Horticulture Innovation Australia

Final Report

Scoping study to trial mechanised peeler technology for Australian chestnuts

Australian Chestnut Company

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CH09006

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CH09006

SCOPING STUDY TO TRIAL MECHANISED PEELING TECHNOLOGY FOR AUSTRALIAN CHESTNUTS

(June 2010)

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Australian Gourmet Chestnuts

Horticulture Australia Project Number: CH09006

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Purpose of report:
Present findings of research into the efficiency and costs associated with peeling Australian chestnuts using Italian chestnut peeling equipment.

Acknowledgements

Horticulture Australia Ltd
Australian Gourmet Chestnuts
Terminio Frutta Alimentari

2 March 2011

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Media Executive Summary

The development of a processing sector for the Australian Chestnut industry is crucial to the long term viability of the industry. The demand for fresh chestnuts has remained static over the past ten years due mainly to the influences of modern eating habits. Fresh chestnuts are time consuming to prepare and with the trend towards quick and easy meal options, fresh chestnuts do not fit the characteristics of contemporary meal preparation. If the industry continues to rely solely on the fresh market, then as supply increases there will be downward pressure on prices resulting in reduced profitability for the entire industry.

Brian and Jane Casey of Australian Gourmet Chestnuts have been processing Australian chestnuts off shore in China for the past 10 years but their desire to process locally encouraged them to investigate the potential financial viability of establishing a processing facility in Australia using existing Italy technology.

To do this in April 2010 a sample of Purton's Pride variety Australian chestnuts was sent to Italy for processing using both the steam peeling and flame (brulage) peeling methods.

The Australian chestnuts were processed and the results from the brulage peeling were more encouraging than those from the steam peeling method.

The machinery involved in both systems is complex and difficult to operate. It requires constant monitoring and there are no specific parameters for optimal processing. The efficiency of the machine is dependant on the expertise of the operator who constantly monitors the speed and throughput of the process. Variables such as variety, moisture content, pre treatment, size and freshness are just some of the parameters that are considered.

The project determined that the current machinery manufactured by Boema and Nunziata in Italy is not suitable for the Australian industry. This equipment is based on large volumes of easy to peel nuts with low raw product costs neither of which is currently available in Australia.

Other niche processing may be possible but the smaller scale processing operations observed during previous research in 2008[1] involved large amounts of unpaid or low cost labour from relatives. These processed products are then generally marketed directly to the consumer at the numerous market days that are common in countries like France and Italy.

Prior to future investment in chestnut processing, further investigation into alternative peeling processes and systems that could operate efficiently at smaller production volumes should be undertaken. Once the Australian production levels increase significantly and the demand for processed chestnuts increases the European machinery could then be reconsidered.

[1] HAL Project :CH08000 - Study Tour To Europe To Investigate New Chestnut Processing Technologies And Value-Added Products

Introduction

The projects researchers, Brian and Jane Casey, have been actively involved in the development of the Australian Chestnut Industry for over 20 years. Jane was appointed an inaugural Director of the peak industry body, Chestnuts Australia Inc (previously The Chestnut Growers of Australia), when it was founded in 1992 and was the Executive Officer from 1994 to 1997. Jane was instrumental in organizing the first Chestnut Industry Strategic Plan in 1996 and the first National Industry conference in 1999, both involving applications for VC funds. Jane is currently the Managing Director of Australian Gourmet Chestnuts established in 1997 to produce value added Australian Chestnut products. AGC has developed an export market to Japan for frozen peeled Australian Chestnuts as well as developing the Australian market for frozen peeled chestnuts since 1999.

Brian was appointed a Director of CGA in 1995, was a member of the R&D committee from 1996 to 2004 and served as Chairman of the CGA Board from 2004 to 2006. Since 2001, Brian has represented the Chestnut Industry on the Australian Nut Industry Council (ANIC), a position he still holds. Brian manages Mountain View Chestnuts with 12 ha of orchards comprising some 2,000 mature chestnut tress producing approx 25 tonne of chestnuts per annum. Both Brian and Jane work full time in the development of their chestnut business and further developing potential markets for the Australian Chestnut Industry.

The development of a processing sector for the Australian Chestnut industry is crucial to the long term viability of the industry. The demand for fresh chestnuts has remained static over the past ten years due mainly to the influences of modern eating habits. Fresh chestnuts are time consuming to prepare and with the trend towards quick and easy meal options, fresh chestnuts do not fit the characteristics of contemporary meal preparation. If the industry continues to rely solely on the fresh market, then as supply increases there will be downward pressure on prices resulting in reduced profitability for the entire industry.

Australian Gourmet Chestnuts (a registered company wholly owned by Brian and Jane Casey) is the only commercial chestnut processor in Australia (there are two other small processors doing small amounts of chestnut flour) and has been producing frozen peeled Australian chestnuts off shore in China for the past ten years. These have been marketed mainly to food service in Australia and have been exported each year to a customer in Japan who accounts for over 50% of total production.

The conclusion from a previous study undertaken by Brian and Jane Casey in October 2008, see HAL Project number CH08000 was *"…that the cost of setting up a peeling facility in Australia was prohibitive given the current sales levels but that as sales increase there will be a point at which the market will be substantial enough to justify such an investment."*

In early 2009, the Australian Government has announced special funding under the Regional Food Producers Innovation and Productivity Program for the introduction and development of new technologies in Australia. This funding provided for a capital injection of 50% of the cost of establishing a facility in Australia to process chestnuts.

Australian Gourmet Chestnuts applied for funding to import specialised peeling machinery and construct a peeling facility on their property in Eurobin in North East Victoria. They were successful in that application. However before any investment decision was to be made a preliminary study of the suitability of the machinery options needed to be undertaken.

There are two different mechanical peeling methods available; brulage or flame peeling; and steam peeling. Each method has its benefits and both produce a peeled chestnut as an end product. Before commencing the RFPIPP Project it was necessary to determine which machine was best for Australian conditions and Australian chestnuts.

This could only be achieved by sending fresh nuts to Italy to be tested in a commercially operating chestnut peeling facility with each type of machine to establish:

1. Quality of end product
2. Recovery Rate – whole and pieces
3. Estimated cost of production information in terms of recovery rates, energy requirements, power, water, labour costs to operate machinery, etc

A company called Terminio Frutta & Alimentari in San Michele di Serino agreed to process our fresh Australian chestnuts using their peeling equipment. They are a large Italian processing company and have both Brulage and Steam Peeling Lines purchased from the Boema company.

Once a detailed analysis of each process and the relevant costs of production have been determined a decision as to the viability of each method in terms of it's suitability for Australian chestnuts can be made.

An estimate of the costs to establish a facility has also been attempted.

Materials and Methods.

Method – the aim of the project was to test the efficiency of two types of Italian peeling machines (i.e. brulage and steam) using Australian chestnuts.

The processing capacity of the machines was deemed to be approximately 200 kg per hour so a volume of 2,000 kg was determined as an appropriate volume of nuts that would enable a good standard of data to be obtained during the trial. There was to be 1,000 kg allocated to brulage and 1,000 kg allocated for steam peeling. An extra 200 kg of a premium Italian marone chestnut (De Coppi Marone) now grown in Australia was also sent to gauge some extra information on the difference that another variety may cause. (Unfortunately, the factory did not process these separately as requested so we do no have data on the differences between the varieties.)

To observe the processing and collect the relevant data Brian and Jane travelled to San Michele di Serino arriving on 14 June 2010.
The parameters to be measured included:

- Recovery Rates
- Colour
- Taste
- Overall Appearance
- Estimated costs of production taking into account
- (a) energy requirements of machinery and
- (b) staff

Results

Pre Dispatch from Australia

Immediately after harvest the fresh chestnuts were put through a wash and pre-cool system at Nightingale Brothers Packing Facility in Wandiligong in North East Victoria. After a day in the cool room at -2^{o}C they were graded and only the Large 1 size were selected. These were then packed into 20kg poly woven sacks commonly referred to as 'super bags'. The nuts were transported to Melbourne via refrigerated transport and a refrigerated sea container was packed on 22 April 2010 on the site of the freight forwarder and sealed. The temperature was set to -1.5^{o}C. Please see Appendix (i) for the Temperature and Humidity Log of the nuts inside the container. The sea container was dispatched from Melbourne Port on 27 April 2010 with an arrival date listed as 3 June 2010.

Arrival in Italy

The container was delayed by 10 days in its arrival in Naples, Italy, finally docking on 13 June. Italian Customs unexpectedly required MRL testing to be completed prior to any product being released. Initial indications were the container would be released within 2 weeks however due to constant delays it was not released until 15 July 2010 – one month after its arrival in Naples and 12 weeks after the container was packed in Melbourne. This was an unforeseen delay as there was no indication from any authority prior to the shipment being sent that it could take up to a month to complete the necessary quarantine inspections.

Brian and Jane Casey had arrived on 14 June as planned to observe the processing however due to the delay in the release of the container were not able to see any processing of Australian chestnuts actually taking place. However, during their visit they did get to inspect the machinery and the entire processing facility in detail and had the opportunity to talk to the production manager Peppino about the processing systems and the important parameters which can affect the quality of the peeled chestnuts.

Steam Peeling

Peeling using steam is a less severe method of peeling chestnuts than the brulage system. However, its effectiveness is dependant on the variety of chestnut being peeled so its use is limited to certain “easy to peel” varieties. Terminio Frutta uses a Boema manufactured steam peeling line. The process is:

Soaking fresh nuts
Pre-drying immediately prior to processing
Cutting / Scoring outer Shell
Steam Application
Rubbing / scouring the outer shell and inner skin from the nut
Final finishing by hand
Dip
Freezing

These will be discussed in more detail.

Soaking the nuts

This is to re-hydrate any dried nuts and to assist in shelf life. There is no refrigeration at the factory for fresh nuts and to preserve them until they are processed the nuts are held in ambient water. This is a process common in Italy and known as “*curatura”*.

Curatura - vats of chestnuts soaking in water from 7 – 10 days.

