

# **Chestnut Study tour to Turkey**

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Chestnut Hill Produce

Project Number: CH10002

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Purpose:

The purpose of the report is to document the execution of the study tour and to present its findings.

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The participants are also grateful to the following organisations for their assistance and contribution to the study:

- BIGTEM Manufacturing, Istanbul
- KAFKAS, Bursa
- EGE University, IZMIR
- Uludag University, Bursa

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## ***Media Summary***

In October 2011 a 2 week tour of Turkey was undertaken to:

- investigate the use of chestnut processing equipment and techniques,
- develop linkages with equipment manufacturers with a view to establishing research studies using Australian harvest products and
- identify value-adding processes suitable for consideration for the Australian market including opportunities to use chestnut resources other than nuts for commercial purposes.

A mature, highly specialised candied chestnut industry was found in Turkey. The retailing of quality food outlets containing chestnut products was centred at Bursa whereas the manufacturing technology was centred at Istanbul. Turkey has developed a process that uses chocolate coating of chestnuts. A taste test was conducted with sample products after our return to Australia. The participants were mature chestnut consumers and all agreed the chocolate coating made a most enjoyable sweet food.

The food processing and retailing business, called KAFKAS, was started in 1930 and now produces 3000 tonnes of candied and chocolate-coated chestnuts per annum. There is a network of 100 retail outlets mostly in northern Turkey and the company also exports candied chestnut products to Europe, North America and Asia. The combination of chestnuts and chocolate is a unique taste and was not known to the study group prior to this tour and offers a substantial opportunity for Australian harvesters wishing to value-add their produce. Importantly the candying process can extend the shelf-life of processed chestnuts.

A high-quality, manufacturer food processing equipment, called Bigtem Makine, was observed in Istanbul. This company designs and manufactures processing equipment for a large range of foods. Recently they have created a machine to peel chestnuts. Importantly the peeling machine is composed of a number of multi-purpose modules so it can be used to processes other foods outside of the chestnut season. This factor will improve the business case for adopting such equipment in Australia given the relatively small quantity of nuts available. The study group was invited to send Australian chestnuts during our harvest period for peeling to verify their suitability for process with the current range of equipment available.

Just prior to leave on the tour an outbreak of blight occurred in the Ovens Valley, Victoria where 70% of Australian chestnuts are grown. The trip was altered slightly to incorporate a visit to the Bornova Plant Protection Research Institute at the EGE University to meet with Dr Celiker, the inventor of a blight treatment process being used successfully in Europe. This contact will be beneficial to the blight control group in Australia and her contact details and research papers have been passed on to the Blight Taskforce in Australia.

## ***Introduction***

In October 2011 a 2 week tour of Turkey was undertaken to:

- investigate the use of chestnut processing equipment and techniques,
- develop linkages with equipment manufacturers with a view to establishing research studies using Australian harvest products and
- identify value-adding processes suitable for consideration for the Australian market including opportunities to use chestnut resources other than nuts for commercial purposes.

A mature, highly specialised candied chestnut industry was found in Turkey. In addition a relationship was developed with the manufacturer of high-quality food processing machinery including equipment developed especially to peel chestnuts.

The results of this research will be disseminated by:

- publishing a report in the Chestnuts Industry publication 'Nuts and Burrs' that is distributed to all members of Chestnuts Australia Inc
- presenting the outcomes to the annual general meeting of Chestnuts Australia Inc in October 2011
- providing a copy of the report for download from the members section on the Chestnuts Australia website.

