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EXPORT OPPORTUNITIES FOR ASPARAGUS THROUGH POST HARVEST RESEARCH

Background information

for

New Zealand Asparagus Council

and

Market Development Board

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CONFIDENTIAL

EXPORT OPPORTUNITIES FOR ASPARAGUS: POST HARVEST RESEARCH PROPOSAL

1. BACKGROUND:

Levin Horticultural Research Centre has been involved in post harvest research of asparagus since 1977. There has been a major increase in effort in this research area from 1982-1986, with expenditure in asparagus post harvest research over this time amounting to $367,000. A list of scientific and popular papers produced from this research is appended to this report. The New Zealand Asparagus Council has placed 65% of its 1986 research funds with the post harvest group at Levin HRC, and this jointly-funded research in 1986 (Government and NZAC) has led to a major opportunity for increased exports for asparagus through supplementary feeding of asparagus spears before or during sea transport. The objective now is to develop a commercial method which will allow asparagus to achieve five days shelf life after a four week sea transport period.

2. EXPECTED BENEFITS:

Provision of five day's shelf life after four weeks of storage would allow sea freight of asparagus to meet any increase in the size of overseas markets during our September to November/ December harvest period. It will allow a very substantial proportion of the fresh asparagus export (1200 tonnes in 1986) to be exported by sea with a major saving in freight costs. It would open up large market opportunities for expanding New Zealand asparagus exports into the Pacific rim countries, especially Japan and the United States, and potentially into Europe.

Financial benefits from successful technology development would flow to growers, exporters, transport companies and packaging firms within New Zealand. In other words there is an opportunity for major industry-wide benefits.

3. RESEARCH PROGRAMME:

Year 1 (1987)

Research will concentrate on examining the normal sap flow of metabolic products in freshly cut asparagus spears to determine which carbohydrate or related compounds may usefully be fed to asparagus to maintain respiration requirements and hence spear quality. This will be underpinned with examination of physiological respiratory processes involved. There is also provision for overseas trips to the USA and Japan to examine methods already used successfully by US exporters who achieve high product flow into Japan by a 13 day sea freight process. Also first hand experience of Japanese and US quality criteria (flavour and appearance) will be established.

Year 2 (1988)

Emphasis will be on developing commercial transport systems for carbohydrate-fed asparagus. Our scientists will evaluate continuous carbohydrate availability versus pulse techniques for the crop before and during transport, in simulated sea transport.

Year 3 (1989)

The better commercially-applicable methods will be evaluated and market tested in shipping trials in a range of packaging configurations with fine tuning of techniques for carbohydrate pulsing during simulated transport.

4. RISK:

Figure 1 shows an indicator cash benefit analysis for this proposed project. Under the assumptions stated of implementation costs, likely freight savings and projected volume increases, an IRR of 144% is predicted. Figures 2 and 3 as sensitivity analyses indicate a sound investment base: e.g. in figure 3 even where implementation costs of the technology are set as high as 20¢ per kg and expected freight savings at $2.50 are written down to $1.50 with a slow uptake rate of the technology, an IRR of 44% is still achieved.

Risk evaluation in an R & D project is very important. Levin HRC estimates from the basic research trials carried out in 1986, that there is a 70% chance that the three year research and development programme will result in commercially applicable technology to ensure a five day shelf life for fresh asparagus after 4 weeks of sea transport.

5. RESEARCH FACILITIES:

Levin Horticultural Research Centre has recently developed the most up-to-date post harvest research facilities in the country. We have a suite of computerized controlled environment rooms under which wide ranging temperature and humidity conditions can be achieved. There is expertise in controlled atmosphere (CA) technology and use of special gases for insect disinfestation. The research system at Levin HRC has been developed for commercial clients with a strong view to practical end use. Accordingly a refrigerated container is situated at the Research Centre to assess and confirm research solutions to post harvest problems on a fully commercial basis.

Research in the controlled environment rooms is served by an analytical biochemistry laboratory, equipped with a wide range of analysis equipment. The post harvest group comprises eleven scientific staff including specialists in biochemistry, plant physiology, electron microscopy and entomology and is led by Dr Ross Lill who has experience in asparagus research for the past decade.

6. LEVIN HRC BUSINESS OPERATION:

Levin Horticultural Research Centre believes that research and development is an investment option. To this end we undertake for clients those research and development projects which we estimate will have a good likelihood of healthy investment returns. Levin HRC would appoint a Commercial Product Manager to co-ordinate this asparagus post harvest project (if funded by NZAC through MDB), liaise with the New Zealand Asparagus Council and the Market Development Board, and ensure that key scientific and economic milestones in the business plan are adhered to.