Grading into Sizes

The fresh chestnuts are graded into sizes at 1mm calibration. This is possible because of the high volume of throughput in the factory. The very specific sizing is important as it assists in the standardisation of the shelling process. For example, when drying the nuts there is a more even rate of drying in a batch when all the nuts are within 1mm in size.

Predrying

To improve the efficiency of peeling, the nuts are dried slightly using ambient forced air. Partially drying the nuts shrinks the kernel slightly separating it from the inner skin (pellicle) and encourages more efficient removal. The length of time in the dryer was determined by the variety and condition of the nuts. A small batch of nuts would be released and peeled and if there was an acceptable peeling ratio then the whole dryer load would be peeled. If not, the nuts would remain in the dryer and the process would be repeated at a later time. Each batch was different and required constant monitoring and assessment. There were no set parameters in terms of percentage moisture or weight loss that were measured and the process was heavily reliant on the experience of the production manager to determine the time in the dryer.

Jane talking to Production Manager and QA Manager in front of the dryer.

Cutting

After drying the nuts pass through a cutting machine. This is a cylindrical unit with many razor sharp blades which slice the outer shell of the chestnut. The unit is very susceptible to damage and the factory has had problems with small rocks which can accidentally be picked up off the orchard floor during machine harvesting of chestnuts. Each cutting unit was worth approximately 500 euros and during the processing season needed to be replaced at least once per month. If rocks were introduced to the unit then it would be damaged to the point of requiring replacement immediately.

The bank of three cutting machines.

Inside the cutting machine – notice the lines of very sharp fine blades protruding 2-3 mm from the disc. These blades put many fine cuts in the outer leathery shell of each chestnut.

Steam application

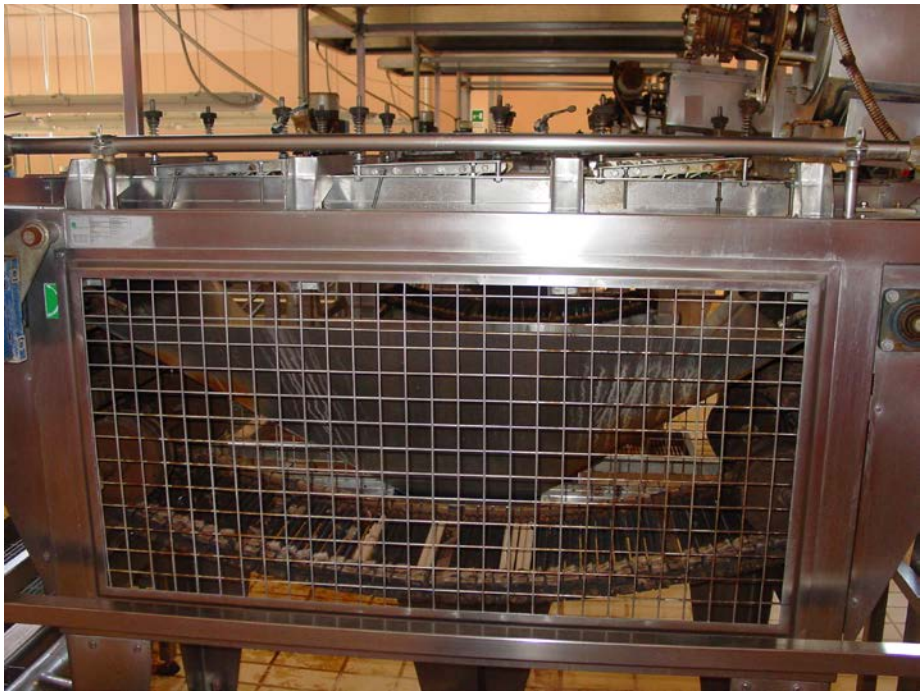
From the cutting machines the nuts are then elevated and transferred to the steam oven.

The steam peeling unit

The long stainless steal units (4 are shown here) are full of steam. The chestnuts travel within the unit by an auger and the speed in which the nuts are carried through the unit can be altered depending on their ease of peeling with easier to peel varieties moving more quickly. The outer shell which has been scored creates ‘gaps’ for the steam to penetrate and soften the inner skin (pellicle) of the chestnut.

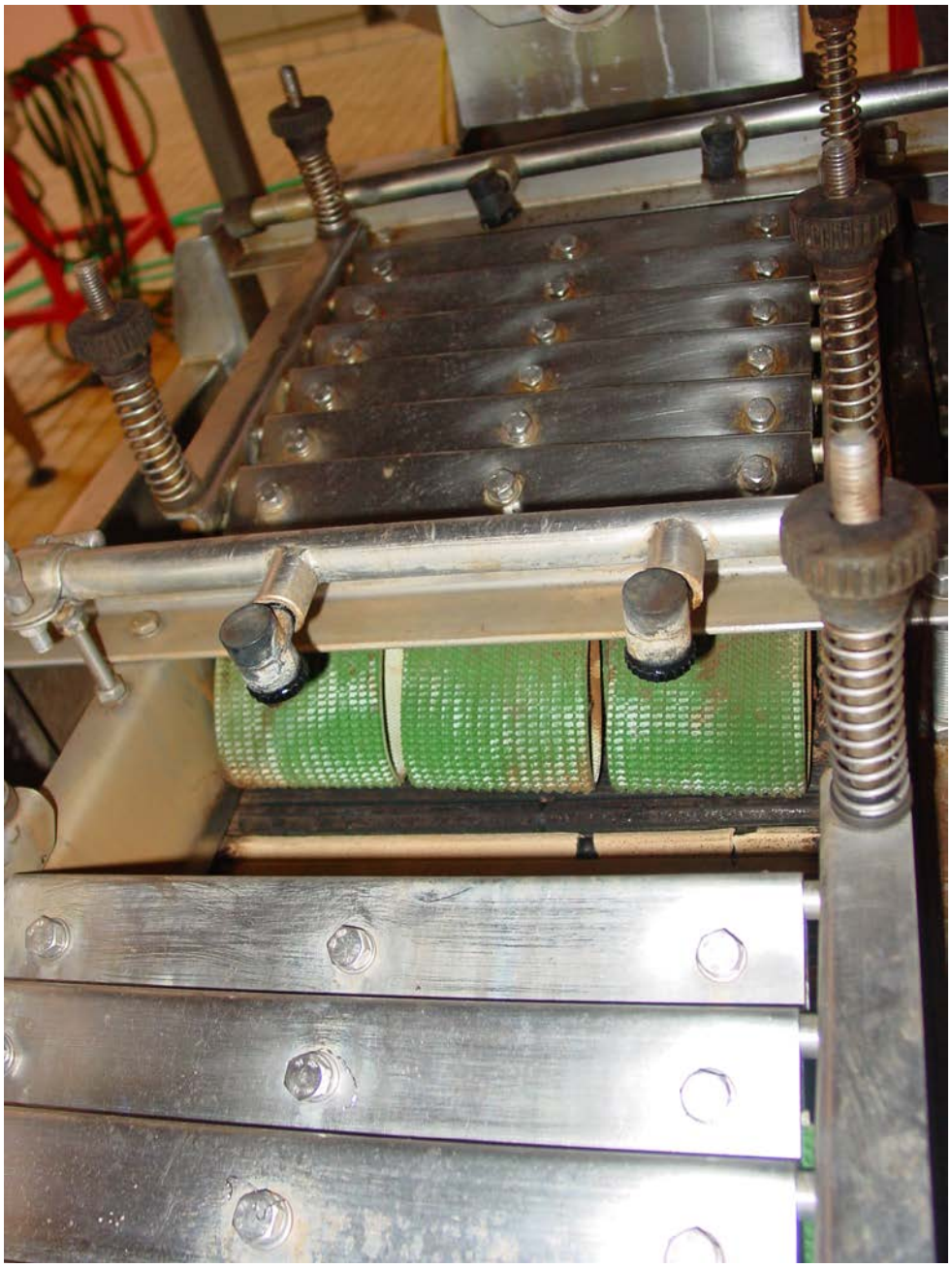
Steam peeling unit.

Shell Removal by Rubbing/Scouring



Shell removal section – side view.

Shell removal section longitudinal view.



View from above

Nuts pass between the green belt at the top and the black conveyor on the bottom. One unit is going in one direction and the other in the opposite direction. It creates friction and the scored outer shell and inner skin of the chestnut which has been softened by the steam is rubbed off. The distance between the two belts can be altered depending on the size of the chestnuts being peeled – notice the spring adjustments on the top of the upper section.

Final Sorting/Finishing

The nuts then travel along a conveyor where they are checked by staff.

When the machine is at full production staff are required to grade the nuts as they exit the machinery. Here the staff are looking for defects such as incompletely peeled nuts, broken nuts, worm infestation, general rots, etc.

Frozen nuts being re-checked during quiet period (June 2010)

Final wash

After the nuts have passed the inspection area they are placing into a final wash and then drained and frozen.

Large vat for the final wash.

Conveyor from the wash to the freezer.

Freezing

The freezing process takes a total of 12 minutes. The nuts were transported through the freezer on a series of belts which moved slowly to allow time for the nuts to be completely frozen. The freezer was set a temperature of -40^{o}C.

Jane discussing the freezing process with the QA Manager.

Brulage

The brulage system is a more aggressive method of peeling and is used for chestnuts that cannot be easily peeled by steam. Nuts peeled using the brulage method are generally cheaper in price and considered to be of a lower quality than nuts peeled by steam. They are also more limited in their use with brulage peeled chestnuts being unsuitable for example for marron glacés production. However, the brulage is useful when nuts are difficult to peel and overall the results can be quite acceptable. The system has quite a few steps that are identical to the steam peeling method; the main difference is the initial treatment. Whereas the steam peeled nuts are dried and then the outer shell is finely scored the brulage omits these steps[2]. The nuts are dropped one by one into a blast furnace without any pre-treatment. This furnace is a cylinder approximately
1.5 m long set on an angle that rotates. At the lower part of the cylinder is a jet of flame. The nuts are dropped into the top of the cylinder and move towards the flame, rotating constantly. It takes only a few seconds to move from one end to the other and the internal temperature of the brulage oven is between 650^{o}C and 700^{o}C.

