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Genome Edited Crops kept off GM Rule

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Genome edited crops: Genome editing works by using enzymes to cut DNA at specific points. This method can be used to add, delete or replace sections of DNA. Changes introduced by genome editing can be identical to those occurring naturally or achieved through traditional breeding but can be made more quickly and precisely. Genome editing could be tremendously useful in agriculture. It can be used to silence undesirable genes in crops, such as the genes responsible for browning in mushrooms, and to alter the behavior of other genes, e.g. causing an increase in fruit size or yield, or stimulating the production of useful natural products.

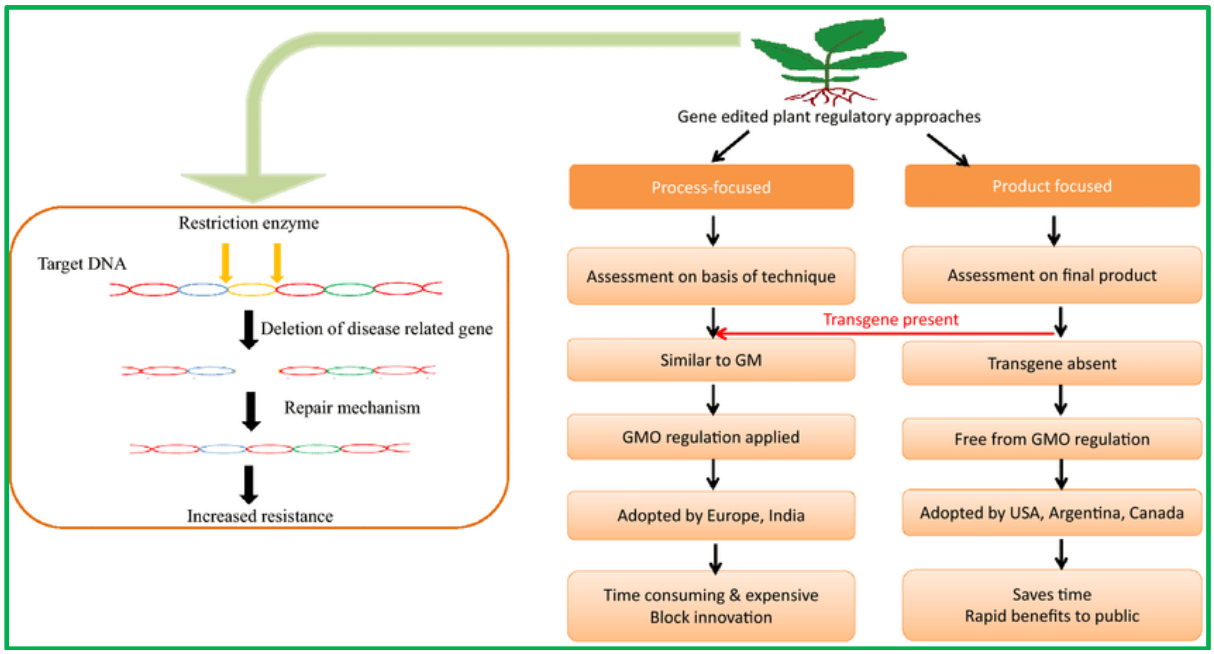
Purpose of genome editing: Genome editing, also called gene editing, is an area of research seeking to modify genes of living organisms to improve our understanding of gene function and develop ways to use it to treat genetic or acquired diseases.

Regulatory concepts for