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1. Executive Summary

The issue of the genetic engineering (GE) of our food supply is well and truly “on the table”. Governments worldwide are moving towards the comprehensive labelling of GE-derived ingredients, including highly refined ingredients such as oils. The market response has been an overwhelming rejection of GE-derived ingredients. Meanwhile, in the absence of effective labelling laws in Australia there is a growing trend toward voluntary “non-GE” statements on food labels.

The Australian food industry is taking a proactive approach, with the majority of food manufacturers implementing non-GE policies across their brand ranges. Last year Australia’s largest refiners and manufacturers of oil and margarine products also took a stand; Goodman Fielder and Peerless joined Unilever in adopting policies to ensure their own brand products exclude ingredients derived from genetic engineering. Their brands include Meadow Lea, ETA, Flora, Logicol, Tablelands, Miracle Canola Spread, and Olive Grove. The retailers Coles, Aldi and IGA also adopted a non-GE policy for their home brand oils and margarines in 2008 and the fast food giant, McDonald’s, although yet to completely address the non-GE issue, has implemented a non-GE policy for oils. In researching this report, some 50 suppliers of oils have been approached and the majority have responded with details that indicate the widespread availability of non-GE oils for the Australian market. [See Fig4]

Locally produced GE canola is for the first time entering our food supply. 2009 is the first year that the harvested GE canola will be crushed for oil. It is now imperative that food industry buyers contact their suppliers to ensure that non-GE supply specifications are in place and are applied to any domestic canola product, such as canola oil. The Greenpeace Good Oils Report was released on September 24th, 2009 and outlined the fact that for the first time, Australia’s main grain handler, GrainCorp, had confirmed that it would be mixing GE canola with the main non-GE canola crop. On the day of the report’s release, and responding to intense pressure from farmers and industry, GrainCorp agreed to segregate the 2009 GE canola crop. This gives a twelve month window of opportunity to stop the potential wholesale GE contamination of canola. Canola is the third-largest crop in Australia in terms of area planted and accounts for half the edible oil stock in Australia. Studies show that consumers are willing to pay considerable premiums for non-GE products. Last year less than 1% of the canola crop was GE, this has marginally increased in 2009 with 300 growers in Victoria and NSW cultivating GE canola. This report highlights the very real threat of contamination that Australia’s food supply faces unless the current GE food crop bans are reinstated.

Until recently, GE cottonseed oil has been a cheap oil used widely in the food service sector and in vegetable oil blends. But the substantial failure of GE cotton crops worldwide and changing preferences for healthier oils is creating a shift to non-GE high oleic canola and sunflower oils. The high oleic oil innovations are products of selective breeding, not genetic engineering. For example, Monsanto’s Roundup Ready GE canola, which is being grown in Australia, has only been genetically engineered for one trait – to be resistant to Monsanto’s herbicide Roundup. This means the canola can be sprayed with large quantities of Roundup without dying, GE crop companies are now making claims they will expand their market with oilseeds genetically engineered for nutritional benefits. However, such innovations in the development of oilseeds continue to be made using selective breeding and benign biotechnology techniques. The risks of GE are unnecessary.

Polls consistently show that consumers do not want to eat GE products and the vast majority of consumers want better labelling so they know what they are eating. Concerns include the potential introduction of unexpected and new allergens; increased allergic sensitivities and the transfer of antibiotic resistance.

The main sources of GE foods are canola, soy, corn and cottonseed and various oil products may be contaminated with ingredients derived from these GE crops. Blended vegetable oils commonly include GE oils in the mix, and, last year a Woolworths home brand pure olive spray was found to contain a blend of seed oils including canola. GE oils can also be found in margarines and in many processed foods such as baby food, dairy products, muesli, and baked goods. GE fats also commonly appear as hidden ingredients, for example, as the ingredient lecithin, typically derived from GE soy.

[1] Including Kellogg’s, Sanitarium, Campbell Arnott’s Asia Pacific, Heinz Wattie’s Australasia and the retailers Coles, Aldi and IGA for their home brands.]
This report shows that DNA from oilseeds continues to exist in refined oils. Australian labelling laws, unlike those in the European Union, do not require highly refined GE ingredients such as oils to be labelled. However this could change soon, with a food labelling review due to start this year that includes in its terms of reference the labelling of GE food.

In addition to the issues of market rejection, when it comes to protecting against contamination from GE crops, current legal remedies are inadequate. European insurers have been advised to add exclusion clauses for protection from liability for health effects of GE foods and Australian insurers are wary of insuring farmers using GE crops.

The Australian food industry now stands at a crossroads. While the majority of Australian manufacturers have clear policies in place on non-GE supply chains, it is imperative for manufacturers to follow up with suppliers to ensure that any canola or canola oil requested is non-GE, and preferably identity preserved non-GE.

The food industry position on genetic engineering does make a difference. It has important implications for customers, as well as for the cost and operational efficiency of the food industry now and in the future. This report aims to provide an overview of the current status of genetic engineering of oils in Australia, and should prove a useful resource for food manufacturers in their efforts to maintain a non-GE supply chain. It also serves as a timely reminder for the wider community that Australia must act urgently to reject GE oilseed crops.

2. The facts about genetic engineering and oils

What is genetic engineering?

The key difference between genetic engineering (GE) and other techniques (e.g., selective breeding) is that genes are usually moved between species. Genes are small lengths of DNA, the living blueprint of life found in the cells of all living things. Genetic engineers use viruses, bacteria, and a device called a "gene gun" to move genes from one organism into another. GE can also be called genetic modification or manipulation (GM), and the resulting life forms are often known as genetically modified organisms (GMOs).

Biotechnology companies argue that GE foods are "substantially equivalent" to their non-GE counterparts. However, several recent studies have called into question this simplistic view of the science of genetic engineering. Inserted genes can disrupt other genes; be unstable in their new environment or function differently than expected or intended.