Bank of six brulage ovens – the nuts are dropped into the top of the unit. The nuts leaving the units can be seen on the conveyor belt underneath the main cylinders.

[2] Except in the case of our trial in which all nuts were pre-dried.

Post Brulage cleaning.

The semi-peeled nuts are then put through a similar steam/wash unit as for the steam peeled nuts.

Nuts being graded after passing through the wash and brush unit. The heat from the nuts can be seen (i.e.steam) and the nuts actually end up being semi-cooked in this process.

Final Wash

Prior to freezing the nuts are put into the final wash. Although the production manager assured us there was no additive in the final wash solution, it seems quite 'soapy'.

Nuts leaving the final wash prior to freezing.

The photos were of Italian nuts being processed through the systems. No photographic records of the Australian chestnuts being processed where received.

Because of delays in the arrival of the chestnuts, Brian and Jane could not observe the processing of Australian nuts personally however, they returned to Italy in October 2010 to visit the factory and discuss the processing with the production staff first hand.

The initial results were:

> *"We peeled by steam the L1 but the results is bad.*
> *3% of already peeled after cutting process*
> *14% of peeled after steaming process.*
> *Too low.*
> *It seems the fruits are too dry.*
> *We stop the test: we are putting the fruits left in water to try to re-hydrate them.*
> *We'll try again on Monday, either steam than fire."*

The total volume of chestnuts sent was 2200 kg and whilst 2000 kg was one variety and 200 kg a second variety the factory did not distinguish between the two and processed them altogether.

Statistics

Pre-drying
2200 kg fresh nuts → 1617 kg semi-dried nuts

Steam Peeling
400 kg steam peeled → 260 kg peeled nuts (mainly pieces)

Brulage
1217 kg brulage peeled → 600 kg whole nuts and 317 kg second grade

Please see photos following of the frozen peeled chestnuts. The results show that many of the peeled nuts still have pellicle (inner skin) attached and the colour is not uniform. Since the aim of this project was to assess the effectiveness of the peeling equipment there were no staff present 'on the line' during our processing so no hand finishing was undertaken.

The production manager did not have any comment as to why there was a high variability in the colour of the nuts. The delay in the container arrival and the age of the fresh nuts may have been a factor although Italian chestnuts are processed at the same time after harvest without any major issues regarding colour. A factor they suggested was variety with the Australian nuts being thought to be a hybrid Japanese/European (*castanea crenata/castanea sativa*) whereas the Italian nuts are pure European. As the authors were not able to observe the processing as originally planned there is a great deal of uncertainty as to exactly how the trial was conducted.

Australian chestnuts – steam peeled and frozen
Poor appearance indicates possible delay between peeling and freezing

Estimated Cost of Production

For 25 tonne production:

Fresh Nuts (70% recovery = 36 tonne fresh nuts @ $3.50/kg)	$126,000
Power (estimated annual power based on $0.2398 / kWh))	$5,000
Gas (assuming brulage)	$12,500
Packaging ($0.50/kg)	$12,500
Distribution/Freight	$15,000
Staff (5 persons full time x 5 wks @$22/hr + 1 supervisor @ $35/hr)	$29,000
TOTAL	$200,000
PER KG PROCESSED PRODUCT	$8.00

It was difficult to get an exact figure of what the cost to operate the individual machinery is. The Boema Company have not responded to specific questions and the factory at Avellino is comprehensive and runs not only the peeling equipment but also equipment used to pack fresh chestnuts, extensive cool stores and freezers. Specific information on costs for the operation of the equipment on a per hour basis was not successfully determined so an estimate of the total power usage has been used in the final calculations taking into account the combined installed electrical power of each of the components as per the Boema quote in Appendix (ii). The same issue affects gas consumption with this being estimated however the packaging and distribution are based on current business expenses incurred in the operation of the existing chestnut processing business.

Costs **NOT** included in the average cost per kg of frozen peeled chestnuts include:

- Ongoing Staff costs – need to base staff to operate business 52 weeks each year.
- Any cash flow / interest costs
- Marketing / PR
- Miscellaneous costs such as QA accreditation & licences, machinery maintenance, disposal of waste, vehicles, rates, etc.
- Rental of premises (if rented)
- Return on investment.

Final product cost to customer will also need to include a profit margin on top of both the production costs and fixed business operating expenses.

Estimated Base Costs to establish a Facility

Peeling Equipment (Boema[3] - €160,350 Peeling Equipment (Nunziata Technologie[4] - €98,900)	$229,000 $145,000
Freight	$20,000
Installation / Commissioning	$50,000
Boiler	$25,000
Upgrade building to food safety standards	$50,000
Freezer (both blast & storage)	$40,000
Coolrooms	$20,000
TOTAL	$434,000 (Boema) or $350,000 (Nunziata)

Not included in these costs is the cost of any building or land.

[3] See Appendix(ii)
[4] See Appendix (iii)

Outcomes

This project was initiated to determine to viability of establishing a chestnut peeling facility in North East Victoria. There were three main questions to be addressed by this project. These were:

1. Quality of end product
   The quality of the end product produced by both the steam peeling method and the brulage method was below expectations. Both methods resulted in a large percentage of nuts with inner skin still attached and the colour of the peeled nuts varied significantly. As the processing was not observed the authors cannot confirm precisely how the processing was undertaken.

2. Recovery Rate – whole and pieces
   Steam Peeling resulted in 65% recovery rate however these were mainly pieces and the actual % of 'clean' whole nuts was very low.
   Brulage Peeling resulted in a 75% recovery rate with 49% being whole nuts and 25% pieces. As for the steam peeled nuts the % of 'clean' nuts was much lower.

3. Estimated cost of production
   A figure of 70% was chosen for the calculations into the cost of production and this was estimated to be $9.00 / kg of finished product regardless of whether the nut is whole or in pieces. Of course having a large number of pieces is problematic as only premium prices can be obtained for whole cleanly peeled chestnuts.

Key Points

Peeling Equipment

The peeling equipment is not "Plug and Play" buy requires constant monitoring and adjustment. Variables include:

Variety
% Moisture
Pre-treatment (wate, pre drying)
Size
Time from harvest (freshness)
End use

There are no specific parameters for optimal processing – pre-drying times and speed through the machine are determined by the experience of the operator. It takes years of training to learn the nuisances of the machinery to gain the optimal production and there is a large percentage of waste during the commencement of operations.

The smallest Boema Line (and also the Nunziata Line) handles 300 kg fresh chestnuts per hour. Using a 6 hour operating day, 5 day week it would take just 4 weeks to complete processing. The machinery would effectively sit idle for 11 months of the year. Even if production doubled it would still only be operating for a fraction of the year.

Labour Costs

After machine peeling there is still a large labour component. Depending on the final results this has the potential to increase the overall cost of production significantly.

Ongoing Maintenance

There are also high ongoing costs in terms of required maintenance and replacement of scoring drum which needs to be replaced regularly and the current cost of one drum is €500.

Fixed Costs

Fixed costs are those costs not directly associated with the production of the product but which are incurred generally regardless of the volume of production. These additional costs add to the overall cost of operating a processing business in Australia and when small volumes are processed will, on a per kg basis, add significantly to the total cost of production. When volumes increase these costs are spread over a larger production so their per kg effect is reduced however the current Australian market for frozen peeled chestnuts is small and a business will need to ensure it has enough capital to keep the business going while markets are developed. Pricing of the processed product will need to take into account these costs.

Conclusion

It is the opinion of the project participants that, on the basis of the evidence the current machinery manufactured by Boema and Nunziata in Italy is not suitable and deemed not to be financially viable for the Australian industry at this time. This equipment is expensive to purchase and install and based on processing large volumes with low raw product costs neither of which is available in Australia.

The tests showed Purton's Pride variety chestnuts were not suitable for steam peeling and there was inconclusive evidence that brulage peeling would produce an acceptable product. Had the authors been able to be present during the peeling as planned then a far more accurate assessment would have been able to have been undertaken.

Other niche processing may be possible but the smaller scale processing operations observed during previous research in 2008[5] have all involved large amounts of unpaid/low paid labour from relatives, etc

Prior to future investment in Australian based chestnut processing, further investigation into alternative peeling processes and systems that could operate efficiently at smaller production volumes should be undertaken.

Information dissemination

A presentation was made to the Chestnuts Australia Inc Board regarding the outcomes of the project[6]. Both Brian and Jane have offered to speak at Chestnuts Australia functions such as the Annual General Meeting and an article is being prepared for the winter edition of the Australian Nutgrower magazine. An overview of the project will also be submitted for the CAI newsletter publication "Nuts and Burrs"

Thanks

The project participants would like to gratefully acknowledge the assistance of the following:

Helen Sargent and Richard Bennett of Horticulture Australia

Guiseppe Bonardi of Ortofrutticola in Marradi and especially

Gaetano De Feo owner of Terminio Frutta who graciously allowed us to use his facilities and teach us so much about processing chestnuts.

[5] HAL Project :CH08000 - Study Tour To Europe To Investigate New Chestnut Processing Technologies And Value-Added Products

[6] See Appendix (iv) for copy of presentation.

