SUGAR INDUSTRY SUBMISSION

TO THE

HOUSE OF REPRESENTATIVES STANDING COMMITTEE INQUIRY INTO PRIMARY PRODUCER ACCESS TO GENE TECHNOLOGY

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INQUIRY INTO PRIMARY PRODUCER ACCESS TO GENE TECHNOLOGY

INTRODUCTION

Sugar is Australia's second largest export crop after wheat. It directly contributes in the order of $2 billion to the national economy every year and generates other outputs worth an additional $1.5 billion in other sectors of the economy. The industry directly employs about 17,000 people and generates a further 24,000 jobs.

Australia is one of the world's leading producers and exporters of sugar. The annual production of about 5.5 million tonnes represents about 4% of the world's sugar production. Exports account for 85% of total Australian production and represent approximately 12% of total global free sugar trade.

Whilst the majority of production is bulk raw sugar, Australia also has a refining capacity of about 1.3 million tonnes. White sugar exports exceed 250,000 tonnes each year.

The Australian industry has developed an enviable reputation as one of the most advanced, efficient and low cost producers in the world. It is a world leader in sugar technology in areas ranging from plant breeding to farming practices to milling operations to bulk storage and shipping.

The Australian sugar industry does not yet produce any raw sugar from genetically engineered sugarcane and no genetically modified sugarcane is grown for commercial purposes. However, as an industry, it places great value on research and innovation and supports genetic engineering research.

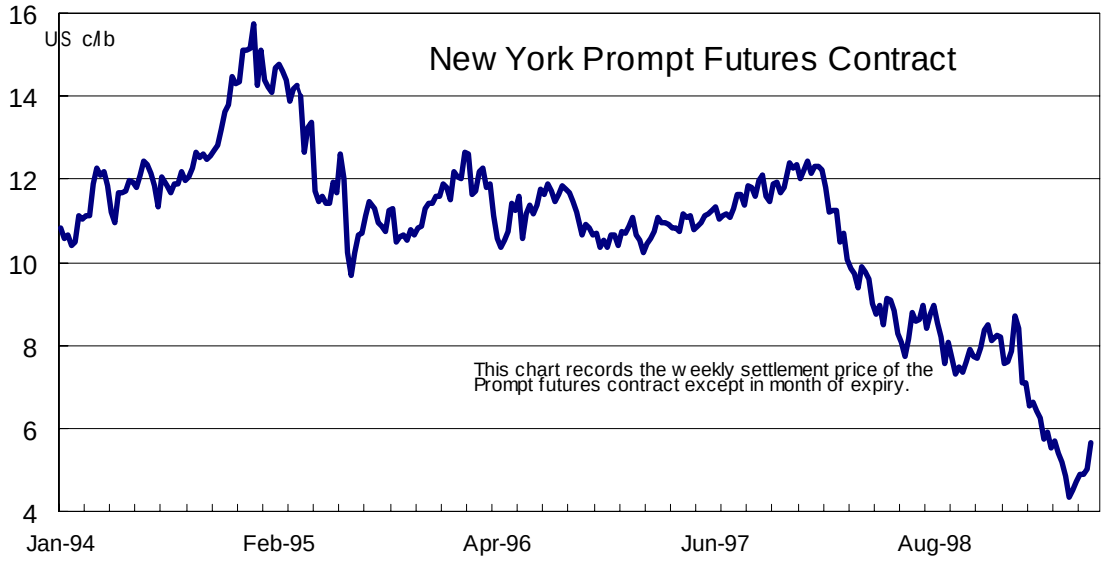
The industry supports genetic engineering research in the belief that the technology will be vital in maintaining international competitiveness by improving disease resistance, productivity and quality. In fact, Australian scientists were the first in the world to genetically transform sugarcane and re-grow viable plants. However, current research is still in the early stages and it is likely to be some years before any transgenic sugarcane varieties are ready for commercial use. Even then, commercial use will be permitted only when it is clear that such varieties pose no risk to the community.