Improvements to oilseeds are a result of selective breeding

Oilseeds have been modified, using the varied techniques of responsible agricultural science over many generations, to contain the desirable fatty acids to suit their different uses and improve their performance. Hybridisation, marker assisted selection (MAS) and other techniques have brought innovation to the oilseeds industries, resulting in improved traits such as varying acid and health profiles.

The Australian Government’s Bureau of Rural Sciences 2007 report, “GM oilseed crops and the Australian oilseed industry,” observes that: “The most significant manipulation of an oilseed crop occurred in Canada in the 1950s when rapeseed was made more suitable for use as a food crop through the development of new varieties containing low levels of anti-nutritional factors.” Other non-GE innovations from agriscience include breeding high oleic canola and sunflower varieties with high levels of mono-unsaturated fats to improve the stability and frying quality of their oils.

Genetic engineering has developed only two traits used in Australian crops:

1. herbicide-tolerant crops;
2. Bt crops: genetically engineered to produce their own pesticide to kill certain insect pests.
GE crop industry-sponsored marketing campaigns attempt to sell GE as the only way to improve oilseeds. However, other breeding techniques offer equal and often better innovations, with none of the burden of risk of GE. The GE crop industry is focusing on GE crops because it allows them to patent the resulting crops, increase farmer dependence on their own branded chemicals and hence maximise profits.

**Health concerns around genetically engineered oils**

Independent studies on the health risks of GE crops for either animals or humans are severely lacking from scientific literature. This is reflected by the ongoing controversy surrounding their safety assessment. It is misleading to claim that GE crops are safe for animal or human consumption, because long-term studies have seldom been performed. Only a handful of peer-reviewed live animal tests of GE food have been undertaken, with overwhelmingly negative results including stomach lesions, organ damage and signs of immune-deficiency.

Concerns include:

- the introduction of unfamiliar or unexpected proteins, toxins and allergens;
- immune reactions;
- increasing the immune system’s sensitivity to other substances;
- increased levels of herbicide use in food production; and
- the use of antibiotic-resistant genes in GE plants.

There is a growing body of evidence showing that proteins do persist in oils and that they can trigger allergies in sensitive individuals. DNA is not necessarily denatured by cooking or refining. The problems inherent in GE crops are also inherent in GE-derived oils.

As well as the expected proteins produced by GE crops, scientists have expressed concerns that unexpected toxins or allergens may also be present in oil derived from these crops.

> “Although the presence of small amounts of DNA in oils and animal products is now reasonably well established, what is an even more serious issue is that as a result of the splicing techniques used there is a real possibility of insertional mutagenesis in the transformed plant. Due to this, unwanted and unpredicted harmful metabolites, toxins and/or allergens can be produced by the plant’s own genes and these may contaminate the oils or other products without major amounts of transgenic or other DNA being present.” Dr Arpad Pusztai

**Which GE crops are grown in Australia?**

- Monsanto’s Roundup Ready canola;
- GE cotton.

Australia is one of only a handful of countries worldwide that grow GE crops commercially. In 2008 the New South Wales and Victorian state governments let their bans on GE food crops expire. Bans in the other canola-growing states (South Australia, Western Australia and Tasmania) remain in place and prevent the commercial cultivation of GE canola in those states. Australia produces on average 1.6–1.8 million tonnes of canola annually and in 2008 less than 1% of this was GE.

However, the experience in Canada has shown that GE canola contaminates non-GE canola growing many kilometres away. Given that blanket contamination in Canada occurred in only a few years, Australia has a small window of opportunity to reject GE canola and continue reaping the economic benefits of higher premiums and access to non-GE markets.

GE cotton has been grown in Australia for some years now and has failed to deliver. The industry is showing signs of failure globally. In 2009 Monsanto pulled out of its major GE cotton project in
Australia, Deltapine." Concurrently in Texas, United States, cotton producers have abandoned nearly one-fourth of their sown acreage of GE cotton this year and output fell sharply around the globe, including in India, the US and China, which have GE as a large proportion of their cotton stocks. No recovery is expected in 2009-2010.

Which foods in Australia might contain GE crops?

There are five GE crop foods present in the Australian food supply as whole and processed ingredients:

- GE canola, both local and imported;
- GE cottonseed, both local and imported;
- GE soy, imported;
- GE maize (corn), imported;
- GE sugar beet, imported.

3. Availability of non-GE oils

Non-GE oilseed crops and their products are readily available in ample quantities in Australia and internationally. Appendix 1 provides a list of suppliers of non-GE oils to Australia. Appendix 2 provides a reference list of GE-free product by country source. The Non-GMO Sourcebook www.nongmosource.com provides an up-to-date global reference of non-GE suppliers of hundreds of ingredients. Options for substitution are discussed in section 7.

4. Oils product mix and usage in the Australian food industry

The Australian food industry utilises around 550,000 tonnes of oils and fats annually in:

- food manufacturing, using approximately 40% of domestic oil supply;
- food services such as fast food, using approximately 25% of domestic oil supply;
- Australian retail branded oil and margarine using approximately 35% of domestic oil supply.

Canola oil

Australian canola accounts for almost half of the market share of food industry usage of oils and has up until now been non-GE. It is widely used in retail branded products including vegetable oil blends. Non-GE canola oil is a good substitute for soy oil, and high oleic canola oil (which is non-GE) is a good substitute for palm oil. Non-GE canola lecithin has also been identified as a good substitute for GE soy lecithin. Growth in usage of canola oil is attributed to health branding for “a reduction in undesirable cholesterol levels and reduced risk of heart disease”.

