocado is an ideal first food for babies because it is soft, nutrient rich, mild in flavour and naturally low in sodium and sugars.

MASHED AVO IS AN IDEAL FIRST FOOD FOR BABIES

The information below describes the nutrients in 2 heaped tablespoons of avocado (50g) and what they do to help baby's growth and development (9).

Energy
Avocado helps babies on the move. It contains nutrients that help release energy from food such as B group vitamins B1, B2, B3 and B6, pantothenic acid, vitamin C, magnesium, manganese and biotin.

Brain development
Avocado contains nutrients needed for brain development such as niacin, Vitamin B6, biotin, pantothenic acid, folate, vitamin C, magnesium and copper.
At around 6 months of age babies need more iron for brain development and avocado contains iron as well vitamins B2, B6, C and copper which help absorb and transport iron.

Gut health
Avocado provides fibre needed for a healthy gut.

Muscle and bone
Avocado contains potassium and magnesium needed for muscle development and movement, and vitamin K for bone building. Each 50gram serve (2 heaped tablespoons) contains 100% of the infant RDI for bone-building vitamin K.

Immune system
Avocado contains a range of immune-supportive nutrients for babies such as Vitamins B6 & C, folate and copper.

Skin and hair
Avocado contains important nutrients for healthy skin including healthy fats, B-group vitamins, vitamin C and copper. Avocado also contains biotin and copper for heathy hair.

Eye health
Lutein protects the retinal cells required for vision and must be obtained from the diet. (10) The higher lutein levels in breastmilk compared to formula indicate it is important for infant eye development (11). It follows that lutein-rich foods such as avocado are important. Avocado also contains riboflavin that assists with normal vision development.

Latest Research
Avocados in maternal and infant nutrition were the topic of two articles in the same issue of the journal *Nutrients*. The first was on avocados in the maternal diet (12). The authors concluded avocados are unique among fruits and vegetables because they contain much higher amounts of key nutrients folate and potassium, which are under-consumed in maternal diets. Avocados also contain higher amounts of fibre, monounsaturated fats, and fat-soluble antioxidants, which have all been linked to improvements in maternal health, birth outcomes and/or breast milk quality.

The second article focused on avocado in the infant diet (13). They conclude that unsaturated oil-containing fruits such as avocados are nutritionally unique among fruits in that they are lower in sugar and higher in fiber and monounsaturated fatty acids than most other fruits, and they have the proper texture for first foods and a neutral flavour. They say avocados can help meet the dietary needs of infants and toddlers and should be recommended for complementary and transitional feeding.

THE TRANSITIONAL PERIOD FROM EXCLUSIVE BREASTFEEDING TO MOSTLY SOLID FOODS IS A NUTRITIONALLY CRITICAL TIME TO SUPPORT RAPID GROWTH AND DEVELOPMENT AND TO ENCOURAGE THE ACCEPTANCE OF A WIDE VARIETY OF NUTRITIOUS FOODS.

Buying and storage tips
Ripe avocados are firm but yield slightly when pressed gently near the top. If not eaten straight away, they're best stored in the fridge. If they are hard, store next to the bananas in the fruit bowl to assist ripening.
If you're not using a whole avocado at once and have some left over, sprinkle the cut edge with lemon juice or vinegar to stop it from browning, press plastic wrap to the surface to remove air (or place in an avocado saver) and store in the fridge for a day or so. Even after that you can trim the browned edge and the flesh underneath will still be okay for a few days.

5 ways with avocado for mums
1. For a nutrient-rich breakfast, avo on wholegrain toast with egg
2. For a smart snack, wholegrain crispbread with avocado and tomato
3. Green smoothie with fruit, green veg and avo for a sustaining snack or breakfast on the go
4. Brown rice or noodle bowl with salmon/tuna/chicken, avocado and veggies
5. Lift meat-&-3-veg from good to great with avo salsa

5 tips on avocado for bubs
1. When introducing solids at around 6 months, mash plain avocado with a fork until smooth.
2. Use mashed avocado to smooth the texture of other dry foods such as pureed meat, fish, chicken, egg or legumes.
3. Mix a little lemon juice into avocado for a change in flavour and to help iron absorption.
4. When baby has progressed to lumpy texture, smash or chop avocado roughly.
5. When baby is eating finger food by themselves, give them a quarter of an avocado (flesh only), or smashed avo on toast fingers – be prepared for a happy, healthy mess.

Find more recipe ideas at australianavocados.com.au

Nutrition Information with %RDI for babies

NUTRITION INFORMATION (including RDIs for babies) Servings per package: 4 serves per avocado Serving size: ~50g or ¼ avocado		
	Average	Average

	Quantity per Serving	Quantity per 100g
Energy	430kJ (102Cal)	860kJ (205Cal)
Protein, total	1.0g	2.0g
Fat, total	10.7g	21.4g
– saturated	2.4g	4.8g
– trans	0g	0g
– polyunsaturated	1.4g	2.7g
– monounsaturated	7.4g	12.8g
Carbohydrate	<1g	<1g
– sugars	<1g	<1g
Dietary fibre, total	2.5g	5.0g
Sodium	2mg	4mg
Potassium	255mg	509mg
Thiamin	0.04mg (11% RDI)	0.08mg
Riboflavin	0.07mg (12% RDI)	0.14mg
Niacin	1.2mg eq (40% RDI)	2.4mg eq
Vitamin B6	0.06mg (13% RDI)	0.12mg
Biotin	2.5ug (42% RDI)	5.0ug
Pantothenic acid	0.7mg (39% RDI)	1.39mg
Folate	30ug DFE (40% RDI)	59ug DFE
Vitamin C	5.5mg (18% RDI)	11mg
Vitamin E	1mg (25% RDI)	2mg
Vitamin K	11ug (110% RDI)	21ug
Copper	0.14mg (22% RDI)	0.28mg
Iron	0.32mg (11% RDI)	0.64mg
Magnesium	14mg (23% RDI)	28mg
Manganese	0.12mg (15% RDI)	0.24mg
Boron	0.72mg	1.43mg
Polyphenols	71mg GAE	142mg GAE
Beta carotene	14ug	27ug
Cryptoxanthin	59ug	117ug
Lutein & zeaxanthin	136ug	271ug
Gluten	0mg	0mg

"<" means less than

(Industry Collateral: website, social media, contact details)
Image suggestions: pregnant woman, bouncing baby, avo image showing base as baby bump?

References

1. Langley-Evans SC. Nutrition in early life and the programming of adult disease: a review. J Hum Nutr Diet. 2015 Jan;28 Suppl 1:1-14. doi: 10.1111/jhn.12212. Epub 2014 Jan 31 https://www.ncbi.nlm.nih.gov/pubmed/24479490
2.National Health & Medical Research Council (NH&MRC) (2013) Educator Guide. Canberra. NH&MRC. https://www.eatforhealth.gov.au/guidelines
3. Wen LM, Flood VM, Simpson JM, Rissel C, Baur LA. Dietary behaviours during pregnancy: findings from first-time mothers in southwest Sydney, Australia. *Int J Behav Nutr Phys Act*. 2010;7:13. Published 2010 Feb 3. doi:10.1186/1479-5868-7-13
4. Unlu NZ et al. Carotenoid absorption from salad and salsa by humans is enhanced by the addition of avocado or avocado oil. *J Nutr.* 2005 Mar;135(3):431-6. https://www.ncbi.nlm.nih.gov/pubmed/15735074
5.Australian Institute of Health and Welfare 2011. Mandatory folic acid and iodine fortification in Australia and New Zealand: baseline report for monitoring. Cat. no. PHE 139 Canberra: AIHW. http://www.aihw.gov.au/WorkArea/DownloadAsset.aspx?id=10737418918&libID=10737418917
6.Royal Australian and New Zealand College of Obstetricians and Gynaecologists. Vitamin and Mineral Supplementation and Pregnancy (May 2015). Available at URL https://www.ranzcog.edu.au/RANZCOG_SITE/media/RANZCOG-MEDIA/Women%27s%20Health/Statement%20and%20guidelines/Clinical-Obstetrics/Vitamin-and-mineral-supplementation-in-pregnancy-(C-Obs-25)-Review-Nov-2014,-Amended-May-2015.pdf?ext=.pdf

7. Food Standards Australia and New Zealand. Folic acid/folate in pregnancy. http://www.foodstandards.gov.au/consumer/generalissues/pregnancy/folic/Pages/default.aspx
8. National Health & Medical Research Council (NH&MRC) (2013) Infant Feeding Guidelines- Information for health workers. Canberra. NH&MRC. https://www.eatforhealth.gov.au/guidelines
9. FSANZ Australian New Zealand Food Standards Code. Standard 1.2.7 Nutrition, health and related claims standard https://www.legislation.gov.au/Details/F2017C01048 and Schedule 4 https://www.legislation.gov.au/Details/F2017C00711 and regulatory RDIs for infants found in Schedule 1 https://www.legislation.gov.au/Details/F2017C00315
10. Landrum JT, Bone RA (2001) Lutein, zeaxanthin, and the macular pigment. Arch Biochem Biophys 385:28–40
11. Bettler J et al Serum lutein concentrations in healthy term infants fed human milk or infant formula with lutein. *Eur J Nutr.* 2010 Feb;49(1):45-51 https://www.ncbi.nlm.nih.gov/pubmed/19672550
12. Comerford KB, Ayoob KT, Murray RD et al. The Role of Avocados in Maternal Diets during the Periconceptional Period, Pregnancy, and Lactation. Nutrients. 2016 May 21; 8(5). Epub 2016 May 21.
13. Comerford KB, Ayoob KT, Murray RD, Atkinson SA. The Role of Avocados in Complementary and Transitional Feeding. Nutrients. 2016 May 21;8(5). pii: E316. doi: 10.3390/nu8050316. https://www.ncbi.nlm.nih.gov/pubmed/27213450

Appendix 3

Avocado Health and Nutrition Update
A Healthy Weight with Avocados

(Breakout box: summary)
Avocado once the dieters' foe is now the dieters' friend. Not only does avocado add nutritional value to energy restricted diets, their healthy fats can help manage appetite and boost satiety.

(Call out statement)

Not all fats are equal and avocados contain healthy fats

Healthy fats

Avocados contain mostly monounsaturated fats. These plant-based unsaturated fats don't cause weight gain (1) as has long been thought. Higher fat diets such as the Mediterranean diet, rich in monounsaturated fats from extra virgin olive oil, can result in weight loss and "waist" loss when followed for more than 6 months. (2) These higher fat diets appear more enjoyable and easier to stick to in the longer term than low fat diets, ensuring greater weight management success. (3)
Studies have found the monounsaturated fat oleic acid (like that found in avocados) triggers the release of gut hormones glucagon-like peptide 1 (GLP-1) and gastric inhibitory polypeptide (GIP) which control insulin release (4,5). This suggests one mechanism for how avocado helps with appetite control.

Last research: avocado and appetite control

Emerging research into the weight management effects of avocado have found 50-200g a day helps promote satiety and is a good alternative to other dietary fats in energy-restricted diets. (6,7) People who eat avocado weigh less and have a lower BMI and waist circumference. (8)

A recent analysis of the US National Health and Nutrition Examination Survey (NHANES) found that avocado consumers ate on average 70g a day and these regular avocado consumers had:

- Lower body weight (3.4kg less on average),
- Lower BMI (26.7 instead of 28.4) and
- Smaller waist circumference (4cm smaller on average)

compared to those who didn't eat avocado. (8)

So far clinical trials investigating the effects of avocado on appetite and weight have found:

- 200g of avocado in place of 30g of other dietary fats in an energy restricted diet over 6 weeks resulted in significant reductions in: body weight, body mass index, and percentage of body fat in the overweight participants (6),
- 50-90g of avocado added to a lunch meal increased satiety in overweight participants by 23% and their desire-to-eat reduced by 28% for 3-5 hours following the meal.(7) Adding avocado to lunch may help reduce between-meal snacking.
- The same study found 30 minutes after consuming avocado at lunch the rise in blood insulin levels was attenuated by more than 20% and continued for the next 3 hours (7) This is a good result as excess insulin can lead to weight gain.
- A reduction in the gut hormone GLP-1 (Glucagon-like peptide 1) and a corresponding reduction in hunger and an increase in perceived satisfaction after a meal with added avocado. This GLP-1 reduction could in part explain lower insulin levels. (9)
- When eaten at the same time as other foods, avocado intake can counteract inflammation and oxidative stress (10,11) This is beneficial as chronic inflammation can lead to insulin resistance and weight gain (12).

Further research is required to replicate these findings in larger, long-term trials as well as identify mechanisms for avocado's role in weight management. To date research has found extracts of avocado fruit:

- inhibit the action of acetyl-CoA carboxylase, a key enzyme in the production of fat in the body(13) and
- modulates other enzymes involved in carbohydrate metabolism (14).

(Highlight call out summary)

How avocado helps with weight

(call out)

Healthy diet + increased satiety + reduced inflammation + reduced insulin

(Breakout box)

NUTRITION INFORMATION Servings per package: 4 serves per avocado Serving size: ~50g or ¼ avocado		
	Average Quantity per Serving	Average Quantity per 100g
Energy	430kJ (102Cal)	860kJ (205Cal)
Protein, total	1.0g	2.0g
Fat, total	10.7g	21.4g
– saturated	2.4g	4.8g
– trans	0g	0g
– polyunsaturated	1.4g	2.7g
– monounsaturated	7.4g	12.8g
Carbohydrate	<1g	<1g
– sugars	<1g	<1g
Dietary fibre, total	2.5g	5.0g
Sodium	2mg	4mg

Everybody loves avos
Another great thing about avocados are they are on the 'include' list for all the popular diets. Whether it's the Mediterranean diet, DASH, low-carb, paleo, plant-based or vegan, avocados get a big tick.
While avocado may not be the cheapest fruit, it does contain 4 x 50g serves per piece. Avocado is nutrient dense and offers excellent nutritional value for money.

Buying and storage tips
Ripe avocados are firm but yield slightly when pressed gently near the top. If not eaten straight away, they're best stored in the fridge. If they are hard, store next to the bananas in the fruit bowl to assist ripening.
If you're not using a whole avocado at once and have some left over, sprinkle the cut edge with lemon juice or vinegar to stop it from browning, press plastic wrap to the surface to remove air (or place in an avocado saver) and store in the fridge for a day or so. Even after that you can trim the browned edge and the flesh underneath will still be okay for a few days.

