ANALYSIS OF BARLEYmax PRODUCT INFORMATION AND ADVERTISING

UPDATED VERSION V2

1 Introduction

BARLEYmax is a cereal developed by the CSIRO using the genetic manipulation technique of chemical mutagenesis employing sodium azide as the mutagen according to CSIRO patent 2002214804. The description at page 27 lines 5-10 describes mutagenesis of a particular barley variety using sodium azide, and then selection of variants with altered grain morphology. The varietal name *Himalaya 292* in the patent was later changed to BARLEYmax. A breakfast cereal where the main component is BARLEYmax is produced by Popina (Vic) Pty Ltd.

An authoritative review " Mutagenic Effects of Sodium Azide and its Application in Crop Improvement" published in *World Applied Science Journal 2009* states:

> Sodium azide is a chemical mutagen that creates point mutation in the genome of plants by producing metabolites and thus produced **protein** in mutant plant has a **different function** from the normal plant.

The Minimum Safety Data Sheet (MSDS) for sodium azide lists the chemical as "very toxic, hazardous and dangerous to the environment". However, it should be noted that the chemical is only used to create mutations, and the mutated crop and products made from the crop are free of the chemical.

2 The Claim that BARLEYmax is "Natural"

The Concise Oxford Dictionary defines "natural" as:

1. Existing in or by derived from nature; not made, caused by, or **processed** by humans.

A genetically manipulated organism made by the process of targeted chemical mutagenesis using sodium azide would not qualify as "natural" under this definition. Moreover, the CSIRO states in a letter 5th July 2011:

> BARLEY max has not been made by a transfer of gene or gene(s), but using the **process** of mutagenesis as part of non-GM breeding program.

In an ABC *Landline* program of 21st August 2011, Dr Andrew Jacobs of the Plant Genome Centre (ACPFG) states:

Traditional breeding certainly does mix up the genome a lot, which is not very controlled, and indeed there, you know, if we look at commercial varieties of wheat and **barley** today

that are out there in the field, many of them have got traits which have come through **processes** like mutagenesis, **chemical mutagenesis**, which **aren't very natural**.

The above mentioned review states " the **artificial** mutation is a practical mean to achieve genetic improvement in crop species..... ".

Another publication " Eighty Years of Scandinavian Barley Mutation Genetics and Breeding" published by the Nordic Genetic Resource Centre , Ainarp, Sweden states:

> Genetic diversity is an important feature in plant breeding and the breeder can use the **artificially** induced mutants [in relation to irradiation and chemical mutagenesis] for further improvement of his cultivars.

The dictionary defines "artificial" as:

1. Made as a copy of something natural. 2. Contrived or false.

In a letter dated the 19th August 2011, FSANZ has advised that:

> There is no legal provisions in the *Australian New Zealand Food Standards Code* relating to the use of descriptions such as natural; and
>
> It is, however, the response of manufacturers to ensure that labelling claims such as "natural" comply with national consumer law and are therefore not false, misleading or deceptive or likely to mislead or deceive the consumer.

It appears the Qld Department of Health, who are responsible for food labelling in this state, have no legally enforceable definition of "natural". Even if one existed, it is obvious it is not enforced. It is not difficult to find products which use "natural" either untruthfully, or deceptively:

> "W" brand sausages are "100% **natural** and use handmade **natural** casings". The list of ingredients includes preservative 223 (sulphur dioxide).
>
> "X" brand Shower Milk "uses simply the best ingredients from **nature**.....". Only two minor ingredients are natural, the remaining eight are synthetic chemicals
>
> "Y" brand Hand Cream is "Pure and **Natural,** and 95% of natural origin". Of the thirty ingredients, six are natural, most of the rest are derived from petroleum.
>
> "Z" brand salt-water chlorinator passes salt water through an electrode to form chlorine **naturally.** So all you need to do is occasionally add harmless salt to your pool in about the same concentration as a teardrop – or one seventh the concentration of salt in the sea.
>
> Pool Algicide **Nature 2** consists of a mixture of copper and zinc sulphates.

The absence of enforcement enables the unscrupulous to exploit consumers with impunity.

Toxic chemicals are capable of inducing mutations in other life forms, including humans, such as the deformities in Vietnamese children as a result of Agent Orange. Are they "natural"?

3 The Claim that BARLEYmax is Non-GMO.

The WHO definition of Genetically Modified Foods is:

> Genetically modified (GM) foods are foods derived from organisms whose genetic material (DNA) has been modified in a way that does not occur in nature, e.g. through the introduction of a gene from a different organism.

This does not exclude chemical mutagenesis, so under this definition, BARLEYmax would be considered a GMO.