GrainCorp announced in May 2009 that it would only be segregating non-GE canola by request in 2009. Responding to intense pressure from farmers and industry and on the day that the Greenpeace Good Oils Report was released, this decision was reversed for the 2009 canola crop. Graincorp has also agreed not to charge a fee for testing to prove that the canola is GE-free and will only accept GE canola at a small number of silos. While there has been a twelve month reprieve from wholesale contamination of the canola crop this year, the threat of GE contamination of the NSW and Victorian canola supply will always be present unless GE food crop bans are reinstated.

Tasmania, South Australia and Western Australia are continuing to offer a source of non-GE canola. Users of canola need to ensure early requests are made to suppliers for traceable or identity preserved (IP) non-GE canola products, in order to avoid contamination of their food products.

2 See figure 7 for further details on common substitutes for GE oils;
Sunflower oil

All sunflower oil is non-GE. Although sunflower seed is imported it is rarely crushed due to import restrictions. Sunflower is gaining market share as demand shifts away from GE cottonseed oil to high oleic sunflower oil, a better dry land crop, grown in central Queensland. High oleic sunflower oil, otherwise known as mono-unsaturated sunflower oil, is a good frying oil with high stability used in the food services industry and in some retail oils and spreads. Polyunsaturated sunflower oil is a primary commodity used in retail salad and cooking oil, margarine and dairy substitutes and is high in linolenic acid. The oilseed industry believes the prospects for replacing a significant portion of the imported palm oil used in the food services industry for frying applications are favourable. It is very good for frying potato chips, and is also preferred in many high-quality dining establishments for its neutral taste.

Corn oil

Corn oil refined from Australian grown corn is non-GE. Imports from the Americas are frequently GE-derived, although IP non-GE corn oil is also available on the international market. Corn oil is sometimes included in oil blends but occupies a minor market segment.

Soy oil

A very small volume of non-GE soy is produced domestically, with the majority of soy imported into Australia from the Americas for crushing and refining into oil and meal. GE soy is widely grown in the Americas; however, non-GE soy is available from the US and Brazil. A new consortium called ABRANGE, the Brazilian Association of Non-Genetically Modified Grain, is the world’s largest soy producing group and intends to become producers of the world’s premier supplier of non-GE soy.

Soy is a primary commodity used in retail cooking oil and margarine, although to a lesser extent than canola. GE soy oil can be found in processed food, including chocolate, potato chips, margarine, mayonnaise, biscuits, bread, pastries, snack foods, baked products, fried products, edible oil products and special purpose foods.

Cottonseed oil

The vast majority of domestic cottonseed is GE-derived. The oil is a by-product of the cotton fibre crop and is found in blended vegetable oils, fried foods, baked foods, snack foods, edible oil products and small goods casings. Cottonseed and cottonseed meal are not approved for human consumption in Australia because they contain naturally occurring toxic substances.

GE cottonseed oil is used as a frying oil by the food service sector, for example, in many fish-and-chip shops. This oil makes little appearance in the retail sector due to lack of credibility as a food product; however, it can be found in some mayonnaise, salad dressings, and as a common ingredient in cheap vegetable oils and margarines.

Australia’s major refiners, Peerless, Goodman Fielder and Unilever, have reformulated their margarines to avoid the use of cottonseed oil in their blends, replacing it with non-GE canola oil blends. Due to concerns over the health risks of GE foods, demand for GE cottonseed oil is declining. GE cotton yields worldwide are also in decline.

Palm oil

Palm oil is non-GE; however, it has very low consumer acceptance due to its dependence on tropical deforestation and consequent impacts on fauna (e.g. endangered orang-utans). All palm oil is imported, and is primarily used in the low cost end of food manufacturing, and in the food service industry, particularly for frying. It has higher levels of saturated fats than many other vegetable oils. There is increasing pressure on the food service industry to use healthier oils such as those with high oleic and low linolenic oil profiles.
Blended vegetable oil

Most blended vegetable oils contain GE-derived oils; however, non-GE vegetable oil is available on request. Vegetable oil blends may include GE soy oil, GE cottonseed oil, GE corn oil and GE canola oil.

Olive oil

Olive oil is non-GE. The majority of domestically produced olive oil is currently sold at the growing value added and high cost end of the retail sector. The bulk of olive oil for the Australian food industry is, however, imported. There are concerns about adulterated Italian, Turkish and Spanish olive oil imports labelled "extra-virgin" but diluted with cheaper olive oils or other vegetable oils, which may be contaminated with GE oils and in 2008, Woolworth’s home brand pure olive spray was found to contain a blend of seed oils including canola. It is estimated that by 2015 Australian olive oil production will be sufficient to satisfy domestic demand.

Peanut oil

All peanut oil is non-GE and domestically produced. It is a stable cooking oil, suitable for frying. There are, however, serious health concerns regarding allergic anaphylactic response to peanuts.

Rice bran oil

All rice bran oil is non-GE. Rice bran oil is gaining consumer interest as the trans-fats debate heats up. It is stable oil with a high smoke point of over 250 degrees, which does not allow the breakdown of fatty acids, and is considered a healthy oil. It is excellent for deep-frying and all high temperature cooking. As a low viscosity oil, it is also suitable for salad dressings, in mayonnaise and for non-stick baking.

Coconut oil

All coconut oil is non-GE and almost entirely imported from the South Pacific and Asia. It is gaining attention and popularity due to concerns over trans-fats. It is a healthy and stable oil with a long shelf life and a high smoke point. It is excellent for frying and baking and is experiencing growth as a niche product in the retail sector.

Flax oil

Flax oil, also known as linseed, is non-GE and grown in Australia. There is a growing niche retail market for conventional and organic cold-pressed flax oil due to its outstanding healthy properties resulting from a high omega-3 fatty acid profile.