The Australian sugar industry is making this submission because it supports the development of a reasonable approach to this important new technology and appropriate recognition of the role of government in fostering the ongoing competitiveness of Australian agriculture through access to gene technology.

1.0 Future Value and Importance of Genetically Modified Varieties

The Australian sugar industry believes that access to genetically modified varieties is essential for its ongoing international competitiveness. Eighty-five percent of Australia's sugarcane crop is exported. The world sugar market, as Committee members would be aware, is heavily corrupted and at present grossly over-supplied. This is the fourth consecutive year in which world production has exceeded consumption. There is approximately six months' supply of the world's sugar requirements in stocks.

This has resulted in a reduction in the world price from US 12 c/lb in late 1997 to below US 5 c/lb in February this year. Price movement is shown in the graph below. In this environment, Australia cannot afford any complacency. We need to be able to exploit all opportunities for improved profitability that research may allow.



ABARE studies confirm the difficult world situation that the Australian sugar industry finds itself in. (Danzi, *Sugar: outlook to 2003-4*. ABARE "Outlook 99" p359). Nonetheless, Australia has a very competitive sugar industry. This has been borne out by international studies such as that carried out by the commodity analysts LMC International (Fry, *A Global Perspective of the Sugar Industry* in Intensive Sugar Cane Production: Meeting the Challenge Beyond 2000, p1). One of the reasons for our survival is the investment in and success of the research and extension which the Australian sugar industry carries out. Biotechnology research is now included in this package. Australian researchers were the first in the world to genetically transform sugarcane and regrow viable plants. The Australian industry is currently testing cane plants that have a number of genetic modifications. These trials are carried out within the appropriate GMAC protocols and, it must be stressed, no commercial plantings have **been made and there is no sugar being produced which may find its way into any markets.**

Continual effort has been made to improve crop yield, performance, disease and pest resistance and increased nutritional value for as long as crop plants have been domesticated. Since the rediscovery of Mendel's laws of genetics, this activity has become considerably more focussed with some very specific traits being targeted in breeding and selection programs. The modern science of molecular biology further extends our capacity to breed and select varieties and cultivars with desirable traits. We will need access to this technology to continue to produce varieties that allow us to keep up with our competitors, who are also exploiting the technology.

Sugarcane is a genetically complex plant. Modern commercial varieties of sugarcane are complex interspecific hybrids that contain multiple copies of each chromosome (polyploids). Whilst significant progress has been made in sugarcane breeding, this genetic complexity has limited the genetic gains that have been made in this crop. This complexity also means that industry-specific research in the molecular biology area will be important as we may not be able to directly apply the results of work in other crops.

We are faced with a range of issues such as an apparent plateau in productivity as measured by tonnes of sugar per hectare. Genetic gain for this characteristic may be approaching a maximum which is well below the theoretical maximum level of production for the sugarcane plant. New ways of breeding to overcome this plateau must be found. Molecular biology also offers huge potential for increasing sugar content in cane varieties grown in North Queensland and for the environmentally sound management of insect pests and disease, using less chemical inputs.

We believe therefore, that the science of molecular biology will play an important role in increased productivity in the Australian sugar industry in the next century. This will involve not just genetic engineering (the insertion or "introgression" of new genetic material into a plant) but also a marker assisted selection (which speeds "normal" plant breeding selection processes) and functional genomics. Perhaps 70% of the molecular biological science that will be applied in the sugar industry will not be directed specifically at genetic engineering but to the other areas of this field.

The remainder of this submission will concentrate on the use of transgenic plants that are the product of genetic engineering.