***Itinerary***

<b>Date</b>	<b>Times</b>	<b>Activity</b>
15-Oct		Arrive Istanbul, travel to hotel, unpack and recover from international flight
16-Oct	9 am - 5 pm	visit local markets and food halls
17-Oct	8 am -	travel to Bursa
17-Oct	3-7 pm	visit local shops and observe Chestnut foods; visit Candied Chestnuts shop Kardelen
18-Oct	8am - 5pm	meet Prof Soylu at Kafkas
18-Oct		Travel with Prof Soylu to Kafkas factory to observe candied chestnut production facilities
19-Oct	8am -	travel to Selcuk
20-Oct	3-7 pm	visit cafes, local food markets
21-Oct	9-12 am	Travel to Izmir and visit Prof Celiker at Ege University
21-Oct	1-4 pm	visit Ephesus and local markets, cafes, restaurants, shops
22-Oct	9 am -11 pm	travel with Bigtem staff to chestnut processing factory. Proceed to chestnut orchard in central Turkey to observe harvesting methods, tree care and management plus nut storage.
23-Oct	8 am -	Travel to Antalya; visit cafes, local food markets; observe use of chestnut products
24-Oct	8 am - 6 pm	Daytrip to Finike to visit cafes, local food markets in
25-Oct	8 am - 6 pm	travel by bus to Side to visit cafes, local food markets
26-Oct	8 am - 6 pm	visit cafes, local food markets in Antalya CBD
27-Oct	5 am to 8 am	travel to Istanbul
27-Oct	9 am to 9 pm	meet Bigtem General Manager and staff; discuss food processing technology relating to chestnuts and Bigtem capabilities; tour manufacturing facilities
28-Oct		return to Australia



## ***Results of meetings***

### **1. Meeting with Dr Celiker**

Dr Celiker was able to meet with me at short notice. I explained we recently received advice of the outbreak of chestnut blight in the Ovens Valley in Australia.

Dr Celiker talked me through her research on blight. We studied her papers:

- Evaluation of hypovirulent isolates of *Cryphonectria parasitica* for the biological control of chestnut blight in Turkey.
- Biological control of chestnut blight and prospects for the future: Turkey as a case study
- Actual status of biological control studies on chestnut blight in Turkey



Dr Celiker was impressed with the rapid response of the horticultural industry and government bodies to the outbreak in Australia, saying that urgent containment was required. However she was of the opinion that it would be very hard to eradicate as this had not been achieved before.

### **2. Visit to chestnut farm, central Turkey**

Trees are grown from the northern Anatolian region to the interior Mahmah region across to the Aegean coast. Some of the trees are very old; the Life span of chestnut tree is up to 500 years and up to 30 m tall.



Harvest starts in November each year. Chestnut burrs are collected and buried under ferns and grass to protect the nuts from sunlight and allow the burrs to decay. The harvest season is very short due to snow so workers knock green burrs off the trees using large sticks. Burying the burrs not only protects the nuts but allows the burr to ripen and decay so that nuts can be easily harvested by hand. The cold climate and lack of sunlight allows the chestnuts to be stored until mid winter.



When ready the nuts are picked from the decayed burrs and sent to the processing factory. Here they are polished by machine then sorted and classified and spoiled nuts removed by hand.

### 3. Visit to Kafkas Chestnut processing, Bursa, Turkey

Kafkas is the only integrated candied chestnut facility in the world. It started creating candied chestnuts in Bursa in 1930. The processing facility is 6500 sq m inside and 12000 outside. It is capable of producing 3000 tonnes of candied chestnut produce per year. It producing a variety of different candied products and exports them to countries in Europe, Asia and North America. The formula for the candy is adjusted to suit the requirements of the culture in the destination country.



#### Candy Process

Nuts arrive and are sampled for control purposes then labelled with varietal data such as grower id and date and time of receiving to store. Once passed compliance checks the nuts are then sized and the shells removed before drying. They are then peeled using sharp blades, a steam spiral and rubber rollers. The pellicle is removed by hand.

Nuts are then put into 6 kg boxes and frozen at -25C and stored for the year at -18C. Physical, chemical and microbiological analysis is conducted at each stage of the production process to ensure reliability and quality standards and met.

When required the chestnuts are taken from storage and boiled before being sent to the candying process. The candy process is conducted in computer-controlled machines. In this process the quantity of sugar in the fruit is increased gradually to prevent caramelization. The candying process and long and laborious.



A separate line is used to produce Marron Glaze for Europe. This process produces candied nuts with a longer shelf life. There is a range of other processing techniques producing a range of candied products including chestnut puree, mash, flour.

Kafkas is famous for producing a range of chestnut products using chocolate. Chestnuts are turned into a paste and mixed with a variety of other nuts and fruits and coated with chocolate.



