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Gene Technology Bill Submission

Greenpeace Aotearoa

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Introduction

In the early 2000s, the GE Free NZ movement successfully fended off the release of Genetically Engineered organisms into our food and the environment. We insisted on a precautionary approach to the new technology and advocated for a vision of organic and sustainable food production.

Since then, Aotearoa New Zealand has effectively been free of genetically modified organisms in the environment. Our strict regulations have prevented the contamination of nature and food ever since and our GE Free producer status is of great economic value to our food producers.

Greenpeace Aotearoa supports the precautionary approach in regard to the use of GMOs in Aotearoa. It has served us well to keep GMOs out of the environment. If the use of gene technologies is permitted outside of approved containment facilities and deregulated to the extent proposed in this Bill, the health of our people and the environment is put at unacceptable risk.

The proposed Gene Technology Bill creates exempt and non-notifiable categories, in essence defining some products of modern gene technologies as non-GMOs (not regulated organisms) and not requiring verification that they meet exemption criteria or a risk assessment before release. It would allow the Regulator to determine whether *any* organism, or *any* technique is a gene technology and hence regulated or exempt (Clause 12(1)). An additional trigger for the 'exempt' organisms are those that "cannot be distinguished from organisms [...] created through conventional processes" (Clause 163 (2) (a)). This constitutes an extremely broad scope and would increase the risk of human health, environmental, or socioeconomic adverse effects.

Among the countries that chose to deregulate some aspects of genome editing, none have introduced regulations as permissive as the ones in the Bill. Some countries restrict the range of organisms (e.g. to only plants), methods (e.g. only allow SDN1, which do not involve nucleic acid templates), limit the number of modifications per gene in specified plant species, and/or require characterisation in containment

before release¹. All of these restrictions provide a certain level of risk mitigation, something that is completely lacking in the proposed Bill.

Most non-medical GMOs used outside or in contained fermentors, are plants which have benefited from verification of their modifications and risk assessments before release. Experience with the full range of categories of organisms (non-crop plants, animals, fungi, microbes, viruses) that are exempted under the proposed legislation is lacking. Prior experience does not provide confidence that even if the use of some gene technology produced outcomes indistinguishable from conventional processes, these outcomes would be of acceptable risk. Most countries granting exemptions limit them to plants, or even specific plant species, and/or, in some cases, animals, limiting their exposure to risk.

Genome editing techniques vastly increase the efficiency of change to an organism's traits or functions compared to conventional breeding techniques (see Table 1 of INBI submission). However, as with every technique, there are alternative outcomes. With current techniques, multiple unintended changes in the same genome occur regularly. These are also specific and more efficiently made using gene technology than would occur through conventional processes.

It is even possible to make further changes either sequentially or in parallel (multiplex), which creates the opportunity for a combination of mutations all but impossible by conventional breeding or a plethora of unintended mutations to unrelated genes (Koller and Cieslack, 2023 <https://doi.org/10.3389/fbioe.2023.1276226>). The current Bill does not exclude these multiplex or serial applications, risking the production of unregulated organisms that, were they produced in one step or by other techniques, would be regulated.

Requiring the characterisation of an organism in containment before release and a full risk assessment helps to “weed out” those organisms with unintended and possibly hazardous new traits. This is only possible if all development occurs in registered containment facilities.

By exempting certain processes from regulation, contained development is also not required, and modifications can be done anywhere by anyone, for example, directly

¹ For a comprehensive summary, see the Submission from INBI. <https://hdl.handle.net/10092/107966>

in a field by spraying plants from a plane. While touted as surgical and precise (Zheng et al., 2024 <https://doi.org/10.1038/s41392-024-01750-2>), these techniques create a plethora of different genetic changes (Heinemann et al., 2021 <https://doi.org/10.1525/elementa.2021.00086>). These may be intended or unintended, predicted or not, and can occur in the targeted species or any other organism (including taonga species) exposed at that time (Hoepers et al., 2024 <https://doi.org/10.1016/j.ecoenv.2024.116707>). Even small changes of a single nucleotide in a genome can lead to new traits². Trait changes to these non-target organisms can't be predicted or reversed. There is no way of limiting or identifying which organisms have been exposed.