6 ways to add avocado to meals for waist watchers:
1) Go smashed avocado on wholegrain toast for breakfast – the café classic and millennial icon http://australianavocados.com.au/recipes/avoschetta
2) Whiz up an avo fruit smoothie for a breakfast on the go http://australianavocados.com.au/recipes/avocado-and-berry-power-smoothie

3) Add avocado to salads at lunch along with wholegrains such as quinoa, brown rice and wholemeal pasta http://australianavocados.com.au/recipes/avocado-mango-and-quinoa-salad
4) Try a chilled avocado soup in summer for a light easy meal http://australianavocados.com.au/recipes/easy-chilled-avocado-dill-soup
5) Make lean meat and seafood sing with avocado salsa http://australianavocados.com.au/recipes/easy-poached-fish-avocado-salsa

Check out the Australian avocados website for delicious recipes at australianavocados.com.au

References

1) Liu X et al. Changes in Types of Dietary Fats Influence Long-term Weight Change in US Women and Men. *J Nutr.* 2018 Nov 1;148(11):1821-1829. doi: 10.1093/jn/nxy183. https://www.ncbi.nlm.nih.gov/pubmed/30247611
2) Esposito K et al Mediterranean diet and weight loss: meta-analysis of randomized controlled trials. *Metab Syndr Relat Disord.* 2011 Feb;9(1):1-12. doi: 10.1089/met.2010.0031. https://www.ncbi.nlm.nih.gov/pubmed/20973675
3) McManus K et al. A randomized controlled trial of a moderate-fat, low-energy diet compared with a low fat, low-energy diet for weight loss in overweight adults. *Int J Obes Relat Metab Disord.* 2001 Oct;25(10):1503-11. https://www.ncbi.nlm.nih.gov/pubmed/11673773
4) Naughton SS et al. The Acute Effect of Oleic- or Linoleic Acid-Containing Meals on Appetite and Metabolic Markers; A Pilot Study in Overweight or Obese Individuals. *Nutrients.* 2018 Sep 26;10(10). pii: E1376. doi: 10.3390/nu10101376. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6213143/
5) Thomsen C et al. Differential effects of saturated and monounsaturated fatty acids on postprandial lipemia and incretin responses in healthy subjects. *Am J Clin Nutr.* 1999 Jun;69(6):1135-43. https://www.ncbi.nlm.nih.gov/pubmed/10357731
6) Pieterse Z et al. Substitution of high monounsaturated fatty acid avocado for mixed dietary fats during an energy-restricted diet: effects on weight loss, serum lipids, fibrinogen, and vascular function. *Nutrition.* 2005;21(1):67-75. https://www.ncbi.nlm.nih.gov/pubmed/15661480
7) Wien M et al. A randomized 3x3 crossover study to evaluate the effect of Hass avocado intake on post-ingestive satiety, glucose and insulin levels, and subsequent energy intake in overweight adults.*Nutr J.* 2013 Nov 27;12:155. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4222592
8) Fulgoni VL 3rd et al. Avocado consumption is associated with better diet quality and nutrient intake, and lower metabolic syndrome risk in US adults: results from the National Health and Nutrition Examination Survey (NHANES) 2001-2008. *Nutr J.* 2013 Jan 2;12:1. https://www.ncbi.nlm.nih.gov/pubmed/23282226
9) Haddad E et al. Postprandial gut hormone responses to Hass avocado meals and their association with visual analog scores in overweight adults: A randomized 3 × 3 crossover trial. *Eat Behav.* 2018 Dec;31:35-40. doi: 10.1016/j.eatbeh.2018.08.001. https://www.ncbi.nlm.nih.gov/pubmed/30096700
10) Khor A et al. Postprandial oxidative stress is increased after a phytonutrient-poor food but not after a kilojoule-matched phytonutrient-rich food. Nutr Res. 2014 May;34(5):391-400. doi: 10.1016/j.nutres.2014.04.005. https://www.ncbi.nlm.nih.gov/pubmed/24916552
11) Li Z et al. Hass avocado modulates postprandial vascular reactivity and postprandial inflammatory responses to a hamburger meal in healthy volunteers. Food Funct. 2013 Feb 26;4(3):384-91. doi: 10.1039/c2fo30226h. https://www.ncbi.nlm.nih.gov/pubmed/23196671
12) Keane KN et al. Molecular Events Linking Oxidative Stress and Inflammation to Insulin Resistance and β-Cell Dysfunction. Oxid Med Cell Longev. 2015;2015:181643. doi: 10.1155/2015/181643. https://www.ncbi.nlm.nih.gov/pubmed/26257839
13) Hashimura H et al. Acetyl-CoA carboxylase inhibitors from avocado (Persea americana Mill) fruits. *Biosci Biotechnol Biochem*. 2001 Jul;65(7):1656-8. https://www.ncbi.nlm.nih.gov/pubmed/11515553
14) Mahadeva Rao US et al. Salutary potential of ethanolic extract of avocado fruit on anomalous carbohydrate metabolic key enzymes in hepatic and renal tissues of hyperglycaemic albino rats. *Chin J Integr Med.* 2017 Sep 15. doi: 10.1007/s11655-017-2784-2. [Epub ahead of print] https://www.ncbi.nlm.nih.gov/pubmed/28914437

Appendix 4

Avocado Health and Nutrition Update
Avocado – a nutrient booster

(Breakout box: summary)
Avocado is well known for its healthy fats but there is so much more nutrition in this gorgeous green fruit - vitamins, minerals and antioxidants - all essential for good health. Avocado helps boost nutrient absorption too.

Nutrient-rich avocados
We know avocado eaters tend to consume significantly more of key nutrients than non-avocado eaters. (1) That's in part because avocados are nutrient-dense. A quarter of an avocado - just 50g - contains:

- healthy fats and dietary fibre
- folate, niacin and pantothenic acid
- vitamins C, E and K
- potassium
- polyphenol antioxidants
- colourful antioxidant carotenoids - beta carotene, cryptoxanthin, lutein and zeaxanthin

(Breakout box)

NUTRITION INFORMATION Servings per package: 4 serves per avocado Serving size: ~50g or ¼ avocado		
	Average Quantity per Serving	Average Quantity per 100g
Energy	430kJ (102Cal)	860kJ (205Cal)
Protein, total	1.0g	2.0g
Fat, total	10.7g	21.4g
– saturated	2.4g	4.8g
– trans	0g	0g
– polyunsaturated	1.4g	2.7g
– monounsaturated	7.4g	12.8g
Carbohydrate	<1g	<1g
– sugars	<1g	<1g
Dietary fibre, total	2.5g	5.0g
Sodium	2mg	4mg
Potassium	255mg	509mg
Niacin	1.2mg eq (12% RDI)	2.4mg eq
Pantothenic acid	0.7mg (14% RDI)	1.4mg
Folate	30ug DFE (15% RDI)	59ug DFE
Vitamin C	5.5mg (14% RDI)	11mg
Vitamin E	1mg (10% RDI)	2mg
Vitamin K	11ug (14% RDI)	21ug
Polyphenols	71mg GAE	142mg GAE
Beta carotene	14ug	27ug
Cryptoxanthin	59ug	117ug
Lutein & zeaxanthin	136ug	271ug

Why do we need…

Healthy fats
Monounsaturated fats help maintain heart health and aid in the body's absorption of fat-soluble vitamins such as vitamin E and carotenoids. (2,3)

Dietary fibre
Fibre is good for gut health and helps keep us regular.(4) Avocado contains around 2.5g of fibre per 50g serve, and both soluble and insoluble fibre.

Vitamins
Folate
This B group vitamin folate is needed for brain function, a healthy immune system, normal blood formation and supports healthy pregnancy.(4) A 50g serve of avocado provides 30ug or 15% of RDI.

Vitamin C
Antioxidant vitamin C works with vitamin E to help reduce the effects of free radical cell damage.(5) Vitamin C is essential for boosting plant (non-haem) iron absorption, building strong bones and teeth, healthy gums and skin, a healthy immune system and brain function.(4) Avocado contains about 6mg of Vitamin C or 14% of RDI for adults.

Vitamin E
Vitamin E is a fat-soluble antioxidant vitamin (4) commonly found in foods with healthy fats including avocado. A quarter of an avocado (50g) provides 1mg of vitamin E or 10% of RDI for adults.

Vitamin K
Vitamin K helps build bones and assists with blood clotting. (4) A 50g serve of avocado contains 11ug of vitamin K or 14% of the RDI for adults.

Niacin and Pantothenic acid
Avocado is an energy booster and fatigue fighter. It contains niacin to help release energy from food and pantothenic acid needed for fat metabolism. (4) Avocado contains over 10% of the RDI for each nutrient.

Potassium and sodium
A healthy, varied diet low in sodium helps to maintain normal blood pressure(4) and higher potassium intake reduces the risk of heart disease and stroke.(6) Avocado contributes to a good sodium/potassium balance, with a quarter of an avocado providing just 2mg of sodium and 255mg of potassium.

Phytochemicals
Avocado contains phytochemicals with antioxidant and anti-inflammatory properties. These include polyphenols and colourful carotenoids such as beta carotene, cryptoxanthin, lutein and zeaxanthin that help give avocado its unique colour. These natural antioxidants contribute to cell protection from free radical damage.

Latest avocado research: the eyes have it
The latest research supports the nutrient boosting benefits of avocado for eye health. The macula lutea in the centre of the retina is responsible for central vision and is yellow in colour because it contains carotenoid pigments lutein and zeaxanthin. These pigments are found in avocado (9) and avocado consumption has been found to boost macula pigment (10). Carotenoids help reduce the risk of macular degeneration. (7,8) Interestingly carotenoids are transported to the eye via HDL cholesterol (11,12) and avocado also boosts HDL. (13)

Avocados boost nutrient absorption
The healthy fats in avocado don't just look after the heart, evidence is building they boost nutrient absorption as well. Avocado enhances the absorption of carotenoids (provitamin A) and enhances their conversion to vitamin A needed for vision. (15)
For example:
- Adding 75g-150g of monounsaturated fat-rich avocados to salads and salsa increases carotenoid absorption fivefold (14).
- Avocado enhances beta carotene absorption from tomatoes 2.4-fold and enhances vitamin A conversion efficiency 4.6 fold and

- Avocado enhances beta carotene absorption 6 fold and vitamin A conversion efficiency 2.6 fold from carrots. (16)

Buying and storage tips
Ripe avocados are firm but yield slightly when pressed gently near the top. If not eaten straight away, they're best stored in the fridge. If they are hard, store next to the bananas in the fruit bowl to assist ripening.
If you're not using a whole avocado at once and have some left over, sprinkle the cut edge with lemon juice or vinegar to stop it from browning, press plastic wrap to the surface to remove air (or place in an avocado saver) and store in the fridge for a day or so. Even after that you can trim the browned edge and the flesh underneath will still be okay for a few days.

5 tips to nutrient boost your favourite meals by adding avo:

1) Mix avocado into scrambled eggs or use in place of mayo for egg sandwiches http://australianavocados.com.au/recipes/avocado-scrambled-egg-wraps
2) Reduce the inflammatory impact of meals by adding avocado (17) http://australianavocados.com.au/recipes/lamb-burger-avocado-and-chilli-jam
3) Absorb more colourful antioxidant pigments from salad vegetables by adding avo (15) http://australianavocados.com.au/recipes/avocado-watermelon-salad
4) Add a nutrient boost to green smoothies with avocado http://australianavocados.com.au/recipes/avocado-smoothie
5) Make sweet treats healthier using avocado– chocolate mousse anyone? http://australianavocados.com.au/recipes/avocado-chocolate-mousse

Check out the Australian avocados website for delicious recipes at australianavocados.com.au

References

1) Fulgoni VL 3rd, Dreher M, Davenport AJ. Avocado consumption is associated with better diet quality and nutrient intake, and lower metabolic syndrome risk in US adults: results from the National Health and Nutrition Examination Survey (NHANES) 2001-2008. *Nutr J.* 2013 Jan 2;12:1. Doi: 10.1186/1475-2891-12-1. https://www.ncbi.nlm.nih.gov/pubmed/23282226
2) Schwingshackl L et al. Monounsaturated fatty acids and risk of cardiovascular disease: synopsis of the evidence available from systematic reviews and meta-analyses. *Nutrients.* 2012 Dec 11;4(12):1989-2007. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3546618/
3) Dreher ML et al. Hass Avocado Composition and Potential Health Effects *Critical Reviews in Food Science and Nutrition* 2013;53:738–750 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3664913/
4) FSANZ. Australia New Zealand Food Standards Code – Standard 1.2.7 – Nutrition, health and related claims Available at: https://www.legislation.gov.au/Details/F2017C01048 accessed 17 Nov 2018
5) NHMRC (2006). Nutrient reference values for Australia and New Zealand: Vitamin C. Available at https://www.nrv.gov.au/nutrients/vitamin-c ; accessed 17 Nov 2018
6) Hunt BD et al. Potassium intake and stroke risk: a review of the evidence and practical considerations for achieving a minimum target. *Stroke* 2014 May;45(5):1519-22. https://www.ncbi.nlm.nih.gov/pubmed/24699056
7) Meyers KJ et al. Genetic evidence for role of carotenoids in age-related macular degeneration in the Carotenoids in Age-Related Eye Disease Study (CAREDS). *Invest Ophthalmol Vis Sci.* 2014 Jan 29;55(1):587-99. https://www.ncbi.nlm.nih.gov/pubmed/24346170
8) Chew EY et al. Secondary analyses of the effects of lutein/zeaxanthin on age-related macular degeneration progression: AREDS2 report No. 3. *JAMA Ophthalmol.* 2014 Feb;132(2):142-9. https://www.ncbi.nlm.nih.gov/pubmed/24310343
9) Ashton OB et al. Pigments in avocado tissue and oil. *J Agric Food Chem.* 2006 Dec 27;54(26):10151-8. https://www.ncbi.nlm.nih.gov/pubmed/17177553
10) Scott TM et al. Avocado Consumption Increases Macular Pigment Density in Older Adults: A Randomized, Controlled Trial. *Nutrients.* 2017 Aug 23;9(9). pii: E919. doi: 10.3390/nu9090919. https://www.ncbi.nlm.nih.gov/pubmed/28832514
11) Merle BM et al. Association of HDL-related loci with age-related macular degeneration and plasma lutein and zeaxanthin: the Alienor study. *PLoS One.* 2013 Nov 6;8(11):e79848. https://www.ncbi.nlm.nih.gov/pubmed/24223199
12) Kijlstra A et al. Lutein: more than just a filter for blue light. *Prog Retin Eye Res.* 2012 Jul;31(4):303-15. https://www.ncbi.nlm.nih.gov/pubmed/22465791
13) Mahmassani HA et al. Avocado consumption and risk factors for heart disease: a systematic review and meta-analysis. *Am J Clin Nutr.* 2018 Apr 1;107(4):523-536. doi: 10.1093/ajcn/nqx078. https://www.ncbi.nlm.nih.gov/pubmed/29635493
14) Unlu NZ et al. Carotenoid absorption from salad and salsa by humans is enhanced by the addition of avocado or avocado oil. *J Nutr.* 2005 Mar;135(3):431-6. https://www.ncbi.nlm.nih.gov/pubmed/15735074