Kafkas has more than 100 retail outlets around Turkey that offer a quality eating experience involving chestnuts.

The following chestnut products were discovered in Turkey:

1. Glazed candied chestnuts
2. Candied chestnuts –vacuum packed
3. Candied chestnuts in syrup
4. Chestnut spread
5. Chestnut puree
6. Chestnut paste
7. Pre-cooked, peeled, whole chestnuts
8. Peeled and sweetened chestnuts
9. Chestnut flour
10. Chocolate coated chestnuts-many different forms were observed.



## Taste tests

A selection of a dozen different chocolate chestnut products was brought back to Melbourne and a group of experienced chestnut consumers was invited to sample the products.

The outcome of this sampling activity was:

- Many of the candied chestnut products were considered to be much like our hazelnut crème bars and not significantly a chestnut eating experience
- Those products that contained whole chestnuts with chocolate were considered a significant eating experience. Most testers responded they would be happy to buy these products.
- The candied chestnuts in syrup provided the best eating experience. In Turkey this product is eaten with ice-cream as a dessert. It was agreed that it was likely to be a popular product if introduced into Australia.

## 4. Visit to Bigtem Makine, Head Office, Istanbul, Turkey

Bigtem has been in operation since 1973 and sells food processing equipment around the world. They have sold equipment to Sunbeam in Mildura and Fruitex in Sydney.

Bigtem has designed and manufactured machinery for the following industries:

- a. Fruit and vegetable processing
  - Size grading, washing
  - Roasting,
  - Grill marking,
  - Coring, halving, cutting, top/tial, trimming, peeling, cracking, destemming, destining, sieving
  - Aspiration, pumping, blanching, cooling, weighing, filling, packing
  - Canning, continuous drying,, dewatering, frying, rehydrating, instant cooling,
  - Metal checking,
  - Chemical processing,
  - Fresh packing
  - Fruit pulp/juice, jam production for all fruits and vegetable
- b. Precise cast stainless steel centrifugal and food transfer pumps, waste water filtration drums, static filters, oil separation, solid waste sedimentation, plate heat exchangers with over 1200 various machine components.

I spent the day at the headquarters of Bigtem. I was accompanied throughout the day by Bengisu Potuoglu -MD, Cagri Kayali, Ali Karanfil. During the day I was introduced to Ron Sydnet, President, Sydney Technologies Corporation of Texas USA who are consulting engineers for manufacturing and food processing systems in the USA and distributors of Bigtem equipment.

I was provided a complete overview of the capabilities of Bigtem. Bigtem design and manufacture food processing and packing equipment that is sold across the world. Bigtem are known for their quality manufacturing and competitive prices. Bigtem

offer nearly entire end-to-end processing machinery and assemblies and is able to carry technical responsibility for the process.

Bigtem then took me on an extended tour of their manufacturing plant focusing on the equipment components for the chestnut peeling machine. However they have extensive experience with nuts and had designed and manufactured a chestnut peeling machine that was due to go into operation in Europe for the Northern harvest season.

During this visit I found out that Bigtem had not yet installed and operated a chestnut peeling machine. The northern harvest period had not commenced at the time of the visit and their prototype machine was due to go into service within a few weeks. Bigtem invited to me return to Istanbul with sample varieties to test their equipment. I have attempted to seek information from Bigtem about the success of their peeling machine and am yet to receive information back.

Bigtem have supplied me with an estimate for construction of their machine in Australia plus a full set of specifications. I do not have permission to publish these documents but interested parties can obtain a copy of the specifications if they wish.

## ***Implications***

The Australian chestnut industry is relatively immature compared with that found in Turkey. More than 90% of the Australian harvest is sold as fresh fruit. A few entrepreneurs are attempting to establish more sophisticated uses for chestnuts by processing them into flour, cake-mix, puree and freeze-dried peeled and packed ready to cook retail packs.



Turkey has used chestnuts for thousands of years. Initially it was considered the 'bread fruit' since it was the major source of carbohydrates before wheat. Consequently, Turkey has a deep and highly developed culture incorporating chestnuts into their foods.