However, the CSIRO can claim that BARLEYmax is Non-GMO because of an exemption (Gene Technology Regulations 2001 Schedule 1a Item 4) from GMO status for genetic manipulation by chemical mutagenesis was applied to the Gene Technology Act of 2000. Section 10 of the Act defines a GMO as:

> An organism that has been modified by gene technology [where] gene technology is defined as:
>
> A term covering **all laboratory** or industrial techniques used to alter the genetic material of organisms. These techniques assist organisms to produce **new substances to perform new functions**, for example **increased yields** of compounds already produced by the organism, form new compounds or allow organisms to adapt to adapt to drastically altered environments.

Under this act,, BARLEYmax would have been deemed a GMO.

However, Schedule 1 of the regulations states a Non-GMO is:

> A mutant organism in which the mutational event did not involve the introduction of any foreign nucleic acid (that is non-homologous DNA from another species).

The corollary to this is what a GMO **exclusively is:**

> A mutant organisation in which the mutational event **exclusively** involved the introduction of any foreign nucleic acid (that is non-homologour DNA from another species).

Both the *Gene Technology Act 2000* and *Gene Technology Regulations 2001* came into effect on June 21, 2001. This means the Government provided two competing definitions of what

is or isn't a GMO *simultaneously* – the Act being broad, and Schedule 1 of the Regulations restrictive. A package of legislation would not normally be expected to contain competing definitions, and one would normally expect a definition in an act to be unequivocal. The act itself also contains exemptions, but the regulations contain *additional* exemptions This begs the questions: why weren't all exemptions consolidated into the Act, and why didn't Schedule 1 of the regulations replace the Act in defining a GMO?

FSANZ has an explicit definition of a Genetically Modified Food in Division 1 of Standard 1.5.2., which mirrors the corollary of Schedule 1 of the Gene Technology Regulations:

> **A food produced using gene technology** means a food which has been derived or developed from an organism which has been **modified** by gene technology [wherein] **gene technology** means recombinant DNA techniques that alter the heritable genetic material of living cells or organisms.

Interestingly, the following Division 2 which relates to the **labelling** of food produced using gene technology, expands the definition of a **genetically modified food** [which}

> Means food that is, or contains as an ingredient, including a processing aid, a food produced by **gene technology** which:
>
> (a) Contains novel DNA and/**or novel protein;** or
> (b) has **altered characteristics**

The "ors" are superfluous, and render Division 2 ambiguous because the definition of Gene Technology under Division 1 exclusively confines a GMO to intragenic transfer (recombinant DNA), and makes no provision for the add-ons of novel protein or altered characteristics.

In any case, the direct consequence of the exemption was that the CSIRO was obliged to claim that BARLEYmax is "natural", which is untrue. Had the CSIRO claimed that BARLEYmax is Non-GMO and unnatural (the truth), consumers would have asked "what does that mean?". This would have forced the CSIRO to reveal that BARLEYmax was made by chemical mutagenesis with sodium azide. This could be expected to have a detrimental effect on sales, especially to consumers who actually want to eat "natural" food. In particular, BARLEYmax is available in health food shops where discriminating customers expect to trust the description "natural".

4 The Claim that BARLEYmax was produced by Traditional Breeding

Traditional Breeding (also known as conventional breeding, standard breeding and conventional biotechnology) is an umbrella term which includes cross breeding (which has been practiced for millennia), as well as modern sophisticated genetic manipulation techniques carried out in the laboratory such as chemical mutagenesis.

As the CRIRO correctly notes in its letter of the 29th July 2011, the chemical mutagenesis component of "traditional breeding" has been in plant breeding text books for 60 years. The term is also used in plant genetics scientific literature, and is employed by regulators, government departments and advisory boards, agricultural bodies, biotech companies and others. However, the public has been obfuscated into thinking it means cross breeding. For example, the deception succeeded in fooling the "Travelling Dietitian", who, in a glowing report of BARLEYmax on her website, claimed that "BARLEYmax, a non-GMO **cross bred strain of barley** is all **natural .....** Most of the public would be unaware of techniques such as chemical mutagenesis, and the attached survey shows only 16% think chemical mutagenesis qualifies as "traditional breeding". It is possible even this low figure includes GM enthusiasts who would not answer the question objectively.

The history of chemical mutagenesis applied to Barley is described in the abovementioned Scandinavian paper:

> Already in the mid-1940's, chemical mutagenesis started to be included in experiments together with irradiation.....The real work on chemical mutagenesis in crop plants began with the effects of mustard gas followed by many different compounds such as various alkylating and oxidising agents, epoxides, epimines, purines, organic sulphates, and sulphonates, nitroso compounds, purine and acridine derivatives and many others.

Consumers of BARLEYmax might be very interested to learn that the "tradition" of chemical mutagenesis applied to barley began by gassing barley embryo with mustard gas, the notorious vesicant of WW1, and this process is "natural". The "tradition" was then handed down to succession of "breeders" who employed a range of noxious and dangerous chemicals for their "breeding" experiments.

The most disturbing aspect of this deception is that it has been used as a reference for an outright untruth - that all GM food, including that made by intragenic transfer is "safe".