15) NHMRC (2006). Nutrient Reference Values for Australia and New Zealand including Vitamin A paper. Available at http://www.nrv.gov.au/nutrients/ vitamin-a accessed 17 Nov 2018.
16) Kopec RE et al. Avocado Consumption Enhances Human Postprandial Provitamin A Absorption and Conversion from a Novel High-β-Carotene Tomato Sauce and from Carrots. *J Nutr.* 2014 Aug;144(8):1158-66 https://www.ncbi.nlm.nih.gov/pubmed/24899156
17) Li Z et al. Hass avocado modulates postprandial vascular reactivity and postprandial inflammatory responses to a hamburger meal in healthy volunteers. *Food Funct.* 2013 Feb 26;4(3):384-91. doi: 10.1039/c2fo30226h. https://www.ncbi.nlm.nih.gov/pubmed/23196671

Appendix 5

Avocado Health and Nutrition Update
Avocado for diabetes

(Breakout box: summary)
Just over 1 million Australians reported having type 2 diabetes in the last National Health Survey (2014/15) (1) and it's estimated 2 million Aussies are at high risk of developing it in the future (2). Avocado is a whole plant food with nutrients people with diabetes need and including avocado in meals and snacks can positively effect blood glucose and insulin levels.

(call out)
Diabetes-friendly nutrients in avocados

AVOCADO = GOOD FATS + FIBRE + VITAMINS C&E + CAROTENOIDS + GLYCAEMIC BENEFITS

Healthy fats
Diets containing monounsaturated fats like those in avocado may reduce the risk of developing type 2 diabetes (T2D) (3) and for those who already have T2D monounsaturated fat diets decrease fasting blood glucose (4), decrease glycosylated haemoglobin (HbA1c) (5), lower fasting insulin (6), improve insulin sensitivity (6) and decrease postprandial insulin response (7).

Dietary fibre
Higher intakes of dietary fibre especially from fruits and green/yellow vegetables is associated with a reduced risk of T2D. (8)

Vitamin C
A New Zealand study found people with T2D may have higher vitamin C requirements (9) and vitamin C supplements have been shown to help glucose control in those with T2D (10). A 50g serve or 1/4 avocado contains 14% of the RDI for vitamin C.

Vitamin E
Avocado also contains vitamin E (10% RDI) and it's helpful that vitamin C and E are present together as vitamin E requires vitamin C to help it regenerate its antioxidant ability. (11) Higher intake of vitamin E is also associated with a reduced risk of T2D. (12)

Carotenoids
Avocado contains colourful carotenoid pigments beta carotene, lutein and zeaxanthin. Higher intake of these carotenoids is associated with a reduced risk of T2D. (12,13) Lutein and zeaxanthin may also protect against diabetic retinopathy, a complication of T2D. (14)

Polyphenols
Diets high in polyphenols may help reduce the risk of developing T2D by positively affecting glucose metabolism. (15) For those with T2D, polyphenols help lower HbA1c (16) and reduce oxidative stress and inflammation thereby improving insulin resistance (17).

Glycaemic benefits
Adding healthy fats to meals with carbohydrate reduces the glycaemic impact of the meal. Fat content is estimated to predict 31% of the variability of postprandial glycaemia and insulinaemia. (18) A reduced glycaemic impact has been demonstrated for other high monounsaturated fat spreads peanut butter (19) and hummus (20) so there's no reason why avocado wouldn't have the same effect. Smashed avo on toast anyone?

Sugars

Avocado contains a unique sugar D-manno-heptulose that does not contribute energy and may help blood glucose control by reducing glycolysis. (21,22)

Avocado and metabolic health
People with diabetes have twice the risk of cardiovascular disease as those without T2D. (23) Avocado can assist those with T2D through improving blood lipid levels – triglycerides and total, LDL and HDL cholesterol. (24,25)

Last research on avocado and metabolic health
Blood lipids
Two studies have examined the effects of avocado in people with T2D. A small randomised crossover study involving 12 women with T2D found after four weeks each of a high monounsaturated fat diet (with an avocado a day, a third at each meal) and a high carbohydrate diet, there was minor cholesterol lowering in both diets but the avocado diet was associated with a greater decrease in blood triglycerides (20% vs. 7% in the high-carbohydrate diet). Glycaemic control was similar during both diets. Researchers concluded that including avocado in the diet of those with T2D could help reduce cholesterol and triglycerides. (24)

The second study followed 37 participants with hypercholesterolemia (half with T2D) who consumed a diet enriched with 300g of avocado to replace all other fats for a week. In those with T2D, total and LDL cholesterol was reduced by about 20% and reductions in blood glucose levels were seen for most participants although only a third were clinically significant. (25)

For more heart health benefits see the *Avocado for a Healthy Heart* fact sheet (hyperlink)

Blood glucose
In people with type 2 diabetes replacing some carbohydrate with avocado helps to maintain blood glucose control (24). Studies in healthy or overweight people have found either no compromise in blood glucose with avocado consumption (26,27) or significant reductions in post prandial glycemia after a half serve (68g) or full serve (136g) of avocado (28). Lower post prandial insulin has also been shown in several studies (26,28,29). These results are promising, and more research is needed.

Animal research is uncovering mechanisms to explain the beneficial glycaemic effects of avocado. Avocado extracts have been found to:

- modulate the activities of carbohydrate metabolic enzymes in rats (30,31),
- inhibit enzymes such as α-amylase and reduce oxidative stress in rat pancreas (32),
- increase glucose uptake in the liver and normalise liver enzyme levels (33,34).

Avocado oil has been shown to improve glucose tolerance and insulin resistance in rats fed high sucrose diets. (35)

(call out)

Avocado = lower blood lipids + better blood glucose control + lower insulin levels

(Breakout box)

NUTRITION INFORMATION Servings per package: 4 serves per avocado Serving size: ~50g or ¼ avocado		
	Average Quantity per Serving	Average Quantity per 100g
Energy	430kJ (102Cal)	860kJ (205Cal)
Protein, total	1.0g	2.0g

Fat, total	10.7g	21.4g
– saturated	2.4g	4.8g
– trans	0g	0g
– polyunsaturated	1.4g	2.7g
– monounsaturated	7.4g	12.8g
Carbohydrate	<1g	<1g
– sugars	<1g	<1g
Dietary fibre, total	2.5g	5.0g
Sodium	2mg	4mg
Potassium	255mg	509mg
Vitamin C	5.5mg (14% RDI)	11mg
Vitamin E	1mg (10% RDI)	2mg
Polyphenols	71mg GAE	142mg GAE
Beta carotene	14ug	27ug
Cryptoxanthin	59ug	117ug
Lutein & zeaxanthin	136ug	271ug

Buying and storage tips

Ripe avocados are firm but yield slightly when pressed gently near the top. If not eaten straight away, they're best stored in the fridge. If they are hard, store next to the bananas in the fruit bowl to assist ripening.

If you're not using a whole avocado at once and have some left over, sprinkle the cut edge with lemon juice or vinegar to stop it from browning, press plastic wrap to the surface to remove air (or place in an avocado saver) and store in the fridge for a day or so. Even after that you can trim the browned edge and the flesh underneath will still be okay for a few days.

6 diabetes-friendly meal ideas with avocado:

1) Easy avo and baked beans on wholegrain toast for a high fibre, low GI breakfast
   http://australianavocados.com.au/recipes/avocado-and-baked-beans-toast
2) Spread your wholegrain bread, roll, wrap or crispbread with avocado instead of butter
   http://australianavocados.com.au/recipes/multigrain-bread-smoked-fish-avocado-cucumber-spicy-sauce
3) Make lean meat, chicken, fish or vege-burgers sing with an avo salsa
   http://australianavocados.com.au/recipes/sweetcorn-and-avocado-salsa-limes-and-tomatoes
4) Top pasta or vege-noodles with avocado
   http://australianavocados.com.au/recipes/avo-zoodles
5) Make a lower GI green potato mash with avocado
   http://australianavocados.com.au/recipes/avocado-potato-parsnip-mash-salmon
6) Viva Mexicana with avo and chilli beans in tacos and tortillas
   http://australianavocados.com.au/recipes/tacos-grilled-chicken-bean-salsa-and-avocado

Check out australianavocados.com.au for more delicious recipes.

References

1) https://www.aihw.gov.au/reports/diabetes/diabetes-snapshot/contents/how-many-australians-have-diabetes/type-2-diabetes
2) http://www.novonordisk.com.au/content/dam/australia/affiliate/www-novonordisk-au/Home/Documents/180712_Burden%20of%20Diabetes_Its%20Time%20for%20More%20Action%20Report_Digital_%20FINAL....pdf
3) Mirmiran P et al. Fatty acid quality and quantity of diet and risk of type 2 diabetes in adults: Tehran Lipid and Glucose Study. *J Diabetes Complications.* 2018 Jul;32(7):655-659. doi: 10.1016/j.jdiacomp.2018.05.003. https://www.ncbi.nlm.nih.gov/pubmed/29853261
4) Qian F et al. Metabolic Effects of Monounsaturated Fatty Acid-Enriched Diets Compared With Carbohydrate or Polyunsaturated Fatty Acid-Enriched Diets in Patients With Type 2 Diabetes: A Systematic Review and Meta-analysis of Randomized Controlled Trials. *Diabetes Care.* 2016 Aug;39(8):1448-57. doi: 10.2337/dc16-0513. https://www.ncbi.nlm.nih.gov/pubmed/27457635