(See Figure 7 for details of common substitutes for GE oils)

Australian retail market response to GE oils

Australian retail brands of oils and margarines are increasingly adopting non-GE supply chains and marketing. This coincides with an increasing trend towards health branding of retail oils and margarines. Unilever, Peerless and Goodman Fielder have all ensured that their retail branded oils and spreads are not derived from GE crops.
### Figure 4: GE status of retail oil and margarine brands in the Australian marketplace

(See appendix 1 for full list of non-GE oils by supplier)

<table>
<thead>
<tr>
<th>Non-GE brands A-L</th>
<th>Non-GE brands M-Z</th>
<th>May be GE-derived</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australian grown 100% olive oils</td>
<td>Meadow Lea</td>
<td>Allowrie</td>
</tr>
<tr>
<td>all brands</td>
<td>Melrose Omega Gold</td>
<td>Country Gold</td>
</tr>
<tr>
<td>Australian grown 100% corn oils</td>
<td>Miracle Canola Spread</td>
<td>Girgar</td>
</tr>
<tr>
<td>all brands</td>
<td>Melrose oils</td>
<td>Imported soy, corn and vegetable oils all brands</td>
</tr>
<tr>
<td>Barilla</td>
<td>Nuttelex</td>
<td>Mainland</td>
</tr>
<tr>
<td>Becel</td>
<td>Olive Gold margarine spread</td>
<td></td>
</tr>
<tr>
<td>Bertolli</td>
<td>Olive Grove</td>
<td>Naytura (Woolworths)</td>
</tr>
<tr>
<td>Brookfarm macadamia oils</td>
<td>Organic Mountain spreads</td>
<td>WeightWatchers canola spread</td>
</tr>
<tr>
<td>Coles</td>
<td>Pureharvest oils</td>
<td>Western Star</td>
</tr>
<tr>
<td>Copha vegetable shortening</td>
<td>Pureharvest organic cold pressed oils</td>
<td></td>
</tr>
<tr>
<td>Crisco</td>
<td>Rosnay olive oil</td>
<td>Woolworths butters</td>
</tr>
<tr>
<td>Dairy Soft</td>
<td>Sandhurst Fine Foods</td>
<td>Woolworths margarines</td>
</tr>
<tr>
<td>Dick Smith canola oil</td>
<td>Stoney Creek oils</td>
<td>Woolworths oils</td>
</tr>
<tr>
<td>ETA</td>
<td>Tablelands margarine</td>
<td></td>
</tr>
<tr>
<td>Fairy cooking margarine</td>
<td>Tatura</td>
<td></td>
</tr>
<tr>
<td>Flora</td>
<td>Vitalife canola spread</td>
<td></td>
</tr>
<tr>
<td>Flora Proactiv</td>
<td></td>
<td></td>
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<tr>
<td>Golden Canola</td>
<td></td>
<td></td>
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<tr>
<td>Logicol</td>
<td></td>
<td></td>
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<tr>
<td>Leo’s Fine Food</td>
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</tbody>
</table>

### Australian food services market response to GE oils

Consumer concerns over GE oils and rainforest-sourced palm oil are urging fast food retailers to reconsider their oil supplies. The fast food giant McDonald’s, although yet to completely address the non-GE issue, now has a non-GE policy for oils.
5. Consumer attitudes to genetic engineering of food

Australian consumer concerns regarding GE food primarily focus on the potential health risks, and the lack of labelling of GE-derived ingredients. The broader implications of genetic engineering such as the environmental, ethical, farming and food security impacts also appear on the radar. Polls indicate that shoppers are less likely to buy a product if they know it contains GE-derived ingredients and that the majority of people are uncomfortable with GE plants and animals for food. 78% of Japanese, 70% of Europeans and 86% of British consumers do not want to eat GE foods.

6. Product premiums for non-GE oils

Consumer willingness to pay price premiums for non-GE products

Recent studies show that consumers are willing to pay significant premiums for non-GE products. In a review of 25 studies, Lusk et al found that consumers on average placed a 23% to 42% higher value on non-GE food compared to GE food. A UK study found that consumers are willing to pay premiums of up to 168% for non-GE food.

The organic certification system in Australia is at present the only regulated means by which consumers can choose a non-GE product. It is interesting to note that the market for certified organic food has experienced rapid growth over the period in which GE-derived ingredients became commonplace in Australian foods. Studies show that retail price premiums already paid in Australia for certified organic foods average 80%.

GE-foods considered of lesser value by consumers

Similarly, several studies have concluded that, on average, consumers will pay less for GE food products. In a Norwegian study, consumers required discounts of 37%-63% to buy bread containing GE-derived ingredients. In France, 35 per cent of consumers are unwilling to purchase GE foods, and 42% are only willing to purchase them if they are less expensive. Similar attitudes exist in Australia, where polling last year showed that 54% of Australian consumers are less likely to buy food if they know it contains GE ingredients.

7. Non-GE supply chain management

There are various measures available to companies to ensure a non-GE supply chain:

Substituting non-GE where a GE-derived ingredient is detected

When a supply chain audit detects a GE-derived ingredient, companies generally find a non-GE substitute of the same crop. On occasion substitutions are made with a different ingredient. Most oils have a variety of possible uses and substitution is possible between oils with similar properties. Some companies with smaller product ranges find that substituting with ingredients derived from crops not approved for genetic engineering (for example substituting GE soy oil with sunflower oil) presents the simplest way forward, and eliminates the need for implementing traceability or identity preservation measures.
Figure 7: Common substitutes for GE oils