A real-world example of what could occur is already seen in the USA. Biotech kits that allow for the modification of yeast in classrooms or even in the homes of students are readily available for sale (McDonnell et al., 2022 doi: [10.1128/jmbe.00321-21](https://doi.org/10.1128/jmbe.00321-21)). It can not be expected that all resulting organisms will be disposed of in a safe manner, and releases into the environment are inevitable. Aotearoa has seen numerous incidences where environmental releases have led to detrimental outcomes (calicivirus, gorse, possums), and this is not something we should be aiming to repeat.

Hazard vs Risk

The explanatory note of the Bill states that “exempt activities [are those with] minimal-risk products of gene editing, for example, products of editing techniques that result in organisms that cannot be distinguished from those produced by conventional processes”.

Indistinguishable from conventional breeding implies a focus on a potential hazard (the potential to cause harm), i.e. ‘it’s no worse than conventionally bred’. There are several concerns with this approach. First, most organisms on Earth have never been bred using “conventional processes” or any other kind of planned breeding process, and we therefore have no knowledge of what may be distinguishable from these processes or not. Second, just because an organism has been altered by conventional breeding does not guarantee that it is safe or desirable. For example, a plant could be produced by conventional breeding which causes more allergies in

² For example, a single change in the *gyrA* gene of *E. coli* can make the organism resistant to the critical last resort antibiotic ciprofloxacin (Shariati et al., 2022 doi: [10.3389/fpubh.2022.1025633](https://doi.org/10.3389/fpubh.2022.1025633)).

people consuming it. This point was also made by a court in the USA which removed the phrase “indistinguishable from conventional breeding” as the legal standard used to exempt organisms from a risk assessment (United States District Court Northern District of California, Case No 21-cv-05695-JD, document 81 (2024)). This is because the phrase does not imply that conventional breeding produces organisms of acceptable risk, therefore making harmful organisms using different methods is also deemed not acceptable. Only Australia has regulations approximately in line with the proposed Bill, however as discussed above, they are still less extreme than those proposed here. And lastly, ‘indistinguishable from conventional breeding’ does not take into account that risk (probability of the hazard occurring) is highly context specific. While a hazard might be the same, the efficiency of new genome technologies could result in the unmonitored release of a large number of newly altered organisms creating a much higher risk of exposure to that hazard.

Economic Considerations

As proposed, the tiered system that exempts or deems non-notifiable certain activities or products of genome technologies can still cause harm to Aotearoa’s economic standing and opens the door to trade disruptions and disputes. These could for example be the rejection of shipments due to contaminations with exempt (but unknown and unauthorised) organisms detected at the destination. Many countries have a zero tolerance for unidentified (or unregistered) organisms detected through unknown genome changes. With detection methods steadily improving, these disruptions likely will increase over time.

GMOs are a block to climate action

The dairy industry has long used the false promise of gene technology to delay action to reduce methane emissions. The dairy industry is New Zealand’s worst climate polluter and as-yet unproven genetically engineered methane inhibitors will not solve that problem.

The problem is simple, and the solution is simple too. New Zealand has way too many cows, fed with imported feed like rainforest-destroying palm kernel and grass grown with vast quantities of synthetic nitrogen fertiliser.

The solution is to significantly reduce cow numbers, end the use of palm kernel and phase out synthetic nitrogen fertiliser. These are things we know will substantially reduce climate pollution.

But instead of taking measures that actually work to cut emissions, agribusiness tells us that magical GE solutions, that are always on the horizon, will solve the climate problem.

Te Tiriti and te ao Māori

The Bill marginalises Māori as it does the public and wider community.

The Bill is inconsistent with the Crown's responsibility to protect Māori interests in relation to indigenous flora and fauna, cultural knowledge, and practices. It would further undermine Te Tiriti o Waitangi by limiting Māori input and decision-making power regarding resources and taonga over which they hold rangatiratanga.

[E]xempt organisms include [Section 163 (4) (c)] *those as specified in Schedule 1 and 1A of the Australian Gene Technology Regulations 2001.*

It's a matter of sovereignty to not rely on a Schedule that could be altered by the Australian government without consultation or even notification.

Recommendations

Greenpeace Aotearoa opposes the Gene Technology Bill and recommends it be rejected in its entirety.