5) Schwingshackl L et al Effects of monounsaturated fatty acids on glycaemic control in patients with abnormal glucose metabolism: a systematic review and meta-analysis. *Ann Nutr Metab*. 2011 Oct;58(4):290-6. doi: 10.1159/000331214. https://www.ncbi.nlm.nih.gov/pubmed/21912106
6) Ryan M et al Diabetes and the Mediterranean diet: a beneficial effect of oleic acid on insulin sensitivity, adipocyte glucose transport and endothelium-dependent vasoreactivity. *QJM*. 2000 Feb;93(2):85-91. https://www.ncbi.nlm.nih.gov/pubmed/10700478
7) Shah M et al. Lipid, glycemic, and insulin responses to meals rich in saturated, cis-monounsaturated, and polyunsaturated (n-3 and n-6) fatty acids in subjects with type 2 diabetes. *Diabetes Care*. 2007 Dec;30(12):2993-8. https://www.ncbi.nlm.nih.gov/pubmed/17804680
8) Wang PY et al. Higher intake of fruits, vegetables or their fiber reduces the risk of type 2 diabetes: A meta-analysis. *J Diabetes Investig.* 2016 Jan;7(1):56-69. doi: 10.1111/jdi.12376. https://www.ncbi.nlm.nih.gov/pubmed/26816602
9) Wilson R et al Inadequate Vitamin C Status in Prediabetes and Type 2 Diabetes Mellitus: Associations with Glycaemic Control, Obesity, and Smoking. *Nutrients*. 2017 Sep 9;9(9). pii: E997. doi: 10.3390/nu9090997. https://www.ncbi.nlm.nih.gov/pubmed/28891932
10) Ashor AW et al. Effects of vitamin C supplementation on glycaemic control: a systematic review and meta-analysis of randomised controlled trials. *Eur J Clin Nutr*. 2017 Dec;71(12):1371-1380. doi: 10.1038/ejcn.2017.24. https://www.ncbi.nlm.nih.gov/pubmed/28294172
11) NHMRC Nutrient References Values for Australia and New Zealand. Vitamin E paper https://www.nrv.gov.au/nutrients/vitamin-e
12) Montonen J et al. Dietary antioxidant intake and risk of type 2 diabetes. *Diabetes Care*. 2004 Feb;27(2):362-6. https://www.ncbi.nlm.nih.gov/pubmed/14747214
13) Sluijs I et al. Dietary intake of carotenoids and risk of type 2 diabetes. *Nutr Metab Cardiovasc Dis*. 2015 Apr;25(4):376-81. doi: 10.1016/j.numecd.2014.12.008. https://www.ncbi.nlm.nih.gov/pubmed/25716098
14) Neelam K et al. Putative protective role of lutein and zeaxanthin in diabetic retinopathy. *Br J Ophthalmol*. 2017 May;101(5):551-558. doi: 10.1136/bjophthalmol-2016-309814. https://www.ncbi.nlm.nih.gov/pubmed/28232380
15) Rienks J et al. Polyphenol exposure and risk of type 2 diabetes: dose-response meta-analyses and systematic review of prospective cohort studies. *Am J Clin Nutr*. 2018 Jul 1;108(1):49-61. doi: 10.1093/ajcn/nqy083. https://www.ncbi.nlm.nih.gov/pubmed/29931039
16) Palma-Duran SA et al. Nutritional intervention and impact of polyphenol on glycohemoglobin (HbA1c) in non-diabetic and type 2 diabetic subjects: Systematic review and nmeta-analysis. *Crit Rev Food Sci Nutr.* 2017 Mar 24;57(5):975-986. doi: 10.1080/10408398.2014.973932. https://www.ncbi.nlm.nih.gov/pubmed/25746842
17) Guasch-Ferré M et al. Dietary Polyphenols, Mediterranean Diet, Prediabetes, and Type 2 Diabetes: A Narrative Review of the Evidence. *Oxid Med Cell Longev.* 2017;2017:6723931. doi: 10.1155/2017/6723931. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5572601/
18) Bell KJ et al. Algorithms to Improve the Prediction of Postprandial Insulinaemia in Response to Common Foods. *Nutrients.* 2016 Apr 8;8(4):210. doi: 10.3390/nu8040210. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4848679/
19) Lilly LN et al The Effect of Added Peanut Butter on the Glycemic Response to a High-Glycemic Index Meal: A Pilot Study. *J Am Coll Nutr*. 2018 Nov 5:1-7. doi: 10.1080/07315724.2018.1519404. [Epub ahead of print] https://www.ncbi.nlm.nih.gov/pubmed/30395790
20) Augustin LS et al Post-prandial glucose and insulin responses of hummus alone or combined with a carbohydrate food: a dose-response study. *Nutr J.* 2016 Jan 27;15:13. doi: 10.1186/s12937-016-0129-1. https://www.ncbi.nlm.nih.gov/pubmed/26818604
21) Shaw PE et al High-performance liquid chromatographic analysis of D-manno-heptulose, perseitol, glucose, and fructose in avocado cultivars. *J Agric Food Chem*. 1980 Mar-Apr;28(2):379-62 https://www.ncbi.nlm.nih.gov/pubmed/7391374
22) Leshem B et al. The hyperglycemic effect of 1-deoxy-D-manno-heptulose. Inhibition of hexokinase, glucokinase, and insulin release in vitro. *Can J Biochem.* 1974 Nov;52(11):1078-81. https://www.ncbi.nlm.nih.gov/pubmed/4609583
23) Barr EL et al. Risk of cardiovascular and all-cause mortality in individuals with diabetes mellitus, impaired fasting glucose, and impaired glucose tolerance: the Australian Diabetes, Obesity, and Lifestyle Study (AusDiab). *Circulation*. 2007 Jul 10;116(2):151-7. https://www.ncbi.nlm.nih.gov/pubmed/17576864
24) Lerman-Garber I et al. Effect of a high-monounsaturated fat diet enriched with avocado in NIDDM patients. *Diabetes Care.* 1994 Apr;17(4):311-5. https://www.ncbi.nlm.nih.gov/pubmed/8026287
25) López Ledesma R et al. Monounsaturated fatty acid (avocado) rich diet for mild hypercholesterolemia. *Arch Med Res.* 1996;27(4):519-23. https://www.ncbi.nlm.nih.gov/pubmed/8987188
26) Wien M et al. A randomized 3×3 crossover study to evaluate the effect of Hass avocado intake on post-ingestive satiety, glucose and insulin levels, and subsequent energy intake in overweight adults. *Nutr J.* 2013 Nov 27;12:155. doi: 10.1186/1475-2891-12-155. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4222592/
27) Mahmassani HA et al. Avocado consumption and risk factors for heart disease: a systematic review and meta-analysis. *Am J Clin Nutr*. 2018 Apr 1;107(4):523-536. doi: 10.1093/ajcn/nqx078. https://www.ncbi.nlm.nih.gov/pubmed/29635493
28) Park E et al Avocado Fruit on Postprandial Markers of Cardio-Metabolic Risk: A Randomized Controlled Dose Response Trial in Overweight and Obese Men and Women. *Nutrients*. 2018 Sep 12;10(9). pii: E1287. doi: 10.3390/nu10091287. https://www.ncbi.nlm.nih.gov/pubmed/30213052
29) Sabaté J, Wien M, Haddad E. Post-ingestive effects of avocados in meals on satiety and gastric hormone blood levels. *Human Health Nut* 2015;459–461. http://www.avocadosource.com/wac8/section_06/sabatej2015.pdf
30) Mahadeva Rao US et al. Salutary potential of ethanolic extract of avocado fruit on anomalous carbohydrate metabolic key enzymes in hepatic and renal tissues of hyperglycaemic albino rats. *Chin J Integr Med*. 2017 Sep 15. doi: 10.1007/s11655-017-2784-2. [Epub ahead of print] https://www.ncbi.nlm.nih.gov/pubmed/28914437
31) Thenmozhi A et al. Biochemical evaluation of anti-diabetic phytomolecule through bioactivity guided solvent fractionation and subfractionation from hydromethanolic (2:3) extract of Alligator pear Fruit in streptozotocin induced diabetic rats. *J Appl Pharm Sci* 2012;2:61 http://www.japsonline.com/admin/php/uploads/343_pdf.pdf

32) Oboh G et al. Inhibition of key enzymes linked to type 2 diabetes and sodium nitroprusside induced lipid peroxidation in rats' pancreas by phenolic extracts of avocado pear leaves and fruit. *Int J Biomed* Sci. 2014 Sep;10(3):208-16. https://www.ncbi.nlm.nih.gov/pubmed/25324703
33) Carvajal-Zarrabal O et al. Effect of dietary intake of avocado oil and olive oil on biochemical markers of liver function in sucrose-fed rats. *Biomed Res Int.* 2014;2014:595479. doi: 10.1155/2014/595479. https://www.ncbi.nlm.nih.gov/pubmed/24860825
34) Rao US, Adinew B. Remnant B-cell-stimulative and anti-oxidative effects of Persea americana fruit extract studied in rats introduced into streptozotocin - induced hyperglycaemic state. *Afr J Tradit Complement Altern Med.* 2011;8(3):210-7. https://www.ncbi.nlm.nih.gov/pubmed/22467999
35) Del Toro-Equihua M et al. Effect of an avocado oil-enhanced diet (Persea americana) on sucrose-induced insulin resistance in Wistar rats. *J Food Drug Anal.* 2016 Apr;24(2):350-357. doi: 10.1016/j.jfda.2015.11.005. https://www.ncbi.nlm.nih.gov/pubmed/28911589

Avocado Health and Nutrition Update
Avocado for diabetes

(Breakout box: summary)
Just over 1 million Australians reported having type 2 diabetes in the last National Health Survey (2014/15) (1) and it's estimated 2 million Aussies are at high risk of developing it in the future (2). Avocado is a whole plant food with nutrients people with diabetes need and including avocado in meals and snacks can positively effect blood glucose and insulin levels.

(call out)

Diabetes-friendly nutrients in avocados

AVOCADO = GOOD FATS + FIBRE + VITAMINS C&E + CAROTENOIDS + GLYCAEMIC BENEFITS

Healthy fats
Diets containing monounsaturated fats like those in avocado may reduce the risk of developing type 2 diabetes (T2D) (3) and for those who already have T2D monounsaturated fat diets decrease fasting blood glucose (4), decrease glycosylated haemoglobin (HbA1c) (5), lower fasting insulin (6), improve insulin sensitivity (6) and decrease postprandial insulin response (7).

Dietary fibre
Higher intakes of dietary fibre especially from fruits and green/yellow vegetables is associated with a reduced risk of T2D. (8)

Vitamin C
A New Zealand study found people with T2D may have higher vitamin C requirements (9) and vitamin C supplements have been shown to help glucose control in those with T2D (10). A 50g serve or 1/4 avocado contains 14% of the RDI for vitamin C.

Vitamin E
Avocado also contains vitamin E (10% RDI) and it's helpful that vitamin C and E are present together as vitamin E requires vitamin C to help it regenerate its antioxidant ability. (11) Higher intake of vitamin E is also associated with a reduced risk of T2D. (12)

Carotenoids
Avocado contains colourful carotenoid pigments beta carotene, lutein and zeaxanthin. Higher intake of these carotenoids is associated with a reduced risk of T2D. (12,13) Lutein and zeaxanthin may also protect against diabetic retinopathy, a complication of T2D. (14)

Polyphenols
Diets high in polyphenols may help reduce the risk of developing T2D by positively affecting glucose metabolism. (15) For those with T2D, polyphenols help lower HbA1c (16) and reduce oxidative stress and inflammation thereby improving insulin resistance (17).

Glycaemic benefits
Adding healthy fats to meals with carbohydrate reduces the glycaemic impact of the meal. Fat content is estimated to predict 31% of the variability of postprandial glycaemia and insulinaemia. (18) A reduced glycaemic impact has been demonstrated for other high monounsaturated fat spreads peanut butter (19) and hummus (20) so there's no reason why avocado wouldn't have the same effect. Smashed avo on toast anyone?

Sugars
Avocado contains a unique sugar D-manno-heptulose that does not contribute energy and may help blood glucose control by reducing glycolysis. (21,22)

Avocado and metabolic health

People with diabetes have twice the risk of cardiovascular disease as those without T2D. (23) Avocado can assist those with T2D through improving blood lipid levels – triglycerides and total, LDL and HDL cholesterol. (24,25,)

Last research on avocado and metabolic health

Blood lipids

Two studies have examined the effects of avocado in people with T2D. A small randomised crossover study involving 12 women with T2D found after four weeks each of a high monounsaturated fat diet (with an avocado a day, a third at each meal) and a high carbohydrate diet, there was minor cholesterol lowering in both diets but the avocado diet was associated with a greater decrease in blood triglycerides (20% vs. 7% in the high-carbohydrate diet). Glycaemic control was similar during both diets. Researchers concluded that including avocado in the diet of those with T2D could help reduce cholesterol and triglycerides. (24)

The second study followed 37 participants with hypercholesterolemia (half with T2D) who consumed a diet enriched with 300g of avocado to replace all other fats for a week. In those with T2D, total and LDL cholesterol was reduced by about 20% and reductions in blood glucose levels were seen for most participants although only a third were clinically significant. (25)

For more heart health benefits see the *Avocado for a Healthy Heart* fact sheet (hyperlink)

Blood glucose

In people with type 2 diabetes replacing some carbohydrate with avocado helps to maintain blood glucose control (24). Studies in healthy or overweight people have found either no compromise in blood glucose with avocado consumption (26,27) or significant reductions in post prandial glycemia after a half serve (68g) or full serve (136g) of avocado (28). Lower post prandial insulin has also been shown in several studies (26,28,29). These results are promising, and more research is needed.

Animal research is uncovering mechanisms to explain the beneficial glycaemic effects of avocado. Avocado extracts have been found to:

- modulate the activities of carbohydrate metabolic enzymes in rats (30,31),
- inhibit enzymes such as α-amylase and reduce oxidative stress in rat pancreas (32),
- increase glucose uptake in the liver and normalise liver enzyme levels (33,34).

Avocado oil has been shown to improve glucose tolerance and insulin resistance in rats fed high sucrose diets. (35)

(call out)

Avocado = lower blood lipids + better blood glucose control + lower insulin levels

(Breakout box)

NUTRITION INFORMATION Servings per package: 4 serves per avocado Serving size: ~50g or ¼ avocado		
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Buying and storage tips

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6 diabetes-friendly meal ideas with avocado:

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2) Spread your wholegrain bread, roll, wrap or crispbread with avocado instead of butter http://australianavocados.com.au/recipes/multigrain-bread-smoked-fish-avocado-cucumber-spicy-sauce
3) Make lean meat, chicken, fish or vege-burgers sing with an avo salsa http://australianavocados.com.au/recipes/sweetcorn-and-avocado-salsa-limes-and-tomatoes
4) Top pasta or vege-noodles with avocado http://australianavocados.com.au/recipes/avo-zoodles
5) Make a lower GI green potato mash with avocado http://australianavocados.com.au/recipes/avocado-potato-parsnip-mash-salmon
6) Viva Mexicana with avo and chilli beans in tacos and tortillas http://australianavocados.com.au/recipes/tacos-grilled-chicken-bean-salsa-and-avocado

Check out australianavocados.com.au for more delicious recipes.

(Industry Collateral: website, social media, contact details)
Image suggestions: avocado with low GI, high carbohydrate foods (pasta/rice/legumes), could use side profile of avocado showing smooth prolonged blood glucose curve.

References

1) https://www.aihw.gov.au/reports/diabetes/diabetes-snapshot/contents/how-many-australians-have-diabetes/type-2-diabetes
2) http://www.novonordisk.com.au/content/dam/australia/affiliate/www-novonordisk-au/Home/Documents/180712_Burden%20of%20Diabetes_Its%20Time%20for%20More%20Action%20Report_Digital_%20FINAL....pdf
3) Mirmiran P et al. Fatty acid quality and quantity of diet and risk of type 2 diabetes in adults: Tehran Lipid and Glucose Study. *J Diabetes Complications.* 2018 Jul;32(7):655-659. doi: 10.1016/j.jdiacomp.2018.05.003. https://www.ncbi.nlm.nih.gov/pubmed/29853261
4) Qian F et al. Metabolic Effects of Monounsaturated Fatty Acid-Enriched Diets Compared With Carbohydrate or Polyunsaturated Fatty Acid-Enriched Diets in Patients With Type 2 Diabetes: A Systematic Review and Meta-analysis of Randomized Controlled Trials. *Diabetes Care.* 2016 Aug;39(8):1448-57. doi: 10.2337/dc16-0513. https://www.ncbi.nlm.nih.gov/pubmed/27457635
5) Schwingshackl L et al Effects of monounsaturated fatty acids on glycaemic control in patients with abnormal glucose metabolism: a systematic review and meta-analysis. *Ann Nutr Metab*. 2011 Oct;58(4):290-6. doi: 10.1159/000331214. https://www.ncbi.nlm.nih.gov/pubmed/21912106
6) Ryan M et al Diabetes and the Mediterranean diet: a beneficial effect of oleic acid on insulin sensitivity, adipocyte glucose transport and endothelium-dependent vasoreactivity. *QJM*. 2000 Feb;93(2):85-91. https://www.ncbi.nlm.nih.gov/pubmed/10700478
7) Shah M et al. Lipid, glycemic, and insulin responses to meals rich in saturated, cis-monounsaturated, and polyunsaturated (n-3 and n-6) fatty acids in subjects with type 2 diabetes. *Diabetes Care*. 2007 Dec;30(12):2993-8. https://www.ncbi.nlm.nih.gov/pubmed/17804680

