



TASMANIAN ALKALOIDS PTY. LTD.

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Friday April 26, 2019

The Hon Guy Barnett MP
Minister for Primary Industries and Water
GMO Moratorium Review
GPO Box 44
Hobart TAS 7001

Submission by email: GMOMoratoriumReview@dpipwe.tas.gov.au

Dear Minister:

RE: GMO Moratorium Review.

Tasmanian Alkaloids Pty Ltd welcomes this opportunity to contribute to the Tasmanian Government's GMO Moratorium Review. We trust that our submission contributes in a positive manner to the collective understanding of GMOs as they are perceived in Tasmania and commend the following information to you for your consideration.

Tasmanian Alkaloids Pty Ltd continues to enjoy exemption under the current moratorium relating to GMOs in Tasmania. If the current moratorium were to be extended in its current form, Tasmanian Alkaloids could (and would) continue to operate under its auspices without any adverse effect on its current Tasmanian operations.

As a major contributor to the Tasmanian economy and a manufacturer of around 25% per cent of the world's natural opiate requirement, the company is well-placed to contribute to the collected knowledge surrounding GMOs as they apply to the cultivation of poppies and the subsequent potential for improved yields and stronger economic returns to the State's agriculture sector; as well as the Tasmanian and national economies.

It is on this basis that Tasmanian Alkaloids submits the following considerations:

1. Since the 1980's Tasmanian Alkaloids has developed poppy strains that have resulted in higher yields of active compounds and better returns to growers. While the company will continue to explore new ways to improve yields and propagate better poppies for the opiate industry using conventional plant breeding technologies, GMOs represent an opportunity for Tasmanian Alkaloids (and others) to lead the way in the improvement of medicinal opiates. We base this opinion on extensive research and development conducted by Tasmanian Alkaloids and others who are of the view that GM technologies could lead to increases in alkaloid production in the order of 20+ percent. This is compared with current results of three to five percent, which are achieved (on average) on a one-to-three-year basis from conventional plant breeding. In addition to increases in alkaloid yield, GM technologies have the potential to offers reductions in pesticide usage, specific disease resistance and other traits, which could assist the Tasmanian poppy industry maintain its standing and international competitiveness.
2. Under the current moratorium, poppies and any associated research and development enjoy an exemption. However, permits and licenses are still required, which represents a significant burden on company resources. Thus, the moratorium, in its current form, still represents an impediment to the commercialisation of GMOs should Tasmanian Alkaloids wish to pursue this option.

3. A central issue affecting GMOs in the Tasmanian context, which the 2013 Moratorium Review identified, is one of social license. In general terms, there is a reluctance by the general public to acknowledge the existence of GM products in Tasmania, or the potential for GMO and non-GMO production systems to coexist within the state. There is a perception that the Tasmanian Government's moratorium means there are no GMOs and/or GM products in the state. This, of course, fails to acknowledge that supermarket shelves carry many lines that contain GM products. It further fails to acknowledge that most Insulin used by diabetics is a GM pharmaceutical that benefits many Tasmanians on a daily basis.

As is evident by a number of responses to the 2013 Review, there exists wide-spread mistrust and a plethora of misinformation surrounding GM technology, its place, its risks, and its commercial application. Clearly GMOs are an emotive issue. GMOs attract a wide-spread objection to these, often, benign technologies, with little or no consideration given to the co-existence of GM and non-GM commercial production in Tasmania. Few, if any of these objections are evidence or data based. They are, instead, much maligned and rely on an emotional argument; and a perception that if GMOs are allowed into the state then Tasmania's perceived "clean, green" status will cease to exist. Further, it appears that there is no economic or fact-based support for this assertion in the responses to the 2013 Review.

4. There is also a need for leadership in the area of identifying the differences between gene editing as opposed to gene transfer and transformation technologies. The latter is covered by the current moratorium, whereas gene editing technologies may not be regulated by the Office of the Gene Technology Regulator and will thus fall outside GM legislation. Editing genes, can take on many forms, one of which is gene transfer. This includes the transfer of genetic material from 'exotic' species into a target organism. It is this science that most people associate with GMOs. However, more recently, gene editing using a range of molecular tools such as Crispr-Cas9 have added a new, less intrusive dynamic to gene technologies. Crispr-Cas9 uses a guide molecule (Crispr) to find a specific region in an organism's genetic code, for instance a mutated gene, which is then spliced by the enzyme, Cas9. In nature, when a cell attempts to resolve an issue with a damaged cell, it is often unsuccessful and, ultimately, renders the gene ineffective. While this might be useful to 'turn off' harmful genes, it is nonetheless altering the organism in an unintended way. However, by using Crispr-Cas9 gene editing technologies, repairing damaged genes becomes a possibility. For example, to repair a damaged or faulty gene, it is possible to remove the mutated or damaged DNA and replace it with a healthy strand of DNA that is injected alongside the Crispr-Cas9 molecules. Depending on the application, different enzymes can be employed, such as Cpf1, which may help to edit the DNA more effectively.
5. Given the current level of the debate and community mistrust surrounding GM technology and GMOs, it is understandable that the Tasmanian Government will continue the Moratorium. While such a decision will not directly impact Tasmanian Alkaloids, the company contends that the introduction of a robust regulatory regime and a requirement that only suitably qualified and secure entities are permitted to conduct GMO-related R&D could, potentially, attract investment and scientific research programmes to Tasmania. Much as the University of Tasmania has conducted its GM research successfully over many years, maintaining a general moratorium with exemptions for suitably qualified institutions and/or organisations, could prove to be advantageous to Tasmania.
6. Commercial GMO research and development programmes may typically require an investment of \$5 million to \$10 million. Programmes also involve a commitment of

between five to ten years from the beginning of a programme to the successful commercialisation of. This type of commitment in time and financial commitment is in its self a barrier to entry to all but the most robust of institutions and commercial entities. This is something that should be taken into consideration when the Tasmanian Government decides on the form any future GMO Moratorium promulgated for Tasmania.

7. As of the date of this submission, Tasmanian Alkaloids has no intention to pursue commercialisation of GMOs. That said, should the Tasmanian Government consider that this submission has merit; and that research and development of GM technologies offered the state a scientific and financial advantage, the company would consider developing programmes and protocols to further commercialise existing capabilities. GM technologies represent a very effective tool for the study of gene function in plants leading to potential efficiencies in conventional plant breeding and other areas of research. In the immediate future, until such time as there is a change to the current moratorium, Tasmanian Alkaloids will, in collaboration with appropriate partners such as the University of Tasmania, continue to explore GM technology opportunities strictly for research and development purposes.

In conclusion, Tasmanian Alkaloids is of the opinion that there is a significant opportunity for the Tasmanian Government to demonstrate a strong leadership role in raising the level of awareness regarding the significant benefits offered by GMOs when they are subject to development in a well-regulated and controlled environment. Only government can successfully facilitate open discussion amongst stakeholder groups, implement educational opportunities, and increase awareness of options for the co-existence of GMO and non-GMO production. While other jurisdictions are now, and will continue to, exploit GMO opportunities; and while the Tasmanian Government has the capability to successfully regulate GMO research and development, Tasmanian Alkaloids is of the opinion that it could consider doing so. Not only will this offer significant opportunities to the scientific, academic, and research sectors; but the agriculture sector and the Tasmania's economy could also benefit.



Doug Blackaby
CEO, Tasmanian Alkaloids Pty Ltd