Michael Specter in his book *Denialism:*

> The National Academy of Sciences and the United Kingdom's Genetically Modified Science Review Panel, amongst many other scientific organisations have concluded repeatedly that the process of adding genes to our food by genetic engineering is **just as safe as conventional breeding.**

Culminating in an epidemic in 1989, a toxin in the food supplement L-tryptophan made from a genetically modified yeast by the Japanese company Showa Denko K.K. killed over a hundred people and disabled thousands. The disaster has been dubbed the thalidomide of GM. The dictionary defines "food" as *any nutritious substance that people or animals eat or drink or that plants absorbs in order to maintain life or growth.* It is reasonable to include a

food supplement in this definition. While the L-tryptophan itself is not GM, the process that produced it involved a GM organism.

Given the above statement, the onus is on these esteemed bodies to cite scientific literature where food produced by conventional breeding has also killed people. If they can, we are reassured that such food is "safe". If they can't, they haven't told the truth.

The EU made a similar statement which was referred to in the draft *Australian Food Plan* of 2012:

> However, in the 2010 European Commission report analysing EU funded genetically organism (GMO) research, the report concluded that biotechnology and in particular GMOs were not intrinsically more risky than **conventional plant breeding** techniques (EU2010). This was based on more than 130 research projects covering a period of more than 25 years involving more than 500 independent research groups.

In 2005, the CSIRO abandoned a ten year research program into a GM pea (made by intragenic transfer of a gene from a kidney bean) and destroyed a 12 ton crop because it caused inflammation in the lungs of rats, and affected their immune systems. The architects of the National Food plan would have been aware of this.

The Governments Review of Food Labelling Law and Policy 2011 includes a citation of a 2007 Australian Academy of Science statement on gene technology and GM plants:

> There is no evidence that consumption of either irradiated food or GM food produces any immediate detrimental effects in humans, nor has any convincing evidence been advanced to indicate potential future harm to humans. The Australian Academy of Science concluded in 2007 the "GM products have been in several food for many years and consumed without any substantial evidence of ill effects on health.

Given the L-tryptophan disaster, both statements are untrue.

5 BARLEYmax is not "novel"

In a letter dated the 5th July 2011, the CSIRO states:

> CSIRO has reviewed the product with FSANZ and it was not deemed to be considered a novel food.

In answer to my question:

> How does one patent something which is "not deemed to be a novel food", given that the Patent Office requires an inventive step in order to grant a patent?

To which the CRIRO replied:

> There is a difference between the concept of "novelty" (as applied in patent law) and "novel" (as applied in the Food Standards Australia New Zealand FSANZ).

Yet the Popina Pty Ltd packet states:

> BARLEYmax is a **unique** new type of Barley with enhanced nutritional benefits developed by CSIRO as part of its ongoing grains research program.

The dictionary defines "novel" as *interestingly new or **unusua**l*; whereas "unique" is *1 Being the only one of its kind; unlike anything else; 2 Special or **unusual**.* Thus BARLEY max is both unusual and not unusual. This amounts to Orwellian double speak.

6 Conclusion

The Roy Morgan Research survey (note: "traditional breeding is not on the Popina packet, but appears as "standard breeding" on the CSIRO advertisement "The BARLEYmax Story") shows a very significant disconnect between the BARLEYmax terms and what the public understands by these terms. However, the GM deception is not confined to these terms. The pro-GM establishment has invented a mutant vocabulary of euphemisms, evasions, and, the favourite trick of all, to sneak GM into generalisations. A few examples are: Bill Gates-speak for GM seeds is "new seeds"; Monsanto refers to "biotechnology products" and avoids GM completely in its website; genetic technologists are "plant scientists"; GM is "agricultural research" , the QUT "Centre for Tropical Crops and Biocommodities" is involved in GM banana research, BARLEYmax was developed by the CSIRO Division of "Food and Nutritional Studies" and so on. While these are not directly relevant to food labelling, they illustrate an institutionalised systemic deceit of which labelling is a subset.

It seems "GM" is a pariah term which must be avoided wherever possible. Norman Bradsick, president of Asgrow Seed Co., a Monsanto subsidiary:

> If you put a label on genetically engineered food, you might as well put a skull and crossbones on it.

GM Food Survey

Please read first:

Some foods are produced from crops which have been developed by inducing a mutation in a natural plant. The mutation has been induced in a laboratory using a chemical, sodium azide. The mutated crops developed this way have a different genetic composition to the original crops. The mutated crops are free of the chemical that induced the mutation.

We are interested in how you believe food produced from crops like this should be labelled, when sold in shops, supermarkets etc.

1. Do you think food made from a crop like this should be labelled "natural"?

Yes
No
Unsure / Can't say

2. Do you think food made from a crop like this should be labelled "made by traditional breeding"?

Yes
No
Unsure / Can't say

3. Do you think food made from a crop like this should be labelled "Non-GMO" (or non-Genetically Modified Organism)?

Yes
No
Unsure / Can't say