8) Wang PY et al. Higher intake of fruits, vegetables or their fiber reduces the risk of type 2 diabetes: A meta-analysis. *J Diabetes Investig.* 2016 Jan;7(1):56-69. doi: 10.1111/jdi.12376. https://www.ncbi.nlm.nih.gov/pubmed/26816602
9) Wilson R et al Inadequate Vitamin C Status in Prediabetes and Type 2 Diabetes Mellitus: Associations with Glycaemic Control, Obesity, and Smoking. *Nutrients*. 2017 Sep 9;9(9). pii: E997. doi: 10.3390/nu9090997. https://www.ncbi.nlm.nih.gov/pubmed/28891932
10) Ashor AW et al. Effects of vitamin C supplementation on glycaemic control: a systematic review and meta-analysis of randomised controlled trials. *Eur J Clin Nutr*. 2017 Dec;71(12):1371-1380. doi: 10.1038/ejcn.2017.24. https://www.ncbi.nlm.nih.gov/pubmed/28294172
11) NHMRC Nutrient References Values for Australia and New Zealand. Vitamin E paper https://www.nrv.gov.au/nutrients/vitamin-e
12) Montonen J et al. Dietary antioxidant intake and risk of type 2 diabetes. *Diabetes Care*. 2004 Feb;27(2):362-6. https://www.ncbi.nlm.nih.gov/pubmed/14747214
13) Sluijs I et al. Dietary intake of carotenoids and risk of type 2 diabetes. *Nutr Metab Cardiovasc Dis*. 2015 Apr;25(4):376-81. doi: 10.1016/j.numecd.2014.12.008. https://www.ncbi.nlm.nih.gov/pubmed/25716098
14) Neelam K et al. Putative protective role of lutein and zeaxanthin in diabetic retinopathy. *Br J Ophthalmol*. 2017 May;101(5):551-558. doi: 10.1136/bjophthalmol-2016-309814. https://www.ncbi.nlm.nih.gov/pubmed/28232380
15) Rienks J et al. Polyphenol exposure and risk of type 2 diabetes: dose-response meta-analyses and systematic review of prospective cohort studies. *Am J Clin Nutr*. 2018 Jul 1;108(1):49-61. doi: 10.1093/ajcn/nqy083. https://www.ncbi.nlm.nih.gov/pubmed/29931039
16) Palma-Duran SA et al. Nutritional intervention and impact of polyphenol on glycohemoglobin (HbA1c) in non-diabetic and type 2 diabetic subjects: Systematic review and nmeta-analysis. *Crit Rev Food Sci Nutr.* 2017 Mar 24;57(5):975-986. doi: 10.1080/10408398.2014.973932. https://www.ncbi.nlm.nih.gov/pubmed/25746842
17) Guasch-Ferré M et al. Dietary Polyphenols, Mediterranean Diet, Prediabetes, and Type 2 Diabetes: A Narrative Review of the Evidence. *Oxid Med Cell Longev.* 2017;2017:6723931. doi: 10.1155/2017/6723931. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5572601/
18) Bell KJ et al. Algorithms to Improve the Prediction of Postprandial Insulinaemia in Response to Common Foods. *Nutrients.* 2016 Apr 8;8(4):210. doi: 10.3390/nu8040210. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4848679/
19) Lilly LN et al The Effect of Added Peanut Butter on the Glycemic Response to a High-Glycemic Index Meal: A Pilot Study. *J Am Coll Nutr*. 2018 Nov 5:1-7. doi: 10.1080/07315724.2018.1519404. [Epub ahead of print] https://www.ncbi.nlm.nih.gov/pubmed/30395790
20) Augustin LS et al Post-prandial glucose and insulin responses of hummus alone or combined with a carbohydrate food: a dose-response study. *Nutr J.* 2016 Jan 27;15:13. doi: 10.1186/s12937-016-0129-1. https://www.ncbi.nlm.nih.gov/pubmed/26818604
21) Shaw PE et al High-performance liquid chromatographic analysis of D-manno-heptulose, perseitol, glucose, and fructose in avocado cultivars. *J Agric Food Chem*. 1980 Mar-Apr;28(2):379-62 https://www.ncbi.nlm.nih.gov/pubmed/7391374
22) Leshem B et al. The hyperglycemic effect of 1-deoxy-D-manno-heptulose. Inhibition of hexokinase, glucokinase, and insulin release in vitro. *Can J Biochem.* 1974 Nov;52(11):1078-81. https://www.ncbi.nlm.nih.gov/pubmed/4609583
23) Barr EL et al. Risk of cardiovascular and all-cause mortality in individuals with diabetes mellitus, impaired fasting glucose, and impaired glucose tolerance: the Australian Diabetes, Obesity, and Lifestyle Study (AusDiab). *Circulation*. 2007 Jul 10;116(2):151-7. https://www.ncbi.nlm.nih.gov/pubmed/17576864
24) Lerman-Garber I et al. Effect of a high-monounsaturated fat diet enriched with avocado in NIDDM patients. *Diabetes Care.* 1994 Apr;17(4):311-5. https://www.ncbi.nlm.nih.gov/pubmed/8026287
25) López Ledesma R et al. Monounsaturated fatty acid (avocado) rich diet for mild hypercholesterolemia. *Arch Med Res.* 1996;27(4):519-23. https://www.ncbi.nlm.nih.gov/pubmed/8987188
26) Wien M et al. A randomized 3×3 crossover study to evaluate the effect of Hass avocado intake on post-ingestive satiety, glucose and insulin levels, and subsequent energy intake in overweight adults. *Nutr J.* 2013 Nov 27;12:155. doi: 10.1186/1475-2891-12-155. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4222592/
27) Mahmassani HA et al. Avocado consumption and risk factors for heart disease: a systematic review and meta-analysis. *Am J Clin Nutr*. 2018 Apr 1;107(4):523-536. doi: 10.1093/ajcn/nqx078. https://www.ncbi.nlm.nih.gov/pubmed/29635493
28) Park E et al Avocado Fruit on Postprandial Markers of Cardio-Metabolic Risk: A Randomized Controlled Dose Response Trial in Overweight and Obese Men and Women. *Nutrients*. 2018 Sep 12;10(9). pii: E1287. doi: 10.3390/nu10091287. https://www.ncbi.nlm.nih.gov/pubmed/30213052
29) Sabaté J, Wien M, Haddad E. Post-ingestive effects of avocados in meals on satiety and gastric hormone blood levels. *Human Health Nut* 2015;459–461. http://www.avocadosource.com/wac8/section_06/sabatej2015.pdf
30) Mahadeva Rao US et al. Salutary potential of ethanolic extract of avocado fruit on anomalous carbohydrate metabolic key enzymes in hepatic and renal tissues of hyperglycaemic albino rats. *Chin J Integr Med*. 2017 Sep 15. doi: 10.1007/s11655-017-2784-2. [Epub ahead of print] https://www.ncbi.nlm.nih.gov/pubmed/28914437
31) Thenmozhi A et al. Biochemical evaluation of anti-diabetic phytomolecule through bioactivity guided solvent fractionation and subfractionation from hydromethanolic (2:3) extract of Alligator pear Fruit in streptozotocin induced diabetic rats. *J Appl Pharm Sci* 2012;2:61 http://www.japsonline.com/admin/php/uploads/343_pdf.pdf
32) Oboh G et al. Inhibition of key enzymes linked to type 2 diabetes and sodium nitroprusside induced lipid peroxidation in rats' pancreas by phenolic extracts of avocado pear leaves and fruit. *Int J Biomed* Sci. 2014 Sep;10(3):208-16. https://www.ncbi.nlm.nih.gov/pubmed/25324703
33) Carvajal-Zarrabal O et al. Effect of dietary intake of avocado oil and olive oil on biochemical markers of liver function in sucrose-fed rats. *Biomed Res Int.* 2014;2014:595479. doi: 10.1155/2014/595479. https://www.ncbi.nlm.nih.gov/pubmed/24860825
34) Rao US, Adinew B. Remnant B-cell-stimulative and anti-oxidative effects of Persea americana fruit extract studied in rats introduced into streptozotocin - induced hyperglycaemic state. *Afr J Tradit Complement Altern Med.* 2011;8(3):210-7. https://www.ncbi.nlm.nih.gov/pubmed/22467999
35) Del Toro-Equihua M et al. Effect of an avocado oil-enhanced diet (Persea americana) on sucrose-induced insulin resistance in Wistar rats. *J Food Drug Anal.* 2016 Apr;24(2):350-357. doi: 10.1016/j.jfda.2015.11.005. https://www.ncbi.nlm.nih.gov/pubmed/28911589

Avocado Health and Nutrition Update
Avocado for a healthy heart

(Breakout box: summary)
Avocado is a delicious and versatile prescription for better heart health. Enjoying avocado daily is a good way to improve risk factors such as high blood lipids and blood pressure and helps to achieve a cardioprotective eating pattern.

Heart-healthy nutrients in avocados
Avocados provide a helpful collection of nutrients and phytochemicals important for heart health.

(CALL OUT)

AVOCADO = GOOD FATS + FOLATE + PHYTOCHEMICALS + FIBRE + VITAMINS + MINERALS

- mostly unsaturated fats and no trans fats
- naturally low in sodium and sugars
- dietary fibre, including soluble fibre
- potassium
- folate
- antioxidant vitamins C and E
- polyphenol antioxidants
- colourful antioxidant carotenoids - beta carotene, cryptoxanthin, lutein and zeaxanthin

With all these nutritional goodies it's no wonder the Australian Dietary Guidelines recommend swapping foods high in saturated fats, such as butter, for foods with mostly unsaturated fats such as avocado.

How avocados help the heart
Blood lipids: A diet with a mostly unsaturated fatty acid profile (1), combined with plenty of fibre - including soluble fibre (2) - can optimise blood lipids. Avocados contain monounsaturated fat and soluble fibre and improve lipid profiles in human intervention studies (3).

(Call out)

THE ADDITION OF 75-300G OF AVOCADO TO A VARIETY OF HEALTHY DIETS HAS BEEN SHOWN TO LOWER TOTAL AND LDL CHOLESTEROL WHILE MAINTAINING HDL CHOLESTEROL. THESE BENEFITS HAVE BEEN OBSERVED IN PARTICIPANTS WITH A RANGE OF HEALTH PROFILES (4,5,6,7,8,9,10,11)

Blood pressure: The DASH diet (Dietary Approaches to Stop Hypertension) offers a good evidence-based approach to the management of high blood pressure. Including at least 2 serves of fruit and 5 serves of vegetables a day and limiting sodium (salt) can lower blood pressure. Avocados help meet the 2 & 5 target and are naturally low in sodium.

Body fat: Diets with monounsaturated fats from plant sources are associated with less weight gain over time (12). Avocado with a meal has been shown to increase perceived post-meal satiety (13.14) and better satiety makes a restricted-kilojoule diet easier to sustain over time.

Inflammation: Chronic, low-level metabolic inflammation (also coined *metaflammation)* is a contributor to metabolic disease and nutrition strategies can help (15). Generally saturated fats are pro-inflammatory while unsaturated fats are anti-inflammatory (16). Avocados have unsaturated fats plus the bonus of anti-inflammatory (17) phytochemicals. And avocados also reduce oxidative stress (18), another contributor to cardiovascular disease.

Latest research on avocados
Reviews
Studies on avocado published over the past five years reaffirm their health benefits, especially for cardiovascular health. In particular, two systematic reviews and meta-analyses demonstrate helpful effects for lipid management. The first by Peou (19) and colleagues found avocado lowered total

cholesterol, LDL cholesterol and triglycerides. A second by Mahmassani and colleagues (20) found avocado increased 'good' HDL cholesterol.
More generally, a review paper (21) describes how fruits - such as avocado (botanically a fruit) - can help in the prevention and treatment of cardiovascular disease via a variety of mechanisms.

Intervention studies
A study in overweight and obese adults (22) showed a moderate fat, cholesterol-lowering diet with one avocado a day had additional effects on lipoproteins compared to a matched moderate fat diet with no avocado. The avocado was especially effective at reducing the atherogenic small, dense LDL particles. Positive metabolic effects of avocado in the post-prandial period have also been described (23). Substituting some carbohydrate with avocado in overweight and obese subjects reduced glycemic and insulin responses, improved endothelial function, reduced triglyceride rich lipoproteins and increased HDL compared to a control meal.
A systematic review and dose-response meta-analysis of prospective studies of dietary intake and blood concentrations of antioxidants and the risk of cardiovascular disease, total cancer and all-cause mortality found higher dietary intake or blood concentrations of vitamin C, carotenoids and vitamin E were associated with reduced risk of all three outcomes. Avocado is a source of all three. The authors concluded the results support recommendations to increase fruit and vegetable intake for chronic disease prevention, but not antioxidant supplement use (24).

Epidemiological studies
In an analysis of the large US NHANES (National Health and Nutrition Examination Survey) cohort, consumers of avocado were found to have a fifty percent lower risk of metabolic syndrome (25) than non-consumers, as well as higher HDL cholesterol levels and higher diet quality.
An investigation (26) by the Harvard group using data from the Nurses Health and Health Professional Follow Up studies found monounsaturated fats from plant sources, such as those found in avocados, were associated with a reduced risk of cardiovascular disease. The risk reduction was 19% when monounsaturated fats from plants were used to replace saturated fats and monounsaturated fats from animal sources.

(Call out)

THESE LATEST STUDIES CONFIRM THE VALUE OF AVOCADO IN CARDIO-PROTECTIVE EATING PATTERNS IN BOTH HEALTHY WEIGHT AND OVERWEIGHT PEOPLE

Everybody loves avos
Another great thing about avocados are they on the 'include' list for all the popular diets. Whether it's the Mediterranean diet, DASH, low-carb, paleo, plant-based or vegan, avocados get a big tick. While avocado may not be the cheapest fruit, it does contain 4 x 50g serves per piece. Avocado is nutrient dense and offers excellent nutritional value for money.

Buying and storage tips
Ripe avocados are firm but yield slightly when pressed gently near the top. If not eaten straight away, they're best stored in the fridge. If they are hard, store next to the bananas in the fruit bowl to assist ripening.
If you're not using a whole avocado at once and have some left over, sprinkle the cut edge with lemon juice or vinegar to stop it from browning, press plastic wrap to the surface to remove air (or place in an avocado saver) and store in the fridge for a day or so. Even after that you can trim the browned edge and the flesh underneath will still be okay for a few days.

Avocado for a healthy heart; a delicious prescription
Avocado is a good choice at any time of the day. For maximum benefit, Enjoy avo with other cardio-protective foods such as wholegrains, legumes, nuts, seeds and seafood.