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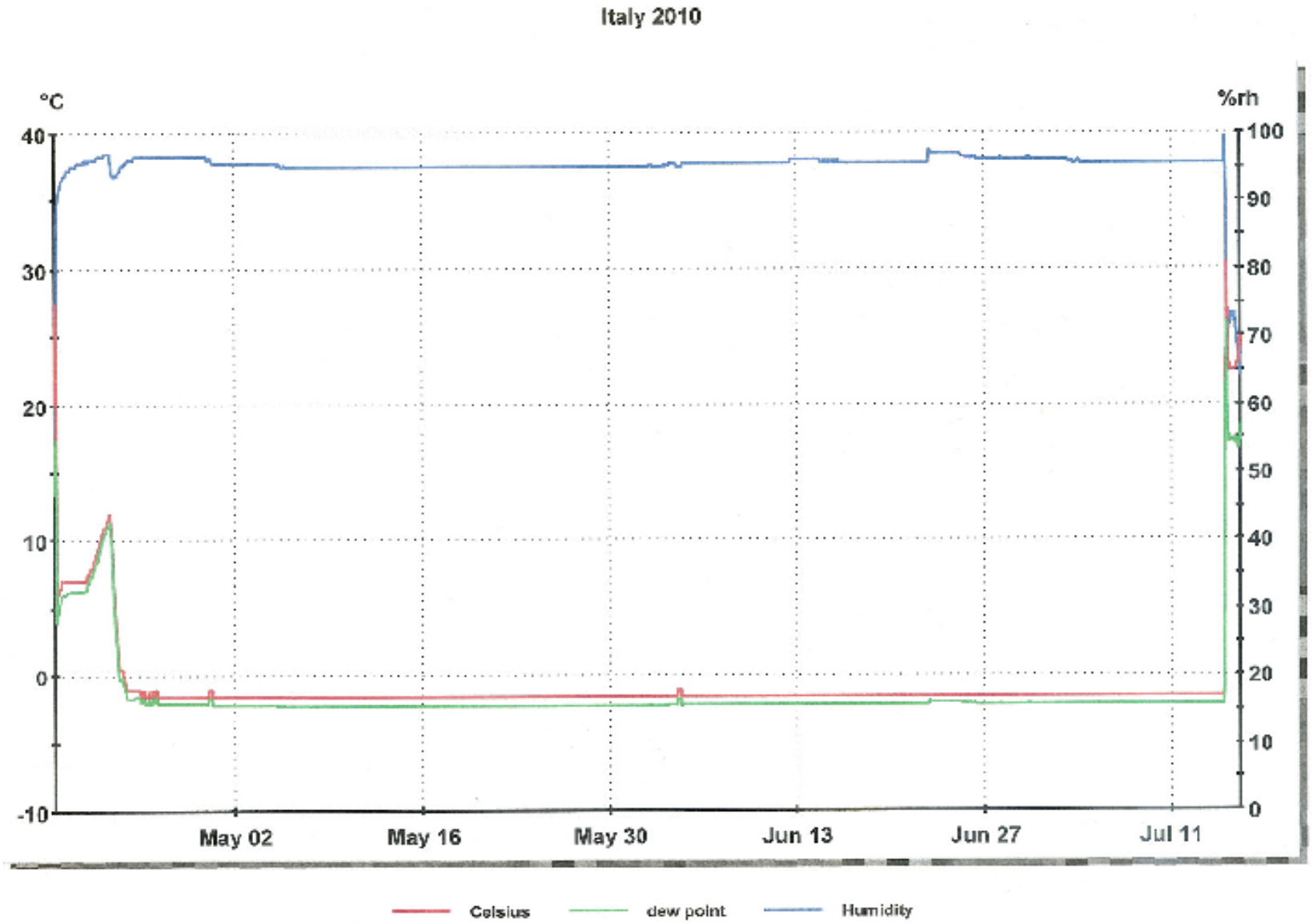
Appendix (i) Data logger record for the container of fresh nuts from Australia to Italy



APPENDIX (ii)
Quote from Boema for Steam Peeling Line

ITEM N	Q.	DESCRIPTION
		STEAM PEELING LINE FOR CHESTNUTS
		Production capacity: max 600 kg/h. of input product. Reference: enclosed technical drawing.
		The line will be composed of the following machines:
1	1	SUPPORTING FRAME
2 OPT	1	PVC STRAIGHT ELEVATOR MOD. EL20/3 (OPTIONAL)
3 OPT	1	PRE-DRYER MOD. PSS/16 (OPTIONAL)
4	1	MULTIPLE-BLADE SHELL-SCORER MOD. J1/1B
5	1	SWAN INTRALOX NECKED ELEVATOR-BATCHER MOD. EL22C
6	1	WORM SCREW PARBOILER MOD. SB/C
7	1	SKIN SEPARATOR MOD. SP/P
8	1	SORTING BELT MOD. NC/X/8/800
9 OPT	1	SWAN NECKED ELEVATOR MOD. EL22C IN TANK MOD. V29G (OPTIONAL)
10	1	ELECTRIC CONTROL PANEL
10.1 OPT	1	SUPPLEMENT TO THE ELECTRICAL PANEL (OPTIONAL)

./.

ITEM N	Q.	DESCRIPTION

DESCRIPTION OF THE PROCESSING PROCEDURE

Bins, containing cleaned and sized chestnuts, are placed on a suitable frame -1- in order to feed the loading hopper of the elevator -2-.

From this point product is lifted to load the pre-dryer -3-, where it stays for approx. 40 minutes at a temperature of 55°C.

Coming out from the pre-dryer chestnuts go to the multiple-blade shell-scorer -4-. The shell scorer makes several micro cuts on chestnuts' shell to enable steam penetration.

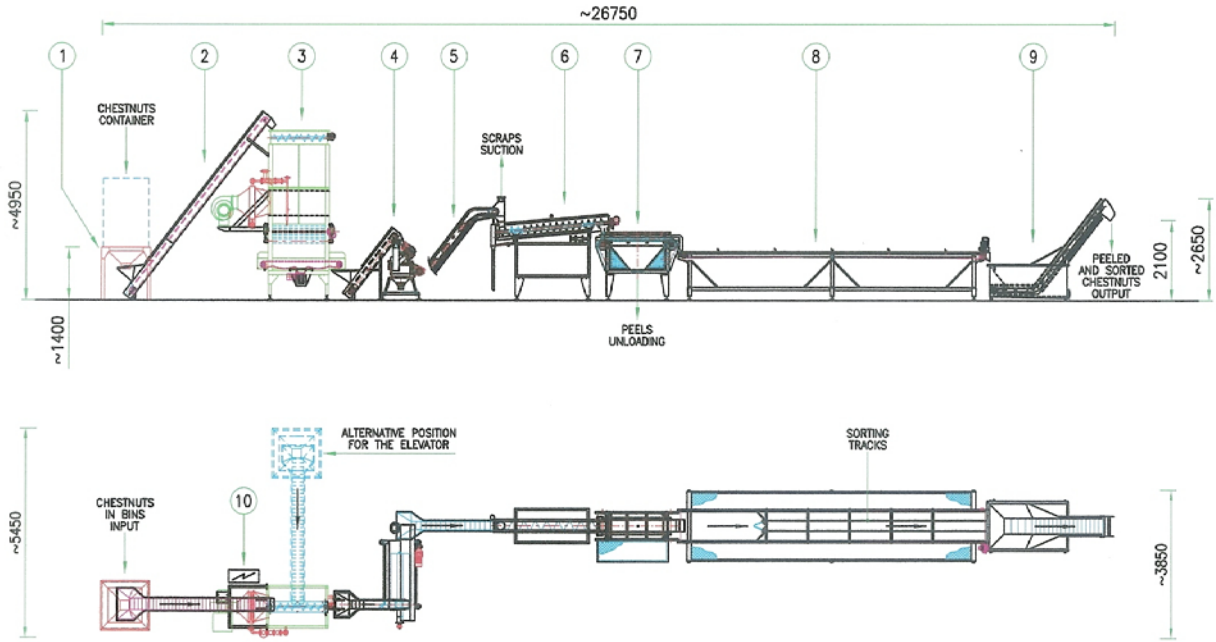
Afterwards, chestnuts go to the Intralox elevator-batcher -5-.

From the elevator, product is fed into the worm screw parboiler -6- and from here, to the skin separator -7-. Afterwards, chestnuts are discharged onto the sorting belt -8-, where operators will check it and finish chestnuts peeling.

By the sorting belt, chestnuts are transferred to the tank -9- prearranged to feed the freezer.

The whole line is controlled by the electrical panel -10-.

STEAM PEELING LINE FOR CHESTNUTS



POSIZ.	DENOMINAZIONE	Q.
10	ELECTRIC CONTROL PANEL	1
9	SWAN NECKED ELEVATOR MOD. EL22C IN TANK MOD. V29G (OPTIONAL)	1
8	SORTING BELT MOD. NC/X/8/800	1
7	SKIN SEPARATOR MOD. SP/P	1
6	WORM SCREW PARBOILER MOD. SB/C	1
5	SWAN INTRALOX NECKED ELEVATOR-BATCHER MOD. EL22C	1
4	MULTIPLE-BLADE SHELL-SCORER MOD. J1/1B	1
3	PRE-DRYER MOD. PSS/16 (OPTIONAL)	1
2	PVC STRAIGHT ELEVATOR MOD. EL20/3 (OPTIONAL)	1
1	BINS SUPPORTING FRAME	1

DRAWING NUMBER
L_PELVAP
UPDATED ON THE
27/03/06
DESIGNER ENGINEER
ROSSO G.
APPROVED
TESTED UNDER CE REGULATION

boema
MACCHINE ED IMPIANTI PER L'INDUSTRIA ALIMENTARE
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e-mail: boema@boema.com SITO INTERNET: www.boema.com

ITEM N	Q.	DESCRIPTION
		DESCRIPTION AND FEATURES OF MACHINES
1	**1**	**SUPPORTING FRAME** Made of painted carbon steel, it supports bins and doses chestnuts inside the hopper of the following elevator.
2 OPT	**1**	**PVC STRAIGHT ELEVATOR MOD. EL20/3 (OPTIONAL)** The elevator transports the product to a working height to load the following machine. Made of painted carbon steel press-formed plate, it is mainly composed of: - side panels fitted with bolts to the sliding table; - draw head with anchorage flanges for mountings with self aligning closed bearings; - return head with anchorage flanges for mountings with self aligning closed bearings and mechanical device for taking up play; - cage draw and return roller; - PVC conveyor belt for foodstuffs with vulcanised plugs; - loading hopper; - discharge hopper; - motorization by means of motorized gear-box; - frame to support the elevator. Technical data Dimensions: length 6.000 mm. width 300 mm. Installed electrical power: 0,75 kW.
3 OPT	**1**	**PRE-DRYER MOD. PSS/16 (OPTIONAL)** Made of painted carbon steel sections and press-formed plate, it will be composed of: - chestnuts containing silo of parallelepiped shape, capacity of 1.600 kg.; - screw mounted on top to spread chestnuts on the whole length; - motorized-gearbox for the screw moving; - electrolevel with rotating paddle to keep the right product quantity inside the dryer; - extraction reel fitted with rollers with special profiles, having pitch movement for an even product extraction; - motorized-gearbox for the reel moving; - device installed on the lower part of the reel for product discharge and drying air holding; - flat belt for product extraction; - battery for heating and hot air blowing inside the Predryer, provided with: centrifugal blower, filter and heating battery with heat exchanger. Such equipment will be equipped with temperature thermo-adjuster with probe and temperature gauge. ./.