<table>
<thead>
<tr>
<th>Ingredient for exclusion</th>
<th>Common substitutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>GE canola oil</td>
<td>Non-GE canola</td>
</tr>
<tr>
<td>GE soy oil</td>
<td>Sunflower oil, non-GE canola oil</td>
</tr>
<tr>
<td>GE soy oil for frying</td>
<td>Hyoletic sunflower oil, non-GE high oleic and low linolenic canola oil, coconut oil</td>
</tr>
<tr>
<td>GE soy lecithin</td>
<td>Sunflower lecithin, non-GE canola lecithin</td>
</tr>
<tr>
<td>GE cottonseed oil for frying</td>
<td>High oleic sunflower oil</td>
</tr>
<tr>
<td>GE cottonseed oil in margarine</td>
<td>Sunflower oil</td>
</tr>
<tr>
<td>Palm oil for frying</td>
<td>Hyoletic sunflower oil, non-GE high oleic and low linolenic canola oil, blends of the above</td>
</tr>
<tr>
<td>GE vegetable oil</td>
<td>Non-GE vegetable oil</td>
</tr>
<tr>
<td>GE oils in salad dressings</td>
<td>Rice bran oil, flaxseed oil, olive oil</td>
</tr>
</tbody>
</table>

Traceability

Traceability refers to systems of record keeping and documentation that enable tracking the history of a product or ingredient at any point in the food chain. It extends beyond record keeping of transactions and process actions to measurement or analysis at critical points to check for compliance with specifications. Existing food and feed supply systems generally have some level of traceability systems in place to meet requirements of individual supply chains.\textsuperscript{lvii}

“Green’s General Foods will endeavour to ensure through survey and auditing, that all raw materials are sourced as non GE ingredients, non GE derived ingredients, and ingredients derived from animals fed with non GE feed. Where GE raw materials are identified or the status is unknown, we will endeavour to identify the status with our suppliers as best as is technically possible, and seek to remove or replace any GE material with a non-GE equivalent.” Greens General Foods.

Identity preservation

Identity preservation (IP) is a more active process than traceability. Increased consumer demand for quality control and food safety in food manufacturing has created demand for an array of IP products. Many refiners and food manufacturers already have IP systems in place, and address the risks of presence of GE contaminants in the food chain through those IP systems.

IP involves a specification agreement for non-GE ingredient supply, made between suppliers and customers. Such agreements act to preserve the non-GE status of ingredients and resultant products from farm to the market with independent verification and testing throughout the supply chain (from the seed planted by farmers, on-farm, post harvest, in transport, at ports of export, import level and point of processing.) In essence, a complete paper trail is established, allowing for traceability of the product, which is subject to independent checking and verification.\textsuperscript{lvii} Food manufacturers which request IP ingredients deal with the issue of GE contamination from its source and are making the best available effort to exclude the possibility of the GE contamination of their food products.
Unilever in Australia and New Zealand has reviewed all ingredients as much as is technically possible and worked to eliminate genetically modified crop derived ingredients, through substitution, sourcing from areas where non-genetically modified crops are grown and IP systems.” Garry West, Unilever

Segregation and identity preservation for oil seed handlers and crushers

For handlers and crushers, it is imperative to have separate transport and storage facilities that receive either GE or non-GE oilseeds, during storage, out-loading and through the sampling process. Systems must be in place at this level to avoid contamination throughout the supply chain.

GrainCorp will continue to segregate GE canola in 2009. However, the GE canola will be harvested and crushed for oils for the first time this year and with 300 growers in Victoria and NSW cultivating GE canola this year, some silos will be processing GE canola seed that will make its way into the Australian food supply. Without GE food crop bans in NSW and Victoria the threat of wholesale contamination of the canola crop remains.

Tasmania, South Australia and Western Australia maintain GE food crop bans, and will continue to offer a source of non-GE canola. Users of canola need to ensure early requests are made to suppliers for traceable or IP non-GE oilseed products, in order to avoid contamination of their food products.

Segregation and identity preservation for oil refiners and manufacturers

Goodman Fielder, Peerless and Unilever have set up systems to ensure that only IP non-GE oilseed crops are used in the refining and manufacturing of their own-brand products. They will also supply non-GE oils on request.

“Specifically Goodman Fielder:

• does not use GE crop derived ingredients in any of its retail consumer branded products - breads, spreads, oils and cooking ingredients;

• does not use GE cottonseed oil in any of its consumer products.”

Ian Greenshields, Goodman Fielder

Australian food manufacturers’ non-GE policies

The majority of the Australian food industry now have formal non-GE policies specifying their requirements for supply of non-GE derived ingredients, including oils and refined products, and animal products (in relation to feed).

Examples of food manufacturers that have adopted non-GE policies and operations include:

• Coles home brands
• Kellogg’s
• Campbell Arnott’s Asia Pacific
• Coca-Cola
• Aldi home brands
• Sanitarium
• Heinz Wattie’s Australasia
• Parmalat
• IGA home brands
• Unilever
• Lion Nathan
• Sandhurst Fine Foods

“Heinz Australia maintains its commitment to using non-GM ingredients in its products. We do this by requiring our suppliers to certify that their ingredients are GE-free before they become suppliers, and by requiring a certificate of analysis to confirm that each delivery conforms with our specifications. Heinz also conducts an ongoing auditing program of its suppliers to ensure compliance with our quality standards.”

Jessica Ramsdan, Corporate Affairs Manager, Heinz Wattie’s Australasia

“We have ascertained the genetic modification status of every ingredient, additive and processing aid of every product. We have undertaken extensive testing and established rigorous audit trails throughout our production systems.” Goodman Fielder

Testing

Many companies are undertaking routine testing to detect some types of GE material. At present testing for GE material, particularly in oils, is an imperfect science. There is no single test that can screen for all GMOs. Often, a combination of tests is employed to aim for an improved result. Testing is a useful tool in some cases; however, it can be costly and ineffective. Priority of effort should be given to establishing a policy and auditing the supply chain to ensure that supplier contracts are only established and maintained with suppliers that can provide traceable or identity preserved non-GE-derived ingredients.