6 ways to enjoy avocado in heart-friendly meals
1. Smashed avo on wholegrain toast – try a poached egg or smoked salmon on top
2. Avocado in sandwiches, wraps and burgers– choose wholegrain bread, and plenty of vegetables, plus some seafood (eg tuna, salmon or prawns), egg or legumes (white beans, tofu or hummus)

3. Rice and noodle bowls with avocado - use brown rice and wholegrain/wholemeal noodles, different coloured veggies, legumes (eg lentils, black beans), nuts (eg almonds, cashews or pistachios) and seeds (sunflower, pumpkin or chia), plus some egg, seafood or chicken
4. Salads with avocado such as green salad, pasta salad or salad with lean meat or seafood (eg prawn and avocado salad)
5. Guacamole or avocado salsa with lean meat, chicken, seafood, eggs, beans or vege-burgers
6. Avocado in shakes and smoothies and better-for-you sweet treats such as chocolate mousse (yes really, try it!).

Check out more delicious recipes at australianavocados.com.au

NUTRITION INFORMATION Servings per package: 4 serves per avocado Serving size: ~50g or ¼ avocado		
	Average Quantity per Serving	Average Quantity per 100g
Energy	430kJ (102Cal)	860kJ (205Cal)
Protein, total	1.0g	2.0g
Fat, total	10.7g	21.4g
– saturated	2.4g	4.8g
– trans	0g	0g
– polyunsaturated	1.4g	2.7g
– monounsaturated	7.4g	12.8g
Carbohydrate	<1g	<1g
– sugars	<1g	<1g
Dietary fibre, total	2.5g	5.0g
Dietary fibre, soluble*	1g	2g
Sodium	2mg	4mg
Potassium	255mg	509mg
Folate	30ug DFE (15% RDI)	59ug DFE
Vitamin C	5.5mg (14% RDI)	11mg
Vitamin E	1mg (10% RDI)	2mg
Polyphenols	71mg GAE	142mg GAE
Beta carotene	14ug	27ug
Cryptoxanthin	59ug	117ug
Lutein & zeaxanthin	136ug	271ug

*(27)

(Industry Collateral: website, social media, contact details)
Image suggestions: avocado making heart shapes, this feature recipe
http://australianavocados.com.au/professionals/food-professionals/professional-recipes/seared-salmon-fillet-avocado-pea-mash

References

1. Martin N et al. Reduction in saturated fat intake for cardiovascular disease. *Cochrane Database Syst Rev*. 2015 Jun 10;(6):CD011737. doi: 10.1002/14651858.CD011737. https://www.ncbi.nlm.nih.gov/pubmed/26068959
2. Brown L et al. Cholesterol-lowering effects of dietary fiber: a meta-analysis. *Am J Clin Nutr.* 1999 Jan;69(1):30-42. https://www.ncbi.nlm.nih.gov/pubmed/9925120
3. Peou S et al. Impact of avocado-enriched diets on plasma lipoproteins: A meta-analysis. *J Clin Lipidol.* 2016 Jan-Feb;10(1):161-71. doi: 10.1016/j.jacl.2015.10.011. https://www.ncbi.nlm.nih.gov/pubmed/26892133
4. Grant, W. C. Influence of avocados on serum cholesterol. *Proc. Soc.Exp. Biol. Med*. 1960;104:45–47. https://journals.sagepub.com/doi/abs/10.3181/00379727-104-25722?journalCode=ebma
5. Colquhoun DM et al. Comparison of the effects on lipoproteins and apolipoproteins of a diet high in monounsaturated fatty acids, enriched with avocado, and a high-carbohydrate diet. *Am J Clin Nutr*. 1992 Oct;56(4):671-7. https://academic.oup.com/ajcn/article/56/4/671/4715560
6. Alvizouri-Muñoz M et al. Effects of avocado as a source of monounsaturated fatty acids on plasma lipid levels. *Arch Med Res.* 1992 Winter;23(4):163-7. Available at https://www.ncbi.nlm.nih.gov/pubmed/1308699 .
7. Lerman-Garber I et al. Effect of a high-monounsaturated fat diet enriched with avocado in NIDDM patients. *Diabetes Care.* 1994 Apr;17(4):311-5. Available from https://www.ncbi.nlm.nih.gov/pubmed/8026287
8. Carranza J et al. Effects of avocado on the level of blood lipids in patients with phenotype II and IV dyslipidemias. *Arch Inst Cardiol Mex*. 1995 Jul-Aug;65(4):342-8. Available from https://www.ncbi.nlm.nih.gov/pubmed/8561655

9. López Ledesma R et al. Monounsaturated fatty acid (avocado) rich diet for mild hypercholesterolemia. *Arch Med Res*. 1996;27(4):519-23. Available at https://www.ncbi.nlm.nih.gov/pubmed/8987188
10. Carranza-Madrigal J et al. Effects of a vegetarian diet vs. a vegetarian diet enriched with avocado in hypercholesterolemic patients. *Arch Med Res.* 1997 Winter;28(4):537-41. https://www.ncbi.nlm.nih.gov/pubmed/9428580
11. Wang L, et al, Effect of a moderate fat diet with and without avocados on lipoprotein particle number, size and subclasses in overweight and obese adults: a randomized, controlled trial. *J Am Heart Assoc.* 2015 Jan 7;4(1). pii: e001355. doi: 10.1161/JAHA.114.001355. https://www.ncbi.nlm.nih.gov/pubmed/25567051
12. Li Y et al. Changes in Types of Dietary Fats Influence Long-term Weight Change in US Women and Men. *J Nutr*.2018 Nov 1;148(11):1821-1829. doi: 10.1093/jn/nxy183. https://www.ncbi.nlm.nih.gov/pubmed/30247611
13. Wien M et al. A randomized 3×3 crossover study to evaluate the effect of Hass avocado intake on post-ingestive satiety, glucose and insulin levels, and subsequent energy intake in overweight adults. *Nutr J.* 2013 Nov 27;12:155 https://www.ncbi.nlm.nih.gov/pubmed/24279738
14. Haddad E et al. Postprandial gut hormone responses to Hass avocado meals and their association with visual analog scores in overweight adults: A randomized 3 × 3 crossover trial. *Eat Behav.* 2018 Dec;31:35-40. doi: 10.1016/j.eatbeh.2018.08.001. https://www.ncbi.nlm.nih.gov/pubmed/30096700
15. Botchlett R et al. Nutritional approaches for managing obesity-associated metabolic diseases. *J Endocrinol*. 2017;233(3):R145-R171. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5511693/
16. Rocha DM et al. The role of dietary fatty acid intake in inflammatory gene expression: a critical review. *Sao Paulo Med J*.2017 Mar-Apr;135(2):157-168. doi: 10.1590/1516-3180.2016.008607072016. https://www.ncbi.nlm.nih.gov/pubmed/28076613
17. Li Z et al. Hass avocado modulates postprandial vascular reactivity and postprandial inflammatory responses to a hamburger meal in healthy volunteers. *Food Funct.* 2013 Feb 26;4(3):384-91. doi: 10.1039/c2fo30226h. https://www.ncbi.nlm.nih.gov/pubmed/23196671
18. Khor A et al. Postprandial oxidative stress is increased after a phytonutrient-poor food but not after a kilojoule-matched phytonutrient-rich food. Nutr Res. 2014 May;34(5):391-400. https://www.ncbi.nlm.nih.gov/pubmed/24916552
19. Peou S et al. Impact of avocado-enriched diets on plasma lipoproteins: A meta-analysis. *J Clin Lipidol.* 2016 Jan-Feb;10(1):161-71 https://www.ncbi.nlm.nih.gov/pubmed/26892133
20. Mahmassani HA et al.. Avocado consumption and risk factors for heart disease: a systematic review and meta-analysis. *Am J Clin Nutr.* 2018 Apr 1;107(4):523-536 https://www.ncbi.nlm.nih.gov/pubmed/29635493
21. Zhao CN et al. Fruits for Prevention and Treatment of Cardiovascular Diseases. *Nutrients.* 2017 Jun 13;9(6). https://www.ncbi.nlm.nih.gov/pubmed/28608832
22. Wang L et al. Effect of a moderate fat diet with and without avocados on lipoprotein particle number, size and subclasses in overweight and obese adults: a randomized, controlled trial. *J Am Heart Assoc.* 2015 Jan 7;4(1) https://www.ncbi.nlm.nih.gov/pubmed/25567051
23. Park E et al. Avocado Fruit on Postprandial Markers of Cardio-Metabolic Risk: A Randomized Controlled Dose Response Trial in Overweight and Obese Men and Women. *Nutrients.* 2018 Sep 12;10(9). https://www.ncbi.nlm.nih.gov/pubmed/30213052
24. Aune D, Keum N, Giavannucci E et al. Dietary intake and blood concentrations of antioxidants and the risk of cardiovascular disease, total cancer, and all-cause mortality: a systematic review and dose-response meta-analysis of prospective studies. *Am J Clin Nutr* 2018; 108 (5):1069-1091 https://academic.oup.com/ajcn/article/108/5/1069/5201459
25.Fulgoni VL 3rd, et al. Avocado consumption is associated with better diet quality and nutrient intake, and lower metabolic syndrome risk in US adults: results from the National Health and Nutrition Examination Survey (NHANES) 2001-2008. *Nutr J*. 2013 Jan 2;12:1 https://www.ncbi.nlm.nih.gov/pubmed/23282226
26. Zong G et al. Monounsaturated fats from plant and animal sources in relation to risk of coronary heart disease among US men and women. *Am J Clin Nutr.* 2018 Mar 1;107(3):445-453 https://www.ncbi.nlm.nih.gov/pubmed/29566185
27.Li BW et al Individual Sugars, Soluble, and Insoluble Dietary Fiber Contents of 70 High Consumption Foods *J Food Comp Anal* 2002(15):715-723 https://www.ncbi.nlm.nih.gov/pubmed/19255919

Avocado Health and Nutrition Update
Healthy mums & bubs with avocado

The first thousand days of life are thought to be critical in the health of a child and may even determine their risk of disease in adulthood (1). Avocado can help optimize nutrition in the key life stages of pregnancy and infancy.

AVOCADO IS A NUTRIENT-RICH FOOD THAT SUPPORTS MATERNAL AND CHILD HEALTH

Avocado for healthy pregnancy

Pregnant women have increased nutrient needs and avocado is a nutrient-rich plant food with a range of vitamins, minerals, healthy fats and fibre.
The Australian Dietary Guidelines (2) recommends an increase in fruit and vegetables serves during breastfeeding

Pregnancy: 5 serves vegetables & 2 serves of fruit
Breastfeeding: 7 ½ serves of vegetables & 2 serves of fruit

Australian research suggests only 7% of pregnant women meet recommended vegetable intake and 13% meet recommended fruit intake (3).

Nutrient boosting
Avocado is not only nutrient-rich but the healthy fats in avocado help enhance the absorption of antioxidants from other foods eaten with it (4).

Fatigue-fighting
Pregnancy and breastfeeding can be tiring, and avocado contains energy boosting nutrients niacin, pantothenic acid, folate & Vitamin C to fight fatigue.

Folate
Avocados are a source of the B group vitamin folate that is important for a healthy pregnancy. It is an essential nutrient for cell division and blood and tissue formation and folate needs are higher during pregnancy and in the peri-conceptual period. A quarter of an avocado (50g) contributes 30ug of folate.

Unfortunately, research has found that most women of child-bearing age do not get nearly enough folate in their diets (5) (AIHW 2011).

The Recommended Dietary Intake (RDI) for women is 400µg of folate per day and the RDI during pregnancy is 600µg per day (NH&MRC 2006). This RDI is for dietary folate and does not include folic acid supplements required to prevent neural tube defects.

A DAILY FOLIC ACID SUPPLEMENT IS RECOMMENDED AT LEAST ONE MONTH BEFORE AND THREE MONTHS AFTER CONCEPTION TO PREVENT NEURAL TUBE DEFECTS SUCH AS SPINA BIFIDA. THE RECOMMENDED DOSE IS 400UG DAILY (6)

(Breakout box): **Folate or folic acid?**
Folate is the nutrient found naturally in foods. Folic acid is the term used for this nutrient when added to foods and in supplements (7)

Avocado for healthy babies

Avocado is a nutrient-rich whole food that contains energy, healthy fats, vitamins and minerals babies need for growth and development.
The NH&MRC Infant Feeding Guidelines (8) underline the importance of exclusive breastfeeding for 6 months and the introduction of nutritious solid foods of appropriate texture at around 6 months of age. The Guidelines say sugar or salt should not be added to foods during the transitional period. Avocado is an ideal first food for babies because it is soft, nutrient rich, mild in flavour and naturally low in sodium and sugars.

MASHED AVO IS AN IDEAL FIRST FOOD FOR BABIES

The information below describes the nutrients in 2 heaped tablespoons of avocado (50g) and what they do to help baby's growth and development (9).

Energy
Avocado helps babies on the move. It contains nutrients that help release energy from food such as B group vitamins B1, B2, B3 and B6, pantothenic acid, vitamin C, magnesium, manganese and biotin.

Brain development
Avocado contains nutrients needed for brain development such as niacin, Vitamin B6, biotin, pantothenic acid, folate, vitamin C, magnesium and copper.
At around 6 months of age babies need more iron for brain development and avocado contains iron as well vitamins B2, B6, C and copper which help absorb and transport iron.

Gut health
Avocado provides fibre needed for a healthy gut.

Muscle and bone
Avocado contains potassium and magnesium needed for muscle development and movement, and vitamin K for bone building. Each 50gram serve (2 heaped tablespoons) contains 100% of the infant RDI for bone-building vitamin K.

Immune system
Avocado contains a range of immune-supportive nutrients for babies such as Vitamins B6 & C, folate and copper.

Skin and hair
Avocado contains important nutrients for healthy skin including healthy fats, B-group vitamins, vitamin C and copper. Avocado also contains biotin and copper for heathy hair.

Eye health
Lutein protects the retinal cells required for vision and must be obtained from the diet. (10) The higher lutein levels in breastmilk compared to formula indicate it is important for infant eye development (11). It follows that lutein-rich foods such as avocado are important. Avocado also contains riboflavin that assists with normal vision development.

Latest Research
Avocados in maternal and infant nutrition were the topic of two articles in the same issue of the journal *Nutrients*. The first was on avocados in the maternal diet (12). The authors concluded avocados are

unique among fruits and vegetables because they contain much higher amounts of key nutrients folate and potassium, which are under-consumed in maternal diets. Avocados also contain higher amounts of fibre, monounsaturated fats, and fat-soluble antioxidants, which have all been linked to improvements in maternal health, birth outcomes and/or breast milk quality.