ITEM N	Q.	DESCRIPTION
		Technical data Overall dimensions: length 3.400 mm. width 1.400 mm. height 3.800 mm. Working dimensions: length 1.500 mm. width 1.000 mm. height 1.600 mm. Steam consumption: 100 kg/h. at 3 bar Installed electrical power: 3,3 kW.
4	**1**	**MULTIPLE-BLADE SHELL-SCORER MOD. J1/1B** Made of painted carbon steel, it will be composed of: - structure to support the rotating cylinder, which is fitted with suitable cutting blades; - chain conveyor with suitable paddles assembled on the blade cylinder; - screw placed below the cylinder for peels removal; - device for light foreign bodies separation with fan assembled on belt output; - loading and discharge hopper. Technical data Overall dimensions: length 2.800 mm. width 1.200 mm. Installed electrical power: 3,8 kW. This machine will be provided with loading elevator with PVC conveyor belt, n° 3.120 spare blades, n° 2 supports for spare blade-bearing shaft, n° 2 blade-bearing shafts (one is equipped with n° 156 disks and the other is "bare"), hydraulic power lift for blade-bearing shaft.
5	**1**	**SWAN INTRALOX NECKED ELEVATOR-BATCHER MOD. EL22C** The elevator conveys the product to a suitable height to load the subsequent machine. Made of AISI 304 stainless steel press-formed plate and sections, it is mainly composed of: - sides and sliding table in a single press-formed and welded piece with wide side openings; - draw head with anchorage flanges for mountings with self-aligning closed bearings; - return head with anchorage flanges for mountings with self-aligning closed bearings; - draw and return pinions; - Intralox grid conveyor belt with relevant sides and plugs; - supporting runners for belt return; ./.

ITEM N	Q.	DESCRIPTION
		- lower casing spaced for cleaning operations; - motorization by means of motovariator. Technical data Dimensions: length 3.000 mm. nominal width 300 mm. working width 220 mm. Installed electrical power: 0,37 kW.
6	1	**WORM SCREW PARBOILER MOD. SB/C** This machine parboils the product with steam penetrating the several cuts in the shell to facilitate their partial removal. Fully made of stainless steel press-formed plate, it is mainly formed of: - product conveying channel having OMEGA reversed section with top guard and perforated bottom for steam injection; - internal worm screw for product feeding; - screw motorization by means of motovariator; - interspace for steam injection placed in the lower part of the channel and fitted with several holes approx. 3 mm. diameter; - insulation of the side and lower parts by glass wool; - pipings for steam injection into the interspace; - n° 3 steam adjusting valves; - steam on-off valve; - condensate drainage valve; - supporting frame made of stainless steel tubulars. Technical data Overall dimensions: length 3.400 mm. width 900 mm. Worm screw diameter: 250 mm. Worm screw length: 2.750 mm. Worm screw pitch: 170 mm. Steam consumption: max. 150 kg/h. approx. Installed electrical power: 0,37 kW.
7	1	**SKIN SEPARATOR MOD. SP/P** This machine strips off the remaining skin by means of rubber rollers. Made of AISI 304 stainless steel tubulars and press-formed plate except for the transmission gears, it is mainly formed of: - set of rubberized small rollers fitted in pairs and counter-rotating; - rubberized sectors to facilitate the removal of the skin; - water system for the shower on the working table; - loading hopper; ./.

ITEM N	Q.	DESCRIPTION
		- skin collection hopper; - discharge hopper; The final user must provide to supply the hot water for the washing phases of the skin separators. <u>Technical data</u> Overall dimensions: length 2.250 mm. width 750 mm. height 1.400 mm. Work table dimensions: 310 x 1.800 mm. Installed electrical power: 1,5 kW.
8	**1**	**SORTING BELT MOD. NC/X/8/800** The conveyor enables personnel to sort unsuitable product. Made of stainless steel tubulars and press-formed plate, it is mainly formed of: - draw drum mounted on self-aligning bearings and controlled by a suitably powered motovariator; - return drum also mounted on self-aligning bearings, provided with a suitable system for the mechanical take-up of play; - PVC sorting belt for foodstuffs with sorting tracks; - side platforms for the sorting personnel. <u>Technical data</u> Overall dimensions: length 8.200 mm. width 2.000 mm. Work table dimensions: length 8.000 mm. width 800 mm. Installed electrical power: 1,5 kW.
9 OPT	**1**	**SWAN NECKED ELEVATOR MOD. EL22C IN TANK MOD. V29G (OPTIONAL)** The elevator conveys the product to a suitable height to load the freezer. Made of stainless steel press-formed plate and sections, it is mainly composed of: - side panels made of stainless steel plate with polyzene guides housing on the belt's return; - sliding table made of stainless steel sections; - Intralox mesh belt with plugs; - draw head with anchorage flanges for mountings with self-aligning bearings and draw pinions made of suitable material; - return head with seats for mounting and bearing, mechanical device for taking up play; - standard loading and discharge hopper; - motorisation by means of motorized-gearbox; ./.

ITEM N	Q.	DESCRIPTION
		- inferior casing for product collection; - swan neck in the loading side (standard length); - supporting frame; - tank Mod. V29G suitable to contain elevator and hopper for product loading inside water. Made of stainless steel press-formed plate, it will have the following features: • tank bottom towards the total discharge hatch; • DN40 water discharge valve; • water discharge pipe from the overflow; • stirrups for elevator's anchorage; • total discharge hatch. <u>Technical data</u> Elevator dimensions: length 4.000 mm. width 500 mm. Tank dimensions: length 2.050 mm. width 1.200 mm. height 850 mm. Discharge height: 2.100 mm. Installed electrical power: 0,75 kW. *(<u>N.B.:</u> Dimensions to be discussed according to the features of freezing tunnel)*
10	**1**	**ELECTRIC CONTROL PANEL** CE regulation construction, with low tension controls, magnetothermic protections for each motor. Stainless steel box.
10.1 OPT	**1**	**SUPPLEMENT TO THE ELECTRICAL PANEL (OPTIONAL)** Supplement to the electrical panel of pos. 10 to control and command the optional machines of pos. 2, 3 and 9.
		./.

ITEM N	Q.	DESCRIPTION		
		PRICE LIST		
1	1	SUPPORTING FRAME	EURO	550,00
4	1	MULTIPLE-BLADE SHELL-SCORER MOD. J1/1B	EURO	31.600,00
5	1	SWAN INTRALOX NECKED ELEVATOR-BATCHER MOD. EL22C	EURO	10.950,00
6	1	WORM SCREW PARBOILER MOD. SB/C	EURO	19.150,00
7	1	SKIN SEPARATOR MOD. SP/P	EURO	33.950,00
8	1	SORTING BELT MOD. NC/X/8/800	EURO	23.300,00
10	1	ELECTRIC CONTROL PANEL	EURO	10.200,00

		TOTAL PRICE OF THE LINE (OPTIONALS EXCLUDED)	**EURO**	**129.700,00**
		OPTIONALS:		
2 OPT	1	PVC STRAIGHT ELEVATOR MOD. EL20/3 (OPTIONAL)	EURO	7.850,00
3 OPT	1	PRE-DRYER MOD. PSS/16 (OPTIONAL)	EURO	30.650,00
9 OPT	1	SWAN NECKED ELEVATOR MOD. EL22C IN TANK MOD. V29G (OPTIONAL)	EURO	17.600,00
10.1 OPT	1	SUPPLEMENT TO THE ELECTRICAL PANEL (OPTIONAL)	EURO	2.700,00

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APPENDIX (ii)

ITEM N	Q.	DESCRIPTION
		PILOT "BRULAGE" PEELING LINE FOR CHESTNUTS
		TECHNICAL SPECIFICATIONS
		Input product: cleaned and sized chestnuts stocked in bins Output product: peeled chestnuts ready to be frozen Capacity: 400÷450 kg./h. of input chestnuts (referred to Longal chestnuts quality). Reference: lay-out Boema n. 09-046.
		The line will be composed of the following machines:
1	1	SUPPORTING FRAME
2	1	PVC ELEVATOR – BATCHER MOD. EL20/3
3	1	CHAIN BATCHER MOD. NDOS/C/1
4	1	OVEN MOD. NBT/1
5	1	TANGENTIAL CLEANER MOD. TC
6	1	INTRALOX SWAN NECKED ELEVATOR – BATCHER MOD. EL22C/3
7	1	WORM SCREW PARBOILER MOD. SB/C/3
8	1	SKIN SEPARATOR MOD. SP/P
9	1	SORTING BELT MOD. NC/X/6/800
10	1	ELECTRICAL PANEL

ITEM N	Q.	DESCRIPTION

DESCRIPTION OF THE PROCESSING PROCEDURE

Bins, containing cleaned and sized chestnuts, are placed on a suitable frame – 1 – in order to feed the loading hopper of the elevator – 2 –.

From this point, chestnuts reach a certain height to load the feeding hopper of the chain batcher – 3 –, where suitable chains pick fruits up from the hopper and put them into the oven – 4 –.

During a short permanence inside the oven, a flame burns the outer peel and the inner skin of chestnuts without damaging the pulp.