In-field segregation a furphy

A Western Australian parliamentary inquiry into genetic engineering formed the view that segregation, or “co-existence” of open-pollinated GE and non-GE varieties in-field is not possible. GE contamination will be inevitable and will occur through: cross contamination of varieties in seed stock; in-field via volunteers or cross-pollination; gene pool contamination of wild relatives; and germination of seeds spilled during transport, grain storage and handling. To avoid escalating contamination, it is imperative that effective segregation measures are applied throughout the supply chain.

8. Labelling of ingredients derived from genetic engineering

Current labelling laws in Australia are extremely limited and exclude the need to label some of the most basic and universally used GE ingredients. Under Australian labelling laws, only foods that contain detectable novel DNA and/or novel protein, or have altered characteristics need to be labelled. Consequently, virtually all GE-derived ingredients in foods in Australia are not labeled for GE content. This includes:

- highly refined GE ingredients (such as cooking oils);
- food prepared at bakeries, restaurants and takeaways;
- products derived from animals fed GE feed (such as meat, milk, eggs and honey);
- foods that are “unintentionally” contaminated with up to 1% GE contamination.

Responding to concern about Australia’s labelling laws, the Australia and New Zealand Food Regulation Ministerial Council announced an independent review of food labelling law and policy due to report back mid 2010.

Comprehensive labelling is cost effective

Comprehensive labelling of GE food is both cost effective and practical, as demonstrated in the EU.

“When the current labelling regime... was introduced in 1997, it did not result in increased costs, despite the horrifying (double-digit) prediction of some interests. Similarly, when Norway introduced its current labelling regime (similar to the one now proposed), it did not provoke any price increase or disruption in trade.” David Byrne, European Commissioner for Health and Consumer Protection, stated prior to the adoption of the EU’s current labelling laws.

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3 The Greenpeace Trolleywatch national supermarket survey in 2006 concluded that only six products in Australia were actually labelled for GE-derived ingredients, despite the fact that thousands of products on supermarket shelves contained them.
Non-GE labelling is also cost-effective. A traceability regime can be put in place as part of a company’s regular quality control efforts, and changes to labels can be phased in with other regular or design changes to avoid extra cost.

**Consumer attitudes to labelling**

According to a recent Newspoll, 90% of all Australians want all GE food comprehensively labelled. Acknowledging public interest in the comprehensive labelling issue, the Australian Labor Party adopted the following party policy: “Labor is committed to effective product labelling to ensure consumers can make informed choices. Food should be labelled to ensure consumers know both the ingredients and processes used… Labor also supports the comprehensive labelling of genetically modified food.”

**DNA is present in oils: GE-derived oils should be labelled**

Our food regulator Food Standards Australia New Zealand (FSANZ) justifies our current GE labelling laws on the basis that no novel proteins or DNA are transferred to highly processed products (such as oils). However, independent peer-reviewed scientific research as early as 1997 has concluded that proteins are detectable in both cold-pressed and refined oils. In fact FSANZ’s own risk assessment for Roundup Ready canola admits that protein is present in trace amounts in the oil. Whilst international regulators pay heed to science and require labelling of GE-derived oils, in Australia outdated regulations are allowing genetically engineered oils into the food supply unlabelled.

*In the words of Hellebrand et al: “… the following conclusions can be drawn:*

1. The determination of DNA is possible in refined oil as well as in samples of non-refined oil.
2. DNA from cold-pressed oils can be unequivocally identified by using nested PCR.

**Value adding with non-GE labelling**

Labelling is an increasingly important aspect of adding value to food sales. All of the label elements that are adjuncts to the generic description of the food item are candidates for adding value for the purchaser.

“Choosing to use non-GE oil was the easiest thing in the world to do. You just insist on the oil being GE free, get the certification and then you can list it on your packaging. Our customers love it!” Carolyn Creswell, Carman’s Fine Foods

The food industry tends to adopt the term “non-GE”, as opposed to “GE-free”, as it refers to the fact that a non-GE policy has been adopted and all available efforts are being made to exclude GE-derived ingredients. Manufacturers usually use a statement of effort to exclude GE-derived ingredients as the non-GE label.

“We believe in supporting Australian Farmers, so we proudly source only non-genetically modified Australian grown canola seeds.” Meadow Lea

The organic certification system in Australia provides consumers with a regulated option for choosing quality-controlled products by label. It is currently the only regulated means by which consumers can choose a non-GE product by label. It is interesting to note that the demand for certified organic food has increased dramatically over the period in which GE-derived ingredients became commonplace in Australian foods.
9. Export limitations of GE oils and oilseed crops

Internationally, consumer concerns regarding GE-derived ingredients have led to comprehensive regulations on GE crops in food in many nations, including:

- strict approval processes for GE products in foods;
- mandatory labelling of GE products in foods;
- strict import requirements for GE-derived food products.

For example, in 2004, the EU introduced stringent approval processes for new GE products and labelling requirements for all GE-derived food and feed ingredients, including highly processed ingredients such as refined oils, sugar and starch. Imports of GE products into Europe have been severely restricted, and as a result US exports to Europe have been limited. The EU also requires strict and comprehensive traceability.

China and Brazil have similar labelling and traceability regulations and the United Arab Emirates, South Africa and Qatar are currently drafting GE labelling legislation. Japan, which already has mandatory labelling for a number of GE foods, may now introduce comprehensive labelling. This follows the election of the Democratic Party of Japan, which has pledged to implement food traceability laws and the more stringent labelling of GE ingredients, including highly processed products such as oils.

“It has been shown that in some countries, strong consumer demand for non-GE products has limited the availability of GE items.” United States Department of Agricultural Foreign Agricultural Service

There is evidence that the introduction of labelling laws has encouraged markets to source GE-free food. For example, prior to labelling laws being introduced in Japan, GE-free sources were being targeted for future supply in anticipation of these laws.