The second article focused on avocado in the infant diet (13). They conclude that unsaturated oil-containing fruits such as avocados are nutritionally unique among fruits in that they are lower in sugar and higher in fiber and monounsaturated fatty acids than most other fruits, and they have the proper texture for first foods and a neutral flavour. They say avocados can help meet the dietary needs of infants and toddlers and should be recommended for complementary and transitional feeding.

THE TRANSITIONAL PERIOD FROM EXCLUSIVE BREASTFEEDING TO MOSTLY SOLID FOODS IS A NUTRITIONALLY CRITICAL TIME TO SUPPORT RAPID GROWTH AND DEVELOPMENT AND TO ENCOURAGE THE ACCEPTANCE OF A WIDE VARIETY OF NUTRITIOUS FOODS.

Buying and storage tips
Ripe avocados are firm but yield slightly when pressed gently near the top. If not eaten straight away, they're best stored in the fridge. If they are hard, store next to the bananas in the fruit bowl to assist ripening.
If you're not using a whole avocado at once and have some left over, sprinkle the cut edge with lemon juice or vinegar to stop it from browning, press plastic wrap to the surface to remove air (or place in an avocado saver) and store in the fridge for a day or so. Even after that you can trim the browned edge and the flesh underneath will still be okay for a few days.

5 ways with avocado for mums
1. For a nutrient-rich breakfast, avo on wholegrain toast with egg
2. For a smart snack, wholegrain crispbread with avocado and tomato
3. Green smoothie with fruit, green veg and avo for a sustaining snack or breakfast on the go
4. Brown rice or noodle bowl with salmon/tuna/chicken, avocado and veggies
5. Lift meat-&-3-veg from good to great with avo salsa

5 tips on avocado for bubs
1. When introducing solids at around 6 months, mash plain avocado with a fork until smooth.
2. Use mashed avocado to smooth the texture of other dry foods such as pureed meat, fish, chicken, egg or legumes.
3. Mix a little lemon juice into avocado for a change in flavour and to help iron absorption.
4. When baby has progressed to lumpy texture, smash or chop avocado roughly.
5. When baby is eating finger food by themselves, give them a quarter of an avocado (flesh only), or smashed avo on toast fingers – be prepared for a happy, healthy mess.

Find more recipe ideas at australianavocados.com.au

Nutrition Information with %RDI for babies

NUTRITION INFORMATION (including RDIs for babies) Servings per package: 4 serves per avocado Serving size: ~50g or ¼ avocado		
	Average Quantity per Serving	Average Quantity per 100g
Energy	430kJ (102Cal)	860kJ (205Cal)
Protein, total	1.0g	2.0g

Fat, total	10.7g	21.4g
– saturated	2.4g	4.8g
– trans	0g	0g
– polyunsaturated	1.4g	2.7g
– monounsaturated	7.4g	12.8g
Carbohydrate	<1g	<1g
– sugars	<1g	<1g
Dietary fibre, total	2.5g	5.0g
Sodium	2mg	4mg
Potassium	255mg	509mg
Thiamin	0.04mg (11% RDI)	0.08mg
Riboflavin	0.07mg (12% RDI)	0.14mg
Niacin	1.2mg eq (40% RDI)	2.4mg eq
Vitamin B6	0.06mg (13% RDI)	0.12mg
Biotin	2.5ug (42% RDI)	5.0ug
Pantothenic acid	0.7mg (39% RDI)	1.39mg
Folate	30ug DFE (40% RDI)	59ug DFE
Vitamin C	5.5mg (18% RDI)	11mg
Vitamin E	1mg (25% RDI)	2mg
Vitamin K	11ug (110% RDI)	21ug
Copper	0.14mg (22% RDI)	0.28mg
Iron	0.32mg (11% RDI)	0.64mg
Magnesium	14mg (23% RDI)	28mg
Manganese	0.12mg (15% RDI)	0.24mg
Boron	0.72mg	1.43mg
Polyphenols	71mg GAE	142mg GAE
Beta carotene	14ug	27ug
Cryptoxanthin	59ug	117ug
Lutein & zeaxanthin	136ug	271ug
Gluten	0mg	0mg

"<" means less than

(Industry Collateral: website, social media, contact details)
Image suggestions: pregnant woman, bouncing baby, avo image showing base as baby bump?

References

1. Langley-Evans SC. Nutrition in early life and the programming of adult disease: a review. J Hum Nutr Diet. 2015 Jan;28 Suppl 1:1-14. doi: 10.1111/jhn.12212. Epub 2014 Jan 31 https://www.ncbi.nlm.nih.gov/pubmed/24479490
2.National Health & Medical Research Council (NH&MRC) (2013) Educator Guide. Canberra. NH&MRC. https://www.eatforhealth.gov.au/guidelines
3. Wen LM, Flood VM, Simpson JM, Rissel C, Baur LA. Dietary behaviours during pregnancy: findings from first-time mothers in southwest Sydney, Australia. *Int J Behav Nutr Phys Act*. 2010;7:13. Published 2010 Feb 3. doi:10.1186/1479-5868-7-13
4. Unlu NZ et al. Carotenoid absorption from salad and salsa by humans is enhanced by the addition of avocado or avocado oil. *J Nutr.* 2005 Mar;135(3):431-6. https://www.ncbi.nlm.nih.gov/pubmed/15735074
5.Australian Institute of Health and Welfare 2011. Mandatory folic acid and iodine fortification in Australia and New Zealand: baseline report for monitoring. Cat. no. PHE 139 Canberra: AIHW. http://www.aihw.gov.au/WorkArea/DownloadAsset.aspx?id=10737418918&libID=10737418917
6.Royal Australian and New Zealand College of Obstetricians and Gynaecologists. Vitamin and Mineral Supplementation and Pregnancy (May 2015). Available at URL https://www.ranzcog.edu.au/RANZCOG_SITE/media/RANZCOG-MEDIA/Women%27s%20Health/Statement%20and%20guidelines/Clinical-Obstetrics/Vitamin-and-mineral-supplementation-in-pregnancy-(C-Obs-25)-Review-Nov-2014,-Amended-May-2015.pdf?ext=.pdf
7. Food Standards Australia and New Zealand. Folic acid/folate in pregnancy. http://www.foodstandards.gov.au/consumer/generalissues/pregnancy/folic/Pages/default.aspx
8. National Health & Medical Research Council (NH&MRC) (2013) Infant Feeding Guidelines- Information for health workers. Canberra. NH&MRC. https://www.eatforhealth.gov.au/guidelines

9. FSANZ Australian New Zealand Food Standards Code. Standard 1.2.7 Nutrition, health and related claims standard https://www.legislation.gov.au/Details/F2017C01048 and Schedule 4 https://www.legislation.gov.au/Details/F2017C00711 and regulatory RDIs for infants found in Schedule 1 https://www.legislation.gov.au/Details/F2017C00315
10. Landrum JT, Bone RA (2001) Lutein, zeaxanthin, and the macular pigment. Arch Biochem Biophys 385:28–40
11. Bettler J et al Serum lutein concentrations in healthy term infants fed human milk or infant formula with lutein. *Eur J Nutr.* 2010 Feb;49(1):45-51 https://www.ncbi.nlm.nih.gov/pubmed/19672550
12. Comerford KB, Ayoob KT, Murray RD et al. The Role of Avocados in Maternal Diets during the Periconceptional Period, Pregnancy, and Lactation. Nutrients. 2016 May 21; 8(5). Epub 2016 May 21.
13. Comerford KB, Ayoob KT, Murray RD, Atkinson SA. The Role of Avocados in Complementary and Transitional Feeding. Nutrients. 2016 May 21;8(5). pii: E316. doi: 10.3390/nu8050316. https://www.ncbi.nlm.nih.gov/pubmed/27213450

Avocado Health and Nutrition Update
A Healthy Weight with Avocados

(Breakout box: summary)
Avocado once the dieters' foe is now the dieters' friend. Not only does avocado add nutritional value to energy restricted diets, their healthy fats can help manage appetite and boost satiety.

(Call out statement)

Not all fats are equal and avocados contain healthy fats

Healthy fats

Avocados contain mostly monounsaturated fats. These plant-based unsaturated fats don't cause weight gain (1) as has long been thought. Higher fat diets such as the Mediterranean diet, rich in monounsaturated fats from extra virgin olive oil, can result in weight loss and "waist" loss when followed for more than 6 months. (2) These higher fat diets appear more enjoyable and easier to stick to in the longer term than low fat diets, ensuring greater weight management success. (3)
Studies have found the monounsaturated fat oleic acid (like that found in avocados) triggers the release of gut hormones glucagon-like peptide 1 (GLP-1) and gastric inhibitory polypeptide (GIP) which control insulin release (4,5). This suggests one mechanism for how avocado helps with appetite control.

Last research: avocado and appetite control

Emerging research into the weight management effects of avocado have found 50-200g a day helps promote satiety and is a good alternative to other dietary fats in energy-restricted diets. (6,7) People who eat avocado weigh less and have a lower BMI and waist circumference. (8)

A recent analysis of the US National Health and Nutrition Examination Survey (NHANES) found that avocado consumers ate on average 70g a day and these regular avocado consumers had:

- Lower body weight (3.4kg less on average),
- Lower BMI (26.7 instead of 28.4) and
- Smaller waist circumference (4cm smaller on average)

compared to those who didn't eat avocado. (8)

So far clinical trials investigating the effects of avocado on appetite and weight have found:

- 200g of avocado in place of 30g of other dietary fats in an energy restricted diet over 6 weeks resulted in significant reductions in: body weight, body mass index, and percentage of body fat in the overweight participants (6),
- 50-90g of avocado added to a lunch meal increased satiety in overweight participants by 23% and their desire-to-eat reduced by 28% for 3-5 hours following the meal.(7) Adding avocado to lunch may help reduce between-meal snacking.
- The same study found 30 minutes after consuming avocado at lunch the rise in blood insulin levels was attenuated by more than 20% and continued for the next 3 hours (7) This is a good result as excess insulin can lead to weight gain.
- A reduction in the gut hormone GLP-1 (Glucagon-like peptide 1) and a corresponding reduction in hunger and an increase in perceived satisfaction after a meal with added avocado. This GLP-1 reduction could in part explain lower insulin levels. (9)
- When eaten at the same time as other foods, avocado intake can counteract inflammation and oxidative stress (10,11) This is beneficial as chronic inflammation can lead to insulin resistance and weight gain (12).

Further research is required to replicate these findings in larger, long-term trials as well as identify mechanisms for avocado's role in weight management. To date research has found extracts of avocado fruit:

- inhibit the action of acetyl-CoA carboxylase, a key enzyme in the production of fat in the body(13) and
- modulates other enzymes involved in carbohydrate metabolism (14).

(Highlight call out summary)

How avocado helps with weight

(call out)

Healthy diet + increased satiety + reduced inflammation + reduced insulin

(Breakout box)

NUTRITION INFORMATION Servings per package: 4 serves per avocado Serving size: ~50g or ¼ avocado		
	Average Quantity per Serving	Average Quantity per 100g
Energy	430kJ (102Cal)	860kJ (205Cal)
Protein, total	1.0g	2.0g
Fat, total	10.7g	21.4g
– saturated	2.4g	4.8g
– trans	0g	0g
– polyunsaturated	1.4g	2.7g
– monounsaturated	7.4g	12.8g
Carbohydrate	<1g	<1g
– sugars	<1g	<1g
Dietary fibre, total	2.5g	5.0g
Sodium	2mg	4mg

Everybody loves avos
Another great thing about avocados are they are on the 'include' list for all the popular diets. Whether it's the Mediterranean diet, DASH, low-carb, paleo, plant-based or vegan, avocados get a big tick. While avocado may not be the cheapest fruit, it does contain 4 x 50g serves per piece. Avocado is nutrient dense and offers excellent nutritional value for money.

Buying and storage tips
Ripe avocados are firm but yield slightly when pressed gently near the top. If not eaten straight away, they're best stored in the fridge. If they are hard, store next to the bananas in the fruit bowl to assist ripening.
If you're not using a whole avocado at once and have some left over, sprinkle the cut edge with lemon juice or vinegar to stop it from browning, press plastic wrap to the surface to remove air (or place in an avocado saver) and store in the fridge for a day or so. Even after that you can trim the browned edge and the flesh underneath will still be okay for a few days.