Afterwards, chestnuts enter the tangential cleaner – 5 –, where they are peeled. Following, through the elevator – 6 –, they reach the worm screw parboiler – 7 – which moisturises their outer surface.

Then, chestnuts pass inside the skin separator – 8 –, which eliminates the peels partially detached. By the sorting belt – 9 – the personnel effects the sorting.

The whole line is controlled by the electrical panel – 10 –.

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ITEM N	Q.	DESCRIPTION
		DESCRIPTION AND FEATURES OF THE MACHINES
1	**1**	**SUPPORTING FRAME** Made of painted carbon steel, it supports bins and doses chestnuts inside the hopper of the following elevator.
2	**1**	**PVC ELEVATOR – BATCHER MOD. EL20/3** The elevator transports the product to a suitable height to load the subsequent machine. Manufactured in painted carbon steel press-formed plate, it is mainly composed of: - side panels assembled to the sliding table by bolts and top and lower casing; - draw head with anchorage flanges for mountings with self-aligning closed bearings; - return head with anchorage flanges for mountings with self-aligning closed bearings and mechanical device for taking up play; - cage draw and return roller; - PVC closed ring conveyor belt with vulcanised plugs; - loading and unloading hopper; - screw motorized-gearbox assembled to the draw shaft with interposition of the reaction arm equipped with self-aligning bushing. Technical data Overall dimensions: length 5.000 mm. width 300 mm. Installed electrical power: 0,75 kW.
3	**1**	**CHAIN BATCHER MOD. NDOS/C/1** The machine is composed of a painted carbon steel hopper where chestnuts are loaded. Chestnuts dosing to the ovens is made by means of chain with special plugs mounted on a single shaft which is motorized by means of speed variator. An electrolevel with rotating paddle keeps constantly the right quantity of chestnuts inside the hopper. Return shaft of chains mounted on slide bearings for tension adjustment. Technical data Installed electrical power: 0,75 kW.
4	**1**	**OVEN MOD. NBT/1** For roasting the outer peel of chestnuts. Composed of: - n° 1 "brulage" oven, composed of: ./.

ITEM N	Q.	DESCRIPTION
		• chestnuts' loading hopper; • chestnuts' containing basket, made of AISI 310 stainless steel, with 13° slant on the horizontal axis. This basket in the initial part (length 200 mm.) is composed of a cylinder with inner spiral for chestnuts' feeding. Following it is composed of outer cage composed of Ø 10 mm. rounds placed in such a way as to create a daisy petal section to move the product. Inside the cage, with 125 mm. pitch, n° 8 sectors dephased of 140° one with the other are welded to the shaft to hold chestnuts inside the roasting area; • basket's covering with refractory material; • chestnuts' unloading hopper; • scraps' collecting hopper; - basket's motorization by means of motovariator to adjust the speed. Motio transmission through shafts and chain joints; - n° 1 burner, composed of: • blower for air injection to the oven with distribution manifold, and manual valve to adjust the flow; • gas feeding unit to the oven with manual valve; • air – gas mixer; • linear burner; • device for flame starting; • photocell to recognize the flame presence; • temperature probe; - oven's insulation through mineral wool; - supporting frame made of painted carbon steel and fitted with side catwalk with trampling table made of galvanized grid, access ladder, protection handrail. Technical data Dimensions of the roasting basket: length 1.550 mm. diameter 330 mm. GPL gas consumption: 10 kg/h at 30 mbar Thermal potentiality: 100.000 Kcal./h. Installed electrical power: 0,75 kW.
5	1	**TANGENTIAL CLEANER MOD. TC** Fully made of AISI 304 stainless steel, it is composed of: - supporting structure made of sections; - closed casing removable for maintenance and cleaning operations; - skinning cylinder with 4 paddles powered by motovariator; - peel collecting hopper with inspection hatch and connection for peel suction. Technical data Installed electrical power: 0,75 kW.

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ITEM N	Q.	DESCRIPTION
6	1	**INTRALOX SWAN NECKED ELEVATOR – BATCHER MOD. EL22C/3** The elevator transports the product to a suitable height to load the subsequent machine. Made of AISI 304 stainless steel sections and press-formed plate, it is mainly composed of: - side panels and sliding table in one single press-formed and welded piece with large side openings; - draw head with anchorage flanges for mountings with self-aligning closed bearings; - return head with anchorage flanges for mountings with self-aligning closed bearings; - cage draw and return pinions; - Intralox mesh conveyor belt with relevant edges and plugs; - supporting runners for belt's return; - lower casing spaced for cleaning operations; - motorization by means of speed motovariator; - supporting frame. Technical data Dimensions: length 3.000 mm. Nominal width 300 mm. working width 220 mm. Installed electrical power: 0,55 kW.
7	1	**WORM SCREW PARBOILER MOD. SB/C/3** In this machine product is treated in hot water in order to be dehydrated and to facilitate the removal of remaining peel scraps. Fully made of stainless steel press-formed plate, it is mainly formed of: - internal worm screw for product feeding; - pipings for direct steam distribution into the lower part of the screw; - speed variator; - steam on-off and adjusting valve (Klinger); - condensate drainage valve; - unloading valve and automatic adjuster of the water level; - dial thermometer for water temperature; - supporting frame made of stainless steel tubulars. Technical data Overall dimensions: length 3.000 mm. width 850 mm. Internal screw diameter: 250 mm. Steam consumption: 80 kg./h. approx Installed electrical power: 0,37 kW. ./.

ITEM N	Q.	DESCRIPTION
8	**1**	**SKIN SEPARATOR MOD. SP/P** This machine separates the peel residuals of product by means of rubberized rollers. Made of AISI 304 stainless steel tubulars and press-formed plate except for the transmission gears, it is mainly formed of: - set of rubberized rollers fitted in pairs and counter-rotating; - brush sectors to facilitate the peels' detachment; - water system for shower on the working table; - loading hopper; - peels collecting hopper; - unloading hopper. The final user must provide to supply hot water for the washing phases of the skin separator. Technical data Overall dimensions: length 2.250 mm. width 750 mm. height 1.400 mm. Work table dimensions: 310 x 1.800 mm. Installed electrical power: 1,5 kW.
9	**1**	**SORTING BELT MOD. NC/X/6/800** The conveyor enables the personnel to sort unsuitable product. Constructed in stainless steel tubulars and press-formed plate, it is mainly composed of: - draw drum mounted on self-aligning bearings and controlled by a suitably powered motovariator; - return drum also mounted on self-aligning bearings, provided with a special system for the mechanical take-up of play; - PVC sorting belt for foodstuffs with side tracks for scraps collection; - side platforms for the sorting personnel. Technical data Overall dimensions: length 6.200 mm. width 2.000 mm. Work table dimensions: length 6.000 mm. width 800 mm. Installed electrical power: 1,1 kW.
10	**1**	**ELECTRICAL PANEL** CE regulation construction. Stainless steel cabinet. IP 55 protection rate. ./.

ITEM N	Q.	DESCRIPTION		
		PRICE LIST		
1	1	SUPPORTING FRAME	EURO	550,00
2	1	PVC ELEVATOR – BATCHER MOD. EL20/3	EURO	6.850,00
3	1	CHAIN BATCHER MOD. NDOS/C/1	EURO	9.850,00
4	1	OVEN MOD. NBT/1	EURO	35.750,00
5	1	TANGENTIAL CLEANER MOD. TC	EURO	13.950,00
6	1	INTRALOX SWAN NECKED ELEVATOR – BATCHER MOD. EL22C/3	EURO	10.950,00
7	1	WORM SCREW PARBOILER MOD. SB/C/3	EURO	19.000,00
8	1	SKIN SEPARATOR MOD. SP/P	EURO	34.200,00
9	1	SORTING BELT MOD. NC/X/6/800	EURO	15.800,00
10	1	ELECTRICAL PANEL	EURO	14.100,00

		TOTAL PRICE OF THE LINE	**EURO**	**161.000,00**

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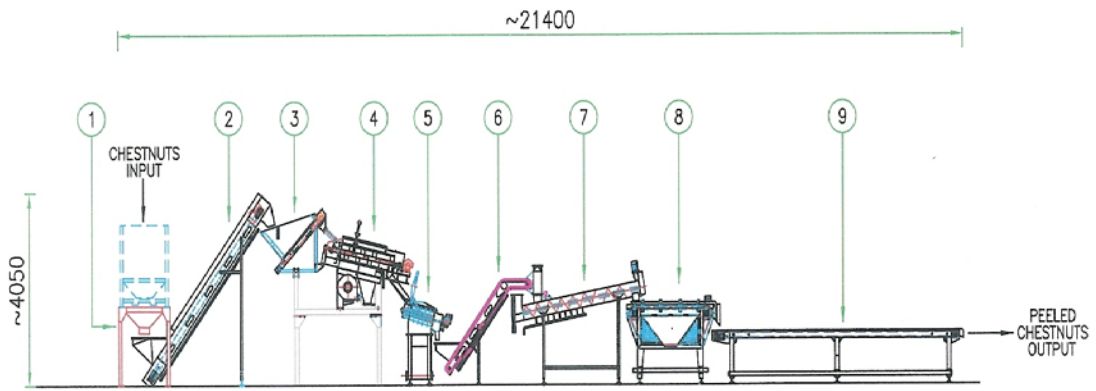
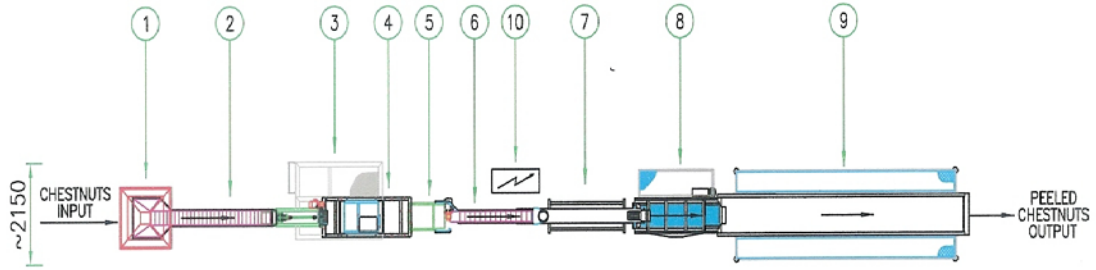




5 mt.