Also Turkey has a much sweeter palette than Australia making the highly sugared chestnut confectionary a much sort after food.

However, combining chocolate with chestnuts is clearly a strategic positioning of the two foods and likely to draw attention to a broad clientele if introduced into other countries including Australia.

The major impediment to the use of chestnuts is the need to peel them. Many varieties have been cultivated simply to improve the peeling experience. However much manual labor is required to remove the skins from the nuts.



Turkey has shown that it is able to manufacture a high-quality, cost-effective chestnut peeling machine. The estimate received from the manufacturer was approximately half the previous quote received from another manufacturer in Europe.

Made from a combination of specialised chestnut modules in concert with standard food-processing modules this machine is as versatile so that it can be used out of chestnut season to process other foods. This feature helps to significantly improve the cost-effectiveness of such a machine given the small size of the Australian harvest and the very small size of the existing market for peeled chestnuts.

The processing methodology utilised by Bigtem does not produce the significant by-products and pollution found in alternative manufacturer's equipment. This could be a significant factor in the adoption of such equipment by local growers in the pristine NE region of Victoria.

Once peeled then a variety of food products could be realised. Since none of the products identified earlier are readily available in Australia an astute marketing campaign would need to be conducted to introduce these new foods into the Australian cuisine.

A further implication for the Australian industry is the extra shelf-life obtained by processing chestnuts. Raw chestnuts have a relatively short shelf life. Bigtem will store chestnuts at -21C for 12 months but this is an expensive proposition. Without freezing the nuts they will typically not last more than a month.

The processed nuts found in Turkey have the following shelf lives:

- Candied chestnuts - 8 months
- Vacuum pack candied chestnuts – 12 months
- Chestnuts in syrup – 2 or 3 years
- Puree, spread, paste – 2 years
- Pre-cooked, peeled whole chestnuts – 1 year
- Flour – 1 year



## ***Recommendations***

Turkey has one of the old chestnut cultures in the world. Harvest techniques have not changed for hundreds of years and many of the trees are hundreds of years old.

Turkey has a mature value-adding industry that produces processed chestnuts. Turkey cuisine using highly sweetened foods and chestnut products were found that had been processed into candied nuts and purees.

One particular business in Turkey, called Kafkas, has developed value-added chestnut foods, notably chocolate coated chestnuts along with candied chestnuts including Marrons Glaces and chestnuts in syrup. The company has created a chain of high-quality, special-purpose retail outlets to bring this range of products to market. Many of these outlets are restaurants rather than shops and provide chestnut food as part of the eating experience.

Turkey also has a highly skilled manufacturing industry that is able to provide cost-effective, high quality food processing equipment. Geographically it is well-positioned to service both Europe and Asia. It develops processing equipment for a large range of fresh foods not just chestnuts.

This trip was valuable for

- Developing a relationship with a high quality manufacturer of food processing equipment
- Discussing and observing the manufacture and design of high quality food processing equipment relating to chestnut peeling; an estimate was obtained for installing a machine in Australia and a strategy to test Australian nuts and setup a machine for diverse uses was discussed
- Developing a relationship with the largest candied chestnut processing facility in Europe
- observing the value-added processing techniques along with discussions on the limitations on use such as shelf-life
- discovering the large range of different candied chestnut foods available from specialty retail outlets. Turkey uses presentation along with the food quality to enrich the eating experience
- observing traditional, old-age farming and harvesting techniques; hand processing is restricted due to the shortness of autumn season and has to stop when snow falls
- sampling a range of cultural uses for chestnuts including street stalls, cafes and markets.
- Identifying geographic regions in Turkey where chestnut use is popular

## ***Suggestions***

The majority of the chestnut industry in Turkey is centred on northern and central regions. In particular Bursa gave the largest range of chestnut retail experiences whereas the central regions inland from Izmir provided farming experiences.

During the development of the itinerary for this trip we were advised that travel to the north coast of Turkey was difficult and so it was decided to keep to the south instead. However it became evident that the northern regions have more chestnut culture to offer for study than the south. It is recommended that a future trip to Turkey take in the northern coastal region.

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