Australian sugar industry recommendations:

1. ***That the Committee should recognise genetically modified plant varieties as being of potential value and specific importance. This is particularly important in crops in which there are active gene technology programs in competitor countries.***

2. ***That the Committee should recognise all that molecular biology techniques, including genetic manipulation (e.g. marker assisted selection and functional genomics) are areas of technology that must be kept open to Australian researchers.***

2.0 The Ability for Producers to Compete Using Traditionally Available Varieties

Crop plants genetically enhanced by molecular biology techniques are already under intensive cultivation in North America. It is estimated that in the United States 25% of maize, 30% of soybean, 35% of canola and 40% of cotton acreages are planted to genetically engineered varieties. In two years (1996 to 1998), the area of land planted to transgenic crops in the world increased 14-fold to 35 million hectares. As this first group of transgenic plants, where the focus has been on 'input traits' (eg pest, disease, herbicide resistance), is replaced by the next group of plants where the emphasis is on 'output traits' (quality and nutritional factors), the area planted to genetically modified crops will increase significantly.

Australia's overseas competitors in sugarcane, sugar beet and corn (from which high fructose corn syrup is produced) have active programs in the application of molecular biology to crop improvement. This year, for the first time, commercial plantings of genetically modified sugar beet are taking place in the United States. It is expected that this will soon result in approximately 20% of the United States beet crop being planted to these varieties and this percentage could increase rapidly. Monsanto have applied for approval in Australia for genetically modified sugar beet. A large percentage of the corn entering wet milling plants is now genetically modified. Monsanto is working on the introduction of sugarcane varieties that have been modified to confer resistance to Roundup. Sweetener producers in the United States are therefore benefiting from the reduced costs of new technology. Other cane sugar industries, notably in Brazil and South Africa, are also working in this field.

The introduction of this new technology in the United States alone will lower the cost of production – some estimate that this lowering will be in the order of 10-20%. This will increase the profitability of existing beet and other sweetener producers and make the production of sweeteners in new areas more economically viable. This would therefore assist in the expansion of the US sweetener industry and be a factor in the reduction of the US demand for imports. Producers such as Australia currently selling sugar into the American market would have to find alternative outlets for their product; this displacement would lead to a drop in returns to Australian producers from the world market. This illustrates the importance of maintaining competitiveness in sweetener production. This competitiveness may well require access to gene technology.

Australian sugar industry recommendation:

That the Committee recognise that new, more productive sugarcane varieties are a key component of a sustainable, productive and internationally competitive Australian sugar industry.

3.0 The Commercialisation and Marketing of Agricultural and Livestock Production Varieties

Marketing of genetically engineered varieties of sugarcane in the Australian sugar industry is not expected to be a major issue in the immediate future. The reason for this is discussed below. However, the Australian sugar industry is deeply concerned at possible impediments to marketing its *product*, sugar, if in the future it is produced from transgenic cane. Most of the export product of the Australian sugar industry is raw sugar. This is then refined into white sugar for consumption; white sugar is extremely chemically pure (more than 99.99% sucrose). No DNA or material can be identified as the product of genetic manipulation in the finished product. In fact, some studies in the Australian industry show that, on the laboratory scale, the sugar crystallised from transgenic cane does not contain any transgene DNA (note that this result was obtained on laboratory produced samples. Sugar derived from transgenic sugar cane is **not** available in Australia). (Taylor *et al, Laboratory Crystallised Sugar from Genetically Engineered Sugar Does Not Contain Transgene DNA*, ASSCT 1999 p495).

The Australian sugar industry has prepared a submission for the ANZFA inquiry into food produced using gene technology - Labelling/Standard A18 (copy attached). In this paper we expressed our concern that calls for labelling of food produced using gene technology could result in enormous extra cost to the Australian industry. This may make use of this new technology uneconomic while at the same time not providing the consumer with any real benefit. The sugar industry handles its product in bulk. Segregation of genetically modified from non-genetically modified stocks during transport, processing, shipping and storage to comply with labelling requirements would be a very complex logistical problem. This requirement could make the use of genetically modified organisms in the sugar industry uneconomic. However, the information provided would be of little assistance to consumers, because, as stated above, the possibility of detecting residual genetic material in raw or white sugar is extremely remote.

We are also concerned that some countries may use quasi-scientific objections to gene technology to set up trade barriers to countries using this technology. We believe that this will be an issue on which Australia should be prepared to argue strongly at the upcoming round of WTO negotiations.