“Where importers have been unable to provide these guarantees, the main course of action taken has been to seek alternatives supplies. This has been either of the same product from a different country (where the EU unapproved GMO is not yet available to farmers) or alternative (different) ingredients.” British Department for Environment, Food and Rural Affairs, “GMO Food Chain Analysis”

Trade interruption has occurred where suppliers have not met the improved regulations on GE foods.

“One positive test in the EU (for even a minute presence level that is below the accepted level of reliability for a test) is usually sufficient for relevant authorities to require the removal and destruction of the illegal material even if another (subsequent or earlier) test produces a negative result...This has resulted in rejections of supplies and often legal disputes.” British Department of Environment, Food and Rural Affairs

There are concerns within the Australian food industry that the proliferation of GE product such as GE canola in Australia will reduce their competitiveness in international markets.

10. Liability issues for the food and beverages industry

There is now ample evidence to show that when it comes to protecting against contamination resulting from GE crops, the current legal remedies available are inadequate. Disputes that may arise which are not resolved by negotiation between the affected parties may become the subject of civil actions and the basis of legal liability. Evidence of economic harm is not always sufficient to ensure cost recovery. The European Insurance Union has advised its members to add exclusion clauses for
Companies such as Monsanto and Bayer have opposed strict product liability, which would require them, as producers and profiteers of the GE products, to remain liable for any harm caused by GE product when it is used in the manner intended. They claim it is unnecessary and likely to stifle innovation.

11. Conclusion

Genetically engineered oilseed crops hold no benefits for oilseed farmers, crushers, distillers, manufacturers, food manufacturers, consumers, or for any sector of the food industry. There are, conversely, many problems and complications associated with genetic engineering of oil seeds that are borne by every stakeholder down the line:

- consumer concerns, including lack of labelling, loss of choice, potential health risks;
- handler and crusher concerns, including contamination risks and segregation costs;
- refiner concerns, including supply chain disruption, contamination risks and testing costs;
- manufacturer concerns, including consumer rejection, liability issues, branding and labelling issues, health issues including introduction of unidentified allergens;
- farmer concerns, including increased costs, increased chemical use, development of herbicide resistant weeds, liability issues, contamination of neighbouring conventional and organic crops, export limitations, loss of seed and farm sovereignty due to contractual obligations to the biotechnology companies, and increasing concentration of the ownership of our food supply;
- environmental concerns, including impacts on soil and water health, biodiversity impacts, and irreversible pollution of the gene pool.

Genetically engineered oilseed crops increase farmer dependence on the biotechnology industry’s patented seeds and pesticides, which increases their market control and profit margins and results in higher costs for farmers, the food industry and consumers.

Achieving a non-GE supply chain can be easy and cost-efficient. Non-GE oilseed and oils are widely available within Australia for manufacturing purposes. Food manufacturers can choose from a range of options in non-GE supply chain management including substitution, traceability and identity preservation.

Inclusion of a voluntary non-GE statement on product labels provides an opportunity to further build brand loyalty by giving customers what they want and showing that quality control is taken seriously. Manufacturers may also take advantage of product premiums for non-GE products.

The majority of the Australian food industry has taken a pro-active stance on non-GE supply chain management. With GE canola entering the Australian food supply, companies need to remain vigilant and ensure that suppliers provide a paper trail to back up non-GE claims. Members of the food industry are also urged to take an active role in lobbying state governments to maintain state bans on GE food crops, in order to minimise complication and disruption within the Australian food industry.

Bans on GE food crops and the proliferation of Australian non-GE food products help build our reputation as a clean green supplier. They also avoid the costly implications of disruptions to our export markets associated with infringing global regulations on GE imports and labelling.

GE food crops cause disruption down the entire supply chain from farmer to marketer. The Australian food industry is taking a smart and responsible stance in excluding GE oils from Australian food products.
### Appendix 1. Non-GE Oil suppliers