6 ways to add avocado to meals for waist watchers:

1) Go smashed avocado on wholegrain toast for breakfast – the café classic and millennial icon http://australianavocados.com.au/recipes/avoschetta
2) Whiz up an avo fruit smoothie for a breakfast on the go http://australianavocados.com.au/recipes/avocado-and-berry-power-smoothie
3) Add avocado to salads at lunch along with wholegrains such as quinoa, brown rice and wholemeal pasta http://australianavocados.com.au/recipes/avocado-mango-and-quinoa-salad
4) Try a chilled avocado soup in summer for a light easy meal http://australianavocados.com.au/recipes/easy-chilled-avocado-dill-soup
5) Make lean meat and seafood sing with avocado salsa http://australianavocados.com.au/recipes/easy-poached-fish-avocado-salsa

Check out the Australian avocados website for delicious recipes at australianavocados.com.au

(Industry Collateral: website, social media, contact details)

Image suggestions: Healthy weight people being active; appetite gauge like a fuel gauge showing "full"; recipe image for the avo-berry power smoothie

References

1) Liu X et al. Changes in Types of Dietary Fats Influence Long-term Weight Change in US Women and Men. *J Nutr.* 2018 Nov 1;148(11):1821-1829. doi: 10.1093/jn/nxy183. https://www.ncbi.nlm.nih.gov/pubmed/30247611
2) Esposito K et al Mediterranean diet and weight loss: meta-analysis of randomized controlled trials. *Metab Syndr Relat Disord.* 2011 Feb;9(1):1-12. doi: 10.1089/met.2010.0031. https://www.ncbi.nlm.nih.gov/pubmed/20973675
3) McManus K et al. A randomized controlled trial of a moderate-fat, low-energy diet compared with a low fat, low-energy diet for weight loss in overweight adults. *Int J Obes Relat Metab Disord.* 2001 Oct;25(10):1503-11. https://www.ncbi.nlm.nih.gov/pubmed/11673773
4) Naughton SS et al. The Acute Effect of Oleic- or Linoleic Acid-Containing Meals on Appetite and Metabolic Markers; A Pilot Study in Overweight or Obese Individuals. *Nutrients.* 2018 Sep 26;10(10). pii: E1376. doi: 10.3390/nu10101376. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6213143/
5) Thomsen C et al. Differential effects of saturated and monounsaturated fatty acids on postprandial lipemia and incretin responses in healthy subjects. *Am J Clin Nutr.* 1999 Jun;69(6):1135-43. https://www.ncbi.nlm.nih.gov/pubmed/10357731
6) Pieterse Z et al. Substitution of high monounsaturated fatty acid avocado for mixed dietary fats during an energy-restricted diet: effects on weight loss, serum lipids, fibrinogen, and vascular function. *Nutrition.* 2005;21(1):67-75. https://www.ncbi.nlm.nih.gov/pubmed/15661480
7) Wien M et al. A randomized 3x3 crossover study to evaluate the effect of Hass avocado intake on post-ingestive satiety, glucose and insulin levels, and subsequent energy intake in overweight adults.*Nutr J.* 2013 Nov 27;12:155. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4222592
8) Fulgoni VL 3rd et al. Avocado consumption is associated with better diet quality and nutrient intake, and lower metabolic syndrome risk in US adults: results from the National Health and Nutrition Examination Survey (NHANES) 2001-2008. *Nutr J.* 2013 Jan 2;12:1. https://www.ncbi.nlm.nih.gov/pubmed/23282226
9) Haddad E et al. Postprandial gut hormone responses to Hass avocado meals and their association with visual analog scores in overweight adults: A randomized 3 × 3 crossover trial. *Eat Behav*. 2018 Dec;31:35-40. doi: 10.1016/j.eatbeh.2018.08.001. https://www.ncbi.nlm.nih.gov/pubmed/30096700
10) Khor A et al. Postprandial oxidative stress is increased after a phytonutrient-poor food but not after a kilojoule-matched phytonutrient-rich food. Nutr Res. 2014 May;34(5):391-400. doi: 10.1016/j.nutres.2014.04.005. https://www.ncbi.nlm.nih.gov/pubmed/24916552
11) Li Z et al. Hass avocado modulates postprandial vascular reactivity and postprandial inflammatory responses to a hamburger meal in healthy volunteers. Food Funct. 2013 Feb 26;4(3):384-91. doi: 10.1039/c2fo30226h. https://www.ncbi.nlm.nih.gov/pubmed/23196671
12) Keane KN et al. Molecular Events Linking Oxidative Stress and Inflammation to Insulin Resistance and β-Cell Dysfunction. Oxid Med Cell Longev. 2015;2015:181643. doi: 10.1155/2015/181643. https://www.ncbi.nlm.nih.gov/pubmed/26257839
13) Hashimura H et al. Acetyl-CoA carboxylase inhibitors from avocado (Persea americana Mill) fruits. *Biosci Biotechnol Biochem*. 2001 Jul;65(7):1656-8. https://www.ncbi.nlm.nih.gov/pubmed/11515553
14) Mahadeva Rao US et al. Salutary potential of ethanolic extract of avocado fruit on anomalous carbohydrate metabolic key enzymes in hepatic and renal tissues of hyperglycaemic albino rats. *Chin J Integr Med*. 2017 Sep 15. doi: 10.1007/s11655-017-2784-2. [Epub ahead of print] https://www.ncbi.nlm.nih.gov/pubmed/28914437

Avocado Health and Nutrition Update
Avocado – a nutrient booster

(Breakout box: summary)
Avocado is well known for it's healthy fats but there is so much more nutrition in this gorgeous green fruit - vitamins, minerals and antioxidants - all essential for good health. Avocado helps boost nutrient absorption too.

Nutrient-rich avocados
We know avocado eaters tend to consume significantly more of key nutrients than non-avocado eaters. (1) That's in part because avocados are nutrient-dense. A quarter of an avocado - just 50g - contains:

- healthy fats and dietary fibre
- folate, niacin and pantothenic acid
- vitamins C, E and K
- potassium
- polyphenol antioxidants
- colourful antioxidant carotenoids - beta carotene, cryptoxanthin, lutein and zeaxanthin

(Breakout box)

NUTRITION INFORMATION Servings per package: 4 serves per avocado Serving size: ~50g or ¼ avocado		
	Average Quantity per Serving	Average Quantity per 100g
Energy	430kJ (102Cal)	860kJ (205Cal)
Protein, total	1.0g	2.0g
Fat, total	10.7g	21.4g
– saturated	2.4g	4.8g
– trans	0g	0g
– polyunsaturated	1.4g	2.7g
– monounsaturated	7.4g	12.8g
Carbohydrate	<1g	<1g
– sugars	<1g	<1g
Dietary fibre, total	2.5g	5.0g
Sodium	2mg	4mg
Potassium	255mg	509mg
Niacin	1.2mg eq (12% RDI)	2.4mg eq
Pantothenic acid	0.7mg (14% RDI)	1.4mg
Folate	30ug DFE (15% RDI)	59ug DFE
Vitamin C	5.5mg (14% RDI)	11mg
Vitamin E	1mg (10% RDI)	2mg
Vitamin K	11ug (14% RDI)	21ug
Polyphenols	71mg GAE	142mg GAE
Beta carotene	14ug	27ug
Cryptoxanthin	59ug	117ug
Lutein & zeaxanthin	136ug	271ug

Why do we need…

Healthy fats
Monounsaturated fats help maintain heart health and aid in the body's absorption of fat-soluble vitamins such as vitamin E and carotenoids. (2,3)

Dietary fibre
Fibre is good for gut health and helps keep us regular.(4) Avocado contains around 2.5g of fibre per 50g serve, and both soluble and insoluble fibre.

Vitamins

Folate

This B group vitamin folate is needed for brain function, a healthy immune system, normal blood formation and supports healthy pregnancy.(4) A 50g serve of avocado provides 30ug or 15% of RDI.

Vitamin C

Antioxidant vitamin C works with vitamin E to help reduce the effects of free radical cell damage.(5) Vitamin C is essential for boosting plant (non-haem) iron absorption, building strong bones and teeth, healthy gums and skin, a healthy immune system and brain function.(4) Avocado contains about 6mg of Vitamin C or 14% of RDI for adults.

Vitamin E

Vitamin E is a fat-soluble antioxidant vitamin (4) commonly found in foods with healthy fats including avocado. A quarter of an avocado (50g) provides 1mg of vitamin E or 10% of RDI for adults.

Vitamin K

Vitamin K helps build bones and assists with blood clotting. (4) A 50g serve of avocado contains 11ug of vitamin K or 14% of the RDI for adults.

Niacin and Pantothenic acid

Avocado is an energy booster and fatigue fighter. It contains niacin to help release energy from food and pantothenic acid needed for fat metabolism. (4) Avocado contains over 10% of the RDI for each nutrient.

Potassium and sodium

A healthy, varied diet low in sodium helps to maintain normal blood pressure(4) and higher potassium intake reduces the risk of heart disease and stroke.(6) Avocado contributes to a good sodium/potassium balance, with a quarter of an avocado providing just 2mg of sodium and 255mg of potassium.

Phytochemicals

Avocado contains phytochemicals with antioxidant and anti-inflammatory properties. These include polyphenols and colourful carotenoids such as beta carotene, cryptoxanthin, lutein and zeaxanthin that help give avocado its unique colour. These natural antioxidants contribute to cell protection from free radical damage.

Latest avocado research: the eyes have it

The latest research supports the nutrient boosting benefits of avocado for eye health. The macula lutea in the centre of the retina is responsible for central vision and is yellow in colour because it contains carotenoid pigments lutein and zeaxanthin. These pigments are found in avocado (9) and avocado consumption has been found to boost macula pigment (10). Carotenoids help reduce the risk of macular degeneration. (7,8) Interestingly carotenoids are transported to the eye via HDL cholesterol (11,12) and avocado also boosts HDL. (13)

Avocados boost nutrient absorption

The healthy fats in avocado don't just look after the heart, evidence is building they boost nutrient absorption as well. Avocado enhances the absorption of carotenoids (provitamin A) and enhances their conversion to vitamin A needed for vision. (15)

For example:

- Adding 75g-150g of monounsaturated fat-rich avocados to salads and salsa increases carotenoid absorption fivefold (14).
- Avocado enhances beta carotene absorption from tomatoes 2.4-fold and enhances vitamin A conversion efficiency 4.6 fold and
- Avocado enhances beta carotene absorption 6 fold and vitamin A conversion efficiency 2.6 fold from carrots. (16)

Buying and storage tips

Ripe avocados are firm but yield slightly when pressed gently near the top. If not eaten straight away, they're best stored in the fridge. If they are hard, store next to the bananas in the fruit bowl to assist ripening.

If you're not using a whole avocado at once and have some left over, sprinkle the cut edge with lemon juice or vinegar to stop it from browning, press plastic wrap to the surface to remove air (or place in an avocado saver) and store in the fridge for a day or so. Even after that you can trim the browned edge and the flesh underneath will still be okay for a few days.

5 tips to nutrient boost your favourite meals by adding avo:

1) Mix avocado into scrambled eggs or use in place of mayo for egg sandwiches http://australianavocados.com.au/recipes/avocado-scrambled-egg-wraps
2) Reduce the inflammatory impact of meals by adding avocado (17) http://australianavocados.com.au/recipes/lamb-burger-avocado-and-chilli-jam
3) Absorb more colourful antioxidant pigments from salad vegetables by adding avo (15) http://australianavocados.com.au/recipes/avocado-watermelon-salad
4) Add a nutrient boost to green smoothies with avocado http://australianavocados.com.au/recipes/avocado-smoothie
5) Make sweet treats healthier using avocado– chocolate mousse anyone? http://australianavocados.com.au/recipes/avocado-chocolate-mousse

Check out the Australian avocados website for delicious recipes at australianavocados.com.au

(Industry Collateral: website, social media, contact details)
Image suggestions: healthy energetic looking people; for eye health section a smiling face with avocados for eyes; avocado on a trampoline to reflect 'boost';

References

1) Fulgoni VL 3rd, Dreher M, Davenport AJ. Avocado consumption is associated with better diet quality and nutrient intake, and lower metabolic syndrome risk in US adults: results from the National Health and Nutrition Examination Survey (NHANES) 2001-2008. *Nutr J.* 2013 Jan 2;12:1. Doi: 10.1186/1475-2891-12-1. https://www.ncbi.nlm.nih.gov/pubmed/23282226
2) Schwingshackl L et al. Monounsaturated fatty acids and risk of cardiovascular disease: synopsis of the evidence available from systematic reviews and meta-analyses. *Nutrients.* 2012 Dec 11;4(12):1989-2007. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3546618/
3) Dreher ML et al. Hass Avocado Composition and Potential Health Effects *Critical Reviews in Food Science and Nutrition* 2013;53:738–750 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3664913/
4) FSANZ. Australia New Zealand Food Standards Code – Standard 1.2.7 – Nutrition, health and related claims Available at: https://www.legislation.gov.au/Details/F2017C01048 accessed 17 Nov 2018
5) NHMRC (2006). Nutrient reference values for Australia and New Zealand: Vitamin C. Available at https://www.nrv.gov.au/nutrients/vitamin-c ; accessed 17 Nov 2018
6) Hunt BD et al. Potassium intake and stroke risk: a review of the evidence and practical considerations for achieving a minimum target. *Stroke* 2014 May;45(5):1519-22. https://www.ncbi.nlm.nih.gov/pubmed/24699056
7) Meyers KJ et al. Genetic evidence for role of carotenoids in age-related macular degeneration in the Carotenoids in Age-Related Eye Disease Study (CAREDS). *Invest Ophthalmol Vis Sci.* 2014 Jan 29;55(1):587-99. https://www.ncbi.nlm.nih.gov/pubmed/24346170
8) Chew EY et al. Secondary analyses of the effects of lutein/zeaxanthin on age-related macular degeneration progression: AREDS2 report No. 3. *JAMA Ophthalmol.* 2014 Feb;132(2):142-9. https://www.ncbi.nlm.nih.gov/pubmed/24310343
9) Ashton OB et al. Pigments in avocado tissue and oil. *J Agric Food Chem.* 2006 Dec 27;54(26):10151-8. https://www.ncbi.nlm.nih.gov/pubmed/17177553
10) Scott TM et al. Avocado Consumption Increases Macular Pigment Density in Older Adults: A Randomized, Controlled Trial. *Nutrients.* 2017 Aug 23;9(9). pii: E919. doi: 10.3390/nu9090919. https://www.ncbi.nlm.nih.gov/pubmed/28832514
11) Merle BM et al. Association of HDL-related loci with age-related macular degeneration and plasma lutein and zeaxanthin: the Alienor study. *PLoS One.* 2013 Nov 6;8(11):e79848. https://www.ncbi.nlm.nih.gov/pubmed/24223199
12) Kijlstra A et al. Lutein: more than just a filter for blue light. *Prog Retin Eye Res.* 2012 Jul;31(4):303-15. https://www.ncbi.nlm.nih.gov/pubmed/22465791
13) Mahmassani HA et al. Avocado consumption and risk factors for heart disease: a systematic review and meta-analysis. *Am J Clin Nutr.* 2018 Apr 1;107(4):523-536. doi: 10.1093/ajcn/nqx078. https://www.ncbi.nlm.nih.gov/pubmed/29635493
14) Unlu NZ et al. Carotenoid absorption from salad and salsa by humans is enhanced by the addition of avocado or avocado oil. *J Nutr.* 2005 Mar;135(3):431-6. https://www.ncbi.nlm.nih.gov/pubmed/15735074
15) NHMRC (2006). Nutrient Reference Values for Australia and New Zealand including Vitamin A paper. Available at http://www.nrv.gov.au/nutrients/ vitamin-a accessed 17 Nov 2018.
16) Kopec RE et al. Avocado Consumption Enhances Human Postprandial Provitamin A Absorption and Conversion from a Novel High-β-Carotene Tomato Sauce and from Carrots. *J Nutr.* 2014 Aug;144(8):1158-66 https://www.ncbi.nlm.nih.gov/pubmed/24899156
17) Li Z et al. Hass avocado modulates postprandial vascular reactivity and postprandial inflammatory responses to a hamburger meal in healthy volunteers. *Food Funct.* 2013 Feb 26;4(3):384-91. doi: 10.1039/c2fo30226h. https://www.ncbi.nlm.nih.gov/pubmed/23196671