The industry is concerned that some media coverage of the issue of genetically modified foods is inaccurate and misleading. The industry supports the decision of the Howard Government to initiate an Office of Gene Technology and believes that it is important that correct and impartial information be made available to enable sensible debate on this new technology.

Australian sugar industry recommendation:

1. ***That no labelling be required for food which is the product of genetic manipulation that is substantially equivalent to conventional crops and does not contain significant levels of genetic material.***

2. ***That comprehensive, impartial and professional information be made available to consumers to enable sensible debate on this new technology.***

4.0 The Cost to Producers of New Varieties

Sugarcane is replanted vegetatively from existing cane. Currently, new varieties are developed by the Bureau of Sugar Experiment Stations (BSES) on behalf of the industry and are made available to the industry free of charge. Developing new varieties is part of the core function of BSES, most of the cost of which is paid for by the industry. Cane Protection and Productivity Boards distribute new varieties to the industry. The BSES holds plant variety rights on the varieties which it produces on behalf of the industry but makes these varieties available free of charge to its clients.

If varieties are introduced over which outside parties hold intellectual property rights over parts of the technology which led to their introduction, there will be costs to the industry associated with utilisation of this technology. This would include "enabling technologies". Negotiating with the owners of these technologies would be difficult and may delay the commercialisation of new varieties or even prevent it. To address this, a cooperative approach amongst industry research providers and outside parties will be required. New varieties, whether conventionally bred or the result of genetic engineering, will not be used unless the cost involved is less than the benefit gained. It is, however, in the interest of Australia as a whole that the provision of technology be as competitive as possible. To this end, it is desirable that the Committee look for ways to ensure that monopoly power is not abused in the provision of technology.

Australian sugar industry recommendations:

That the Committee explore ways in which genetic enabling technologies can be accessed for use in Australia by all research and commercial organisations at minimum cost.

5.0 Other Impediments to the Utilisation of New Varieties by Small Producers

There are a number of areas of market failure in the provision of any new technology and gene technology provides some examples of these. Particularly in the area of regulatory requirements, an individual company may not consider it worthwhile to develop a market because of:

- Small size of that market and difficulty in penetrating it
- High cost of entry due to regulatory barriers or communications issues
- Difficulties in controlling intellectual property within a small but geographically fragmented market

Fortunately, the sugar industry, until now has been able to avoid these disbenefits of scale. One of the reasons for this is the cooperative nature of our research organisations. Much industry research funding is channelled through the Sugar Research and Development Corporation (SRDC) which considers overall industry research priorities when allocating research funding. The Bureau of Sugar Experiment Stations (BSES) the industry's principal research body, is large enough to be able to employ specialists in areas requiring detailed industry knowledge. BSES has established close relationships with CSIRO and the University of Queensland, both of which are able to provide considerable expertise in developing gene technology. The industry as a whole is tackling the issue of intellectual property and has conducted direct negotiations with some of the major players in the gene technology world.

This is not to say that there are no problems with market failure or implementation of new varieties by our producers. However, it illustrates what we believe to be a significant advantage of the cooperative nature of the industry and the way in which industry bodies can work together to achieve desirable outcomes.

CSIRO and other central research institutions should be able to negotiate access to enabling technology for all Australian industries. When intellectual property rights are being traded, all Australian government-funded research organisations should include a "no-disadvantage to Australia" clause in any agreements made with outside bodies.

Australian sugar industry recommendation:

That the Committee explore opportunities for a coordinated approach to gain access to appropriate enabling technologies.