*All oils listed below are Non-GE

<table>
<thead>
<tr>
<th>Suppliers</th>
<th>Head office</th>
<th>Canola</th>
<th>Corn</th>
<th>Vegetable</th>
<th>Sunflower</th>
<th>Olive</th>
<th>Manganese</th>
<th>Other</th>
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<tbody>
<tr>
<td>Goodman Fielder</td>
<td>Macquarie Park, NSW</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Peanut</td>
<td></td>
</tr>
<tr>
<td>Peerless</td>
<td>Braybrook VIC</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unilever</td>
<td>Epping NSW</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cootamundra Oilseeds Pty Ltd</td>
<td>Cootamundra NSW</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Safflower, broad range of cold pressed oils</td>
<td></td>
</tr>
<tr>
<td>Proteco foods and oils</td>
<td>Kingaroy QLD</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Other oils: macadamia, almond, avocado, apricot kernel, peanut, flaxseed, pea- nut, safflower, sesame, soybean, walnut</td>
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</tr>
<tr>
<td>Steric Trading</td>
<td>Villawood NSW</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<td></td>
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<td>Miranda NSW</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
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<td></td>
<td></td>
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<tr>
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<td>Charlestown NSW</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Atlantic Pacific Foods Pty Ltd</td>
<td>Maitland NSW</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pureharvest Oils</td>
<td>Drouin VIC</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<td></td>
</tr>
<tr>
<td>Melrose Oils</td>
<td>Mitcham VIC</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Organic: avocado, brazil Nut, peanut, safflower, flaxseed, sesame, pumpkin, mustard, wheat germ, Organic whole corn, sunflower seed, rice</td>
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<td>Kialla Pure Foods</td>
<td>Greenmount QLD</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Olive Centre</td>
<td>Cabarlah QLD</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EV Olives</td>
<td>Markwood VIC</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<td></td>
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<tr>
<td>Mandala Grove</td>
<td>Goombungee QLD</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Macadamia, flax, avocado, flavoured oils</td>
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</tr>
<tr>
<td>Lakeland’s Olives</td>
<td>Kandos NSW</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suppliers</td>
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<td>Soy</td>
<td>Corn</td>
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<td>Sunflower</td>
<td>Olive</td>
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<tr>
<td>Dwarfda Ridge Estate</td>
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<tr>
<td>Edina Olives</td>
<td>Gin Gin, Queensland</td>
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<tr>
<td>Allambie Grove</td>
<td>Bicton, WA</td>
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<tr>
<td>Terran Grove Olives</td>
<td>Chipping Norton NSW</td>
<td></td>
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<tr>
<td>Barilla Olive Oil</td>
<td>Munno Para Downs S.A.</td>
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<td>Yalla-y-poora Grove</td>
<td>Newbridge Vic</td>
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<td>African Pacific/Nui</td>
<td>Terrey Hills NSW</td>
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</tr>
<tr>
<td>Kokonut Pacific</td>
<td>Queanbeyan, NSW</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Innovative Products and Services</td>
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<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td></td>
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<td>✔️</td>
</tr>
<tr>
<td>Austrade Incorporated</td>
<td>USA</td>
<td></td>
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<tr>
<td>Bestfield</td>
<td>VIC</td>
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<tr>
<td>Salkat</td>
<td>Australia wide</td>
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</tr>
<tr>
<td>Heilongjiang Harvest farm</td>
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<tr>
<td>Heilongjiang province Jiusan Oil and Fat Co.</td>
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</tr>
<tr>
<td>Jilin Ecological Science &amp; Technology Co.</td>
<td>China</td>
<td>✔️</td>
<td>✔️</td>
<td></td>
<td></td>
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<tr>
<td>Jixi Dongfu Cereals, Oils, &amp; Foodstuffs Co.</td>
<td>China</td>
<td>✔️</td>
<td></td>
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</tr>
<tr>
<td>Ruchi Soy</td>
<td>India</td>
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</tr>
<tr>
<td>Tiryaki Agro foods Industry Co.</td>
<td>Turkey</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yanglin soybean</td>
<td>China</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>ABRANGE</td>
<td>Sao Paulo Brazil</td>
<td></td>
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<td></td>
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<td></td>
</tr>
</tbody>
</table>

* This information is based on supplier declarations. When making enquiries seek assurances from suppliers that oils are non-GE by traceability or IP (not by the inadequate standards of FSANZ.)
## Appendix 2. GE status of oilseed by source country

<table>
<thead>
<tr>
<th>Oil</th>
<th>Country</th>
<th>GE status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canola</td>
<td>Australia</td>
<td>IP non-GE available</td>
</tr>
<tr>
<td>Corn/ maize</td>
<td>Australia</td>
<td>Non-GE, GE, IP non-GE available</td>
</tr>
<tr>
<td></td>
<td>Canada and USA</td>
<td></td>
</tr>
<tr>
<td>Cottonseed</td>
<td>Australia</td>
<td>80% GE, Certified organic available</td>
</tr>
<tr>
<td></td>
<td>India, Turkey, USA, China</td>
<td>IP non-GE available</td>
</tr>
<tr>
<td></td>
<td>Europe, Africa</td>
<td></td>
</tr>
<tr>
<td></td>
<td>USA, China, India, Mexico</td>
<td>Mostly GE</td>
</tr>
<tr>
<td>Linseed</td>
<td>Australia</td>
<td>Non-GE</td>
</tr>
<tr>
<td>Olive</td>
<td>Australia</td>
<td>May contain GE vegetable oils</td>
</tr>
<tr>
<td></td>
<td>Non-GE</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Italy, Spain and Turkey</td>
<td></td>
</tr>
<tr>
<td>Peanut</td>
<td>Australia</td>
<td>Non-GE</td>
</tr>
<tr>
<td>Soy</td>
<td>Australia</td>
<td>99% GE</td>
</tr>
<tr>
<td></td>
<td>Argentina</td>
<td>Non GE, limited volume</td>
</tr>
<tr>
<td></td>
<td>Brazil</td>
<td>63% GE, IP non-GE available</td>
</tr>
<tr>
<td></td>
<td>Canada</td>
<td>63% GE</td>
</tr>
<tr>
<td></td>
<td>India</td>
<td>IP non-GE available</td>
</tr>
<tr>
<td></td>
<td>USA</td>
<td>91% GE, IP non-GE available</td>
</tr>
<tr>
<td></td>
<td>Paraguay</td>
<td>90% GE</td>
</tr>
<tr>
<td></td>
<td>Uruguay</td>
<td>100% GE</td>
</tr>
<tr>
<td>Safflower</td>
<td>Australia</td>
<td>Non-GE</td>
</tr>
<tr>
<td>Sunflower</td>
<td>Australia</td>
<td>Non-GE, volumes of certified organic also available</td>
</tr>
<tr>
<td></td>
<td>South America</td>
<td>Non GE</td>
</tr>
<tr>
<td>Vegetable</td>
<td>All</td>
<td>Mostly GE, non-GE available</td>
</tr>
<tr>
<td>Olive</td>
<td>All imports to Australia</td>
<td>Imports may contain GE canola oil</td>
</tr>
<tr>
<td>Sunflower</td>
<td>All</td>
<td>Non-GE</td>
</tr>
<tr>
<td>Peanut</td>
<td>All</td>
<td>Non GE</td>
</tr>
</tbody>
</table>

* Also see references in availability section by product

* Percentages are approximations from available data

## 13. Endnotes

i Newspoll House, 2006, “GM Food Labelling”


iv Stakeholder conversations, 2008, Greenpeace Australia Pacific


vi Ruth Holtzapffel, Hilary Johnson and Osman Mewett, for Australian Government Bureau of Rural Sciences, 2007, “GM oilseed crops and the Australian oilseed industry”

of Agricultural Food and Chemistry, 51: 4268-4272.


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