

AGBIZ ATTENDS 4th SUSTAINABLE BIO-INNOVATION SYMPOSIUM

Background

Biosafety South Africa hosted its fourth sustainable bio-innovation symposium at Diep in die Berg in Pretoria on the 28th of September 2023. The symposium was well attended by academics, scientists, industry representatives and members of the media. The purpose of the symposium was to provide a platform for all stakeholders to discuss the prerequisites for a sustainable genome editing (GE) innovation system in South Africa.

Bio-innovation is crucial for coping with the challenges posed by climate change, as well as environmental and economic sustainability. More and more, we are experiencing crop failures caused by extreme storms, drought and heat waves that threaten the food security of a growing global population. Gene editing has various applications. With gene editing it is possible to change the genetic code of an organism's own DNA – no foreign DNA is introduced. Natural mutations occur constantly in nature. The types of genetic changes that are introduced using genome editing, do not differ from those which occur naturally and are exploited through traditional breeding and mutation breeding. With this technology, genes from a plant can be accurately edited to increase, decrease, or alter gene expression. In this way plants can be made drought- and pest resistant and higher yields and better nutritional value can be ensured. Gene editing could therefore potentially provide new solutions to the food and nutritional insecurity that the world faces.

Gene editing holds potential benefits not only for agriculture, but also for human health.

Presentations made at the symposium

There were three sessions at the symposium, dealing respectively with genome editing regulation, genome editing in practice and genome editing innovation management. All the sessions were highly informative. The session on genome editing practice was quite technical and offered presentations from various academics and practitioners and focussed mainly on the CRISPR technology. The abbreviation CRISPR stands for Clustered Regularly Interspaced Short Palindromic Repeats - the main technology scientists use to selectively edit the DNA of living organisms.

On the subject of regulation there was a very insightful presentation by Dr. Roy B. Mugiira, the chief executive officer of the National Biosafety Authority in Kenya. Dr Mugiira said that Kenya was

committed to the global governance of modern biotechnology and biodiversity conservation. Kenya has a well-established national biosafety framework. The National Biosafety Authority is in regular consultation with other national regulatory agencies responsible for health, plant health, veterinary services, pest control and environmental management in Kenya. They follow a biosafety approval process that consists of screening, technical review and then a decision-making process. They have drafted genome editing guidelines aimed at providing a technical guidance to applicants on the criteria for determining which genome editing organisms are regulated under their Biosafety Act and which are not.

Dr Mugiira said that the desired regulatory framework should be:

- Consistent and risk proportionate.
- Science-based.
- Globally harmonized.
- Done on a case-by-case basis.

Dr Hennie Groenewald from Biosafety South Africa presented a risk-based argument for distinguishing between so-called SDN-1/2 organisms and GMOs. Dr Groenewald explained the nature of genetic variation and the various types of modification of genes, and he made a strong argument why a product-based trigger makes sense from a risk perspective. He put forward a fit-for-purpose governance framework for new breeding techniques (NBT's) and genome editing, similar to those implemented by multiple other countries.

Dr Magdeleen Cilliers from SANSOR presented on "Gene editing and the Seed Industry". She argued that plant breeding has contributed greatly to agricultural productivity in the past. However, yield gain was slowing, whilst the pace of change in the environment and pest pressures are increasing. An annual yield gain of 2.4% is required to meet food needs in 2050. Dr Cilliers pointed out that the cost of putting a GMO product on the market in South Africa was prohibitive (around R 200 million). She also explained that the seed industry is a global industry with different stages of development of a new variety in different countries. Regulation and compliance will become very complicated when the same seed is considered non-GMO in certain countries but subject to the GMO regulatory framework in other countries. An exit system from the GMO Act was sorely needed where products can be classified as a non-GMO if no foreign DNA has been added. Dr Cilliers argued for a "sui generis"/fit for purpose system for genome editing in South Africa. She pointed out, that in the absence of such a system, the likely consequences for South Africa include the following:

- Seed Production contracts will go to different countries with resulting job-losses.
- The seed industry and agriculture in general will not be competitive.
- Innovation will move offshore.
- SA farmers will not have access to latest varieties.

- Seed and food production will be more cumbersome, resulting in shortages and increased food costs.

Conclusion

The symposium clearly illustrated that South Africa is falling behind when it comes to genome editing innovation. There is much to learn from Kenya and other countries on how to regulate genome editing in a risk-appropriate way. If we want to be proactive in dealing with climate change and food security and remain internationally competitive as a country, we need a fit-for-purpose, process-based regulatory system for genome editing.

By Annelize Crosby