For your information we include copies of some brochures describing the general activities of Levin HRC. We are very happy to host visits of any organisations with whom we are working at any stage to view projects in progress, and believe in close communication with our clients.

7. FURTHER DETAILS:

Levin HRC will be very happy to further any details which the New Zealand Asparagus Council or the Market Development Board may wish to view concerning this proposal.

Conway Powell
Director
LEVIN HORTICULTURAL RESEARCH CENTRE

FIGURE 1:

ASPARAGUS: POST HARVEST RESEARCH INVESTMENT ($,000)

Years:	0	1	2	3	4	5	6	7	8	9	10
COSTS:											
Science	166	166	142	0	→	→	→	→	→	→	→
(a)											
Implementation	0	→	→	45	45	45	54	63	72	81	90
BENEFITS:											
(b)											
Freight savings	0	→	→	2250	2250	2250	2700	3150	3600	4050	4500
(c)											
Volume changes	0	→	→	→	→	→	→	138	552	966	1380
(d)											
NET RETURN:	(166)	(181)	(142)	2205	2205	2205	2646	3225	4080	4935	5790
IRR = 144%											

(a) Estimated as 5 cents/kg to put new technological process into practice.

(b) Calculated as the difference between air freight rates ($3.50) and sea freight rates ($1.00) to Pacific rim destinations ($2.50/kg) multiplied by 75% of constant 1986 fresh export levels for years 3-5, and 75% of the expected increased export volumes for years 6-10.

(c) Calculated on the basis that fresh exports double in even annual increments over the years 6-10. Valuations are based on 1986 net farm gate returns.

(d) There will be additional cost savings to the grower and the country in not needing to have products processed, which have not been included.

FIGURE 2:

ASPARAGUS: POST HARVEST RESEARCH INVESTMENT ($,000)

[Sensitivity analysis I]

Years:	0	1	2	3	4	5	6	7	8	9	10
COSTS:											
Science	166	181	142	0	→	→	→	→	→	→	→
(a)											
Implementation	0	→	→	11	23	34	45	45	45	45	45
BENEFITS:											
(b)											
Freight savings	0	→	→	281	563	843	1125	1125	1125	1125	1125
(c)											
Volume changes	0	→	→	→	→	→	→	→	→	→	→
NET RETURN:	(166)	(181)	(142)	270	540	809	1080	1080	1080	1080	1080
IRR = 64%											

This sensitivity analysis I examines the effect of the following changes to costs and benefits from the cashflow in Figure 1:-

(a) Implementation costs doubled to 10¢/kg product

(b) Freight savings phased in over 4 years (3-6) up to a maximum of 37% of 1986 fresh export level.

(c) No increase in volume of production or export.

FIGURE 3:

ASPARAGUS: POST HARVEST RESEARCH INVESTMENT ($,000)

[Sensitivity analysis II]

Years:	0	1	2	3	4	5	6	7	8	9	10
COSTS:											
Science	166	181	142	0	→	→	→	→	→	→	→
(a)											
Implementation	0	→	→	22	46	68	90	90	90	90	90
BENEFITS:											
(b)											
Freight savings	0	→	→	169	338	506	675	675	675	675	675
(c)											
Volume changes	0	→	→	→	→	→	→	→	→	→	→
NET RETURN:	(166)	(181)	(142)	147	292	438	585	585	585	585	585
IRR = 44%											

This sensitivity analysis II examines the effects of the following changes to costs and benefits from the cashflow in figure 1:-

(a) Implementation costs quadrupled to 20¢/kg

(b) Freight savings phased in over 4 years (3-6) up to a maximum of 37% of 1986 fresh export levels with sea/air freight differential reduced from $2.50 to $1.50.

(c) No increase in volume of production or export.

PUBLICATIONS AND REPORTS : ASPARAGUS (in chronological order)

SCIENTIFIC PUBLICATIONS:

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LILL, R.E. and LAUNDON, G.F. 1984. Chlorination of asparagus hydrocooling water for the control of post-harvest decay organisms. New Zealand Journal of Experimental Agriculture 12: 43-5.

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KING, G.A.; HENDERSON, K.G. and LILL, R.E. 1986. Asparagus: effect of controlled atmosphere storage on shelf life of four cultivars. New Zealand Journal of Experimental Agriculture 14: 421-4.

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REPORTS:

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