IMPORTANT NOTE:

PRELIMINARY DRAWING:
THE DIMENSIONS INDICATED ON THE DRAWING AND OTHER TECHNICAL DATA REPORTED HAVE APPROXIMATE VALUE AND CAN BE VARIED IN THE PLANING STAGE BY THE TECHNICAL DEPARTMENT.

POSIZ.	DENOMINAZIONE	Q.
10	ELECTRICAL PANEL	1
9	SORTING BELT MOD. NC/X/6/800	1
8	SKIN SEPARATOR MOD. SP/P	1
7	WORM SCREW PARBOILER MOD. SB/C/3	1
6	INTRALOX SWAN NECKED ELEVATOR-BATCHER MOD. EL22C/3	1
5	TANGENTIAL CLEANER MOD. TC	1
4	OVEN MOD. NBT/1	1
3	CHAIN BATCHER MOD. NDOS/C/1	1
2	PVC ELEVATOR-BATCHER MOD. EL20/3	1
1	SUPPORTING FRAME	1

Disegno n.	Formato	Scala	Disegnatore	Tavola n.	Data	Prev.n.
09-046	A3	1:100	M.C.	1/1	05/02/09	09103

OGGETTO
PILOT "BRULAGE" PEELING LINE FOR CHESTNUTS
Capacity: 400÷450 kg/h. of input chestnuts

COMMITTENTE
AUSTRALIAN GOURMET CHESTNUTS

QUESTO DISEGNO NON PUO' ESSERE RIPRODOTTO NE COMUNICATO A TERZI SENZA LA NOSTRA APPROVAZIONE SCRITTA

boema

Appendix (iii)

Nunziata Tecnologie Agroalimentari s.r.l.
Impiantistica per l'industria Alimentare e Dolciaria

E-MAIL: info@nunziatatecnologie.it SKYPE: nunziata tecnologie agroalimentari WEB: www.nunziatatecnologie.it

Sarno (SA), lì 21/06/2010

Spett.le: Ditta
THE AUSTRALIAN CHESTNUT COMPANY
233 HUGHES LAME EUROBIN 3739

ALLA CORTESE ATTENZIONE DEL DIRETTORE BRIAN CASEY

OGGETTO: PREVENTIVO N° 054/TN/10

Nel ringraziarVi per l'interessamento alla ns. produzione, ci pregiamo trasmetterVi Preventivo per macchine PELATURA CASTAGNE con metodo VAPORE, qui appresso descritte:.

Rif. **A**	*Sez.* ***Macchine***
N°01	**TRAMOGGIA DOSATRICE ns. Tipo TN. 2300/2000/2500** Completa di nastro motorizzato incorporato adatto a dosare il quantitativo di CASTAGNE da immettere nella linea di pelatura - Struttura in acciaio al carbonio verniciato a fuoco con vernici alimentari – rivestimento interno con materiale antitrauma – **(Pos.1);** **€…4.900,00**
N°01	**ELEVATORE ns. Tipo TN. 300/5000 kw 0,5** Struttura in acciaio al carbonio verniciato a fuoco con vernici alimentari – NASTRO listellato in PVC per alimenti – Rulli motrici e folli del tipo a gabbia con sistema antislittamento – tramoggia carico collegata allo scarico della tramoggia dosatrice e tramoggia scarico collegata alla macchina multilame – **(Pos.2);** **€…5.700,00**
N°01	**MACCHINA INCIDITRICE ns. Tipo MULTILAME con sistema cambio lame manuale** Struttura portante in profilati sagomati ed elettrosaldati – cilindro in materiale atossico completo di dischi bloccaggio lame per microincisioni – Nastro a piastre di acciaio per trasporti prodotto alle lame inciditrici – coclea evacuazione bucce – **(Pos.3);** **€…28.900,00**
N°01	**ASPIRATORE** per eliminare parzialmente le bucce che convoglierete a rifiuto – **(Pos.4);** **€…3.900,00**

Rif. B	*Sez. Macchine*

N°01 **ELEVATORE ALIMENTAZIONE MACCHINA SBOLLENTATRICE ns. Tipo TN. 300/5000 kw 0,75**

Struttura in acciaio al carbonio verniciato a fuoco con vernici alimentari – NASTRO listellato – Rulli a gabbia – tramogge di collegamento – **(Pos.5);**

€…5.700,00

N°01 **COCLEA SBOLLENTATRICE ns. Tipo TN. 860/3500 kw 0,75**

Struttura mista in acciaio verniciato ed acciaio inox – motovariatore velocità – tubazione distribuzione vapore completa di valvole intercettatrici – valvola drenaggio condensa – isolamento termico – **(Pos.6);**

€…24.000,00

N°01 **MACCHINA SEPARAPELLI ns. Tipo TN. 700/1000 kw 1,5**

Struttura mista in acciaio verniciato ed acciaio inox – Rulli pulitori ns. tipo rivestiti di gomma speciale per non deteriorare il prodotto – UGELLI Diffusori pioggia alimentati con acqua calda a ca. 65° C – completa di tramogge carico e scarico – **(Pos.7);**

€…25.800,00

Rif. C	*CONDIZIONI DI FORNITURA*

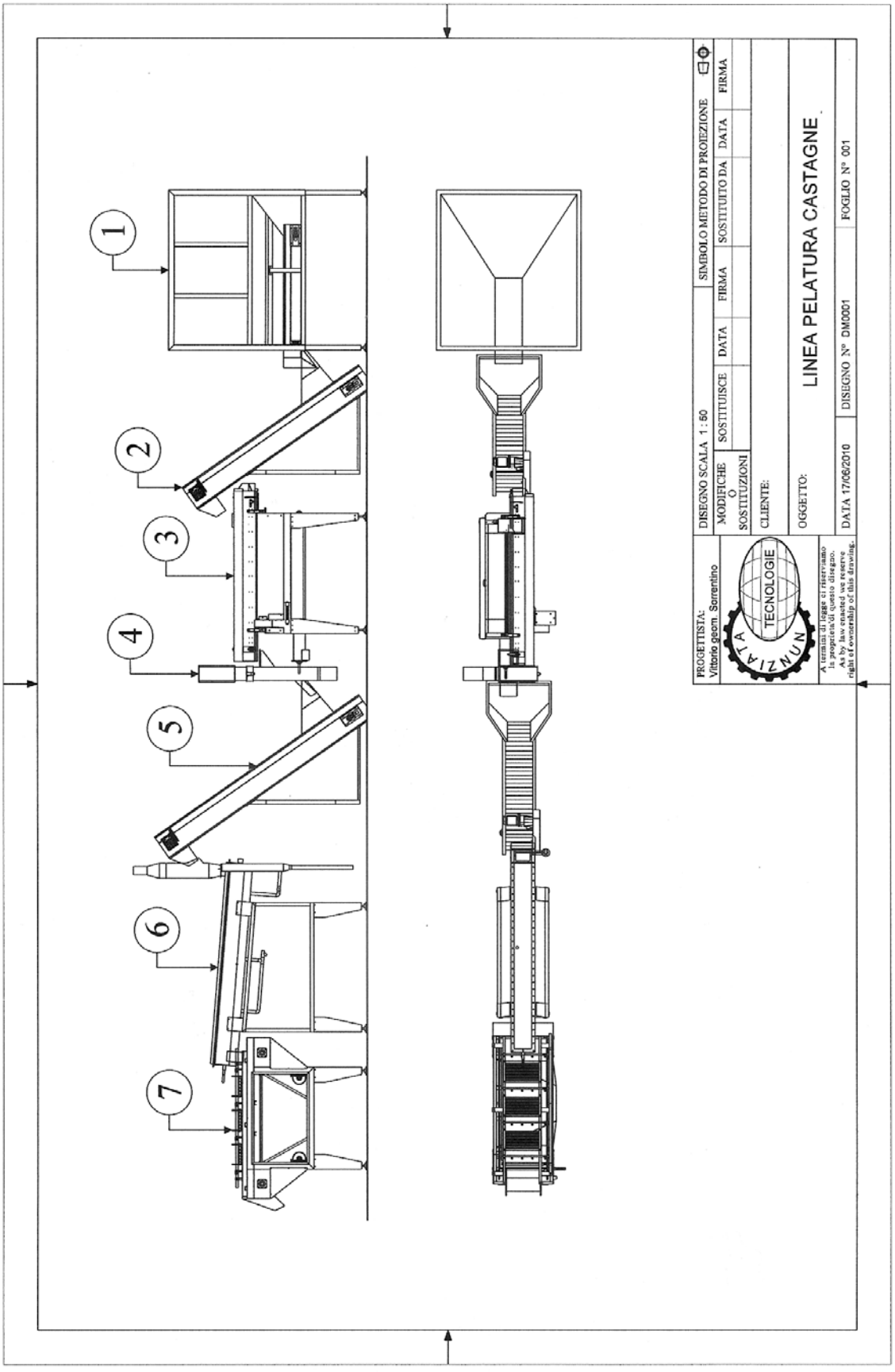
COSTO COMPLESSIVO €…98.900,00 (Novantottomilanovecento/00)+IVA

CONSEGNA	90 gg. S.I.;
PAGAMENTO	30% all'ordine - 30% al ritiro – Saldo a 60/90 gg.;
MERCE RESA	F.co ns. STABILIMENTO in SARNO (SA);
GARANZIA	Mesi 12 con l'esclusione delle parti elettriche e delle parti soggette ad usura naturale; la Ditta venditrice garantisce le macchine da ogni vizio e si impegna a sostituire o riparare tutte quelle parti che a suo insindacabile giudizio sono da ritenersi difettose. Il Foro competente per eventuali controversie è quello di Nola (NA). Nessuna richiesta di danni fatta dall'acquirente per qualsiasi motivo è da ritenersi ammissibile;
ESCLUSIONI	Oneri doganali - IVA – Imballaggi – Trasporto – Montaggio – Alimentazione e Raccordi tra le macchine – IMPIANTI IDRICI – Elettrici – VAPORE – SMALTIMENTO Gusci – Movimentazione – Nastri cernita - Tutto quanto non compreso nell'offerta;

Tutte le macchine sono di ns. ESCLUSIVA PRODUZIONE - PROGETTATE e CALCOLATE dal ns. ufficio tecnico per le Vs. NECESSITÀ – SONO di produzione ARTIGIANALE NON DI SERIE – Rispettano interamente le normative tecniche e le DIRETTIVE EUROPEE VIGENTI ad ESSE APPLICABILI.

Tanto Vi dovevamo ed al piacere dei Vs. sempre ambiti ordinativi, distintamente Vi salutiamo.

Nunziata Tecnologie Agroalimentari S.r.l.


1
2
3
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PROGETTISTA:
Vittorio geom. Sorrentino
DISEGNO SCALA 1 : 50
SIMBOLO METODO DI PROIEZIONE
MODIFICHE O SOSTITUZIONI
SOSTITUISCE
DATA
FIRMA
SOSTITUITO DA
DATA
FIRMA
CLIENTE:
OGGETTO:
LINEA PELATURA CASTAGNE
TECNOLOGIE
A termini di legge ci riserviamo la proprietà di questo disegno.
As by law enacted we reserve right of ownership of this drawing.
DATA 17/06/2010
DISEGNO N° DM0001
FOGLIO N° 001

Appendix (iv) Slides from presentation to CAI Committee on Saturday 12 February 2011.

Australian Gourmet Chestnuts

CH09006

Scoping Study to Trial Mechanised Peeling Technology for Australian Chestnuts

History of Project

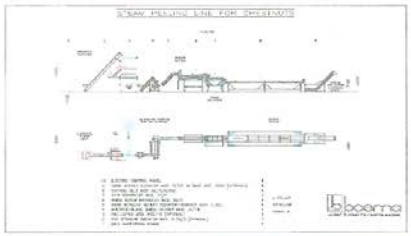
- 2008 STUDY TOUR TO EUROPE TO INVESTIGATE NEW CHESTNUT PROCESSING TECHNOLOGIES AND VALUE-ADDED PRODUCTS
- Outcomes
  - Boema Machinery was the superior manufacturer of chestnut peeling equipment
  - Further investigation to establish the suitability of the machinery for Australian chestnuts was necessary before an investment decision could be made.

Types of Machinery

There are two main methods of machine peeling chestnuts.

1. Steam Peeling
2. Brulage

Steam Peeling



Initial Actions

←Pre-dryer ↑ Shell scoring drum

↖ Par-boiler (steam unit)
←Skin separator (side view)
↑Skin separator (end view)

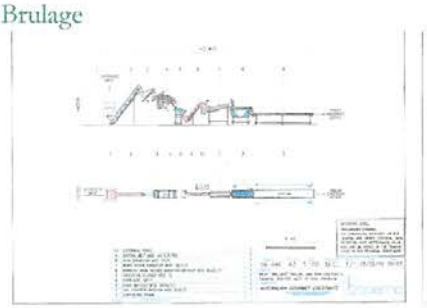
1

Grading/sorting

Final Dip Prior to Freezing

Freezing

Brulage



2

Boema Quote

Steam Peeling Line	€ 129,700
(optional extras)	€ 58,800
Total	€ 188,500
Approx AUD	**$ 256,250**
Brulage Line	€ 166,000
(optional extras)	€ 58,800
Total	€224,800
Approx AUD	**$305,600**

Regional Food Producers Innovation & Productivity Program

- Federal Government initiative to facilitate the introduction and development of innovative technologies to regional food producers and processors.
- Successful in gaining a $250,000 grant (in principle agreement) for a $500,000+ project to establish a chestnut peeling facility at Eurobin.

HAL Project

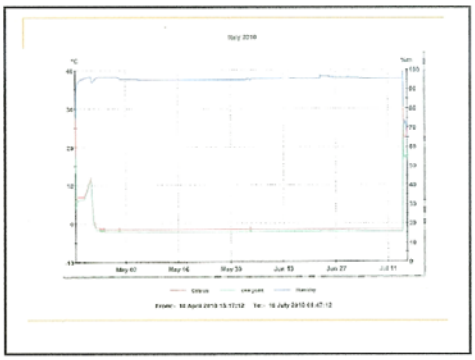
- Needed to establish that the peeling equipment could effectively peel Australian varieties.
- Key Outcomes of the Project were to establish
  1. Quality of end product
  2. Recovery Rate – whole and pieces
  3. Estimated cost of production
- Using both steam peeling and brulage.

Methodology

- The best way to test the equipment was to do a trial using Australia chestnuts.
- Brian and Jane established contact with a chestnut processor near Avellino in southern Italy who agreed to undertake the trial using their Boema equipment.
- In April 2010, 2 tonne Purton's Pride and 200 kg De Coppi Marone sent by refrigerated sea container to Italy.
- Brian and Jane Casey travelled to Italy to observe the peeling process first hand.

Processing

- A combination of a delay in container arrival plus further delays at the port due to a backlog of samples to be tested resulted in the nuts arriving at the peeling facility on 14 July – over one month later than anticipated.
- This resulted in Brian and Jane not being present when the nuts arrived or during processing.
- There was some confusion regarding the condition the nuts arrived in however the datalogger which was later recovered after being feared lost showed they would have been in good condition.



Outcome

- Nuts were pre-dried and peeled using both steam peeling and brulage methods.
- After pre-drying the 2200 kg was reduced to 1617 kg
- 400 kg was steam peeled resulting in 260 kg peeled nuts (mainly pieces)
- Staff advised that in their opinion the steam peeling method not suitable.
- 1217 kg was put through the Brulage. From this 600kg of whole nuts + 317 kg second grade nuts were obtained.

Key Points

- Machinery is not "Plug and Play" but requires constant monitoring. Variables include:
  - Variety
  - % Moisture
  - Pre-treatment (water, pre drying)
  - Size
  - Time from harvest (freshness)
  - End use
- There is no specific parameters for optimal processing – pre-drying times and speed through the machine are determined through the experience of the operator.

Key Points

- Smallest Boema line handles 300kg per hour. To do 50 tonnes would take less than 5 weeks. The equipment is designed to handle large volumes, i.e. in excess of 1000 tonnes.
- After machine peeling, there is still a large labour component.
- High ongoing costs (i.e scoring blade drum requires replacing each month during full production, €500 per drum)

Estimated Base Costs to Set up a Facility

Peeling Equipment (brulage)	$300,000
Installation/commissioning	$50,000
Boiler	$25,000
Upgrade to food safety stds	$50,000
Freezer (both blast & storage)	$40,000
Cool rooms	$20,000
Total	$485,000

This is not including the cost of any building or land.

Estimated Base Costs of Production

For 25 tonne production

Fresh nuts (60% recovery = 42 tonne @ $3.50/kg)	$147,000
Power Consumption	$5,000
Gas Consumption	$12,500
Packaging ($1.5/kg)	$37,500
Distribution/Freight	$15,000
Staff (5 persons full time x 5 weeks @ $22/hr + 1 supervisor @$35 / hr)	$29,000
Total	$246,000
Per kg	$9.84

Not Included in costs

- Miscellaneous costs such as QA Accreditation & licenses, machinery maintenance, disposal of waste, vehicles, etc
- Marketing / PR
- Any cash flow / interest costs
- Ongoing staff costs
- Return on investment ($485,000)

Summary

- These additional costs could take the overall cost of production near to $20 per kg
- The tests were not conclusive that the brulage system would produce an acceptable peeled product.
- To invest in this type of machinery is going to require further investigation perhaps when better easier to peel chestnuts become more available and/or if a cheaper alternative manufacturer can be located.
- Other options for processing Australian chestnuts may be more suitable and these could be investigated in the future. This project was to look at a medium/large scale processing facility, other niche processing may be possible but the smaller scale processing operations we've observed have all involved large amounts of unpaid labour (from relatives, etc).

Appendix (v): Budget

Italy Peeling Trials

3/6/10-13/6/10

		Budget	Actuals
Airfares	Aust/Milan	$5,000.00	$4,005.71
Transport	Europe (car hire, trains, etc)	$1,500.00	$48.00
	Aust (travel to/from airport)	$400.00	$400.00
Accommodation	8 nights @ $180	$1,440.00	$964.96
Meals	10 days @ $130 x 2	$2,600.00	$1,985.03
Incidentals	10 days @ $50 x 2	$1,000.00	$1,000.00
Cost for fresh nuts	2 tonne @ $6.00	$12,000.00	$12,900.00
Cost of Freight	NE Vic - Melb	$750.00	$302.73
	Melb - Italy	$5,000.00	$5,628.00
	Internal Italy	$750.00	$6,342.22
Cost of processing/hire of facilty	Processing and Misc Costs	$2,000.00	$428.66
Project Management Fee	Set up project (40 hrs @ $40.00 p/hr)	$1,600.00	$1,600.00
	Undertake project (10 days @ 8 hr/day)	$3,200.00	$2,560.00
	Compile & Analyize data (40 hrs)	$1,600.00	$1,600.00
	Final report (40 hrs)	$1,600.00	$1,600.00
	Extra time to sort out delay re container		$1,600.00
	Professional cost accountant to assist in analysis	$2,000.00	$0.00
		$42,440.00	$42,965.31

HAL		$17,527.72
Personal Contribution		$24,912.28

Notes: Did not have to hire a car in Italy as anticipated as Terminio Frutta provided all transport.
The company did not charge for processing the chestnuts (although they did keep all processed product.)
Whilst the project participants returned to Serino for a second visit in November 2010 there is no additional amount for any costs incurred, these have been borne 100% by Australian Gourmet Chestnuts.
Overall the project ran slightly over-budget but no additional funds are being sought.