6.0 Assistance to Small Producers to Develop New Varieties and the Protection of the Rights of Independent Breeders, in relation to Genetically Modified Organisms

Gene technologies used for the production of genetically modified organisms are usually the subject of patent applications both in Australia and overseas. The proprietary nature of these technologies differentiates them from the natural traits that small producers and independent breeders may have used in the past for varietal development and propagation. In order to use a proprietary gene technology for the development of a commercial product (i.e. a new variety) one requires a licence from the patent owner. In most cases the important gene technologies that are in common use at the present (e.g. herbicide resistance, insect resistance and male sterility) are owned by large multinational companies (e.g. Monsanto, AgrEvo, DuPont). These companies have well defined business plans for the commercial exploitation of these technologies. These plans are usually targeted at specific commodities in specific markets and are commercialised either directly by the company or by another body that can ensure the greatest return to the company. These proprietary and commercial constraints will mean that producers and small companies involved in varietal development or propagation may not be able to obtain a licence to use a particular gene technology.

A potential solution to this problem is based on leveraging access for Australian producers by trading technologies controlled by Australian public and private organisations.

Most genetically modified crop plants require a combination of several gene technologies to be successful. These may include the actual gene that provides the required trait (e.g. insect resistance) but also enabling technologies such as those required to both insert and express the gene. In modern biotechnology there is a considerable amount of cross-licencing where technologies are exchanged for mutual commercial gain. This means that Australian research institutes that have valuable intellectual property in gene technologies may be able to trade licenses for those technologies for access to other valuable gene technologies controlled by companies outside Australia. This is particularly important to obtain access to the enabling technologies. It would mean that the small Australian producer and breeder can access all the required licences for Australian developed technologies plus the required enabling technologies controlled by overseas companies. These licences also should include access to important export destinations.

The solution proposed above necessitates that Australia has a highly innovative research community that is actively involved in original research that will develop new and valuable intellectual property. It also means that such research should be undertaken with eventual commercialisation in mind and that the intellectual property rights are protected. This will require a substantial funding base for research in gene technology in public research institutions, preferably with links to Australian-based private industry or with overseas companies where suitable arrangements are in place beneficial to Australia. These benefits must include the freedom to operate within Australia and freedom to export primary products containing gene technologies to key markets.

Australian sugar industry recommendation:

That the Committee endorse the need for Australian research in gene technology and the need for an appropriate funding base in public research institutions to attain benefits for Australian producers as a whole.

7.0 The Appropriateness of Current Variety Protection Rights, Administrative Arrangements and Legislation, in relation to Genetically Modified Organisms

As noted above, the BSES holds Plant Variety Rights (PVR) on behalf of the sugar industry for varieties that are released for commercial production. One of the main reasons for this is to protect BSES intellectual property in the event of varieties being genetically transformed by external parties so as to protect the sugar industry's investment in its intellectual property. This may not be possible under current PVR Legislation but is a necessary first step to identify elite material.

The industry is concerned about the current PVR legislation on "essentially derived" varieties. If a variety is clearly distinct from other varieties, it is eligible for PVR. Our concern is that a variety developed by the industry and paid for through the BSES research levy could be transformed with a single gene which adds one distinct characteristic (e.g. herbicide resistance). Under current legislation, the organisation creating this transformed variety can claim PVR, while the original plant breeder that provided all of the other useful genes in the variety has no further claim. The intellectual property of the original breeder is not protected. This is contrary to the UPOB convention and, we believe, contrary to Australia's best interests.

This provision would mean that large multinational companies can obtain access to PVR protected varieties, transform them, and then charge growers for using the variety even though an industry's own organisation bred the original variety.

Australian sugar industry recommendation:

That Plant Variety Rights legislation be changed to take into account the rights of the initial breeder of varieties which are subsequently genetically transformed.

8.0 Opportunities to Educate the Community of the Benefits of Gene Technology

The Australian sugar industry considers this inquiry has an important role in creating opportunities to help allay some community concerns about gene technology. On a global scale we envisage gene technology creating the potential for a huge increase in the world's production of food, giving the likelihood of a guarantee of world food security, while at the same time offering significant environmental benefits. For this to be realised there will have to be informed acknowledgement by the community of the overall benefits.

Australian sugar industry recommendation:

That the Committee set up mechanisms by which independent and knowledgable debate on genetic engineering can take place and provide a clearing house for discussion and the allaying of community concerns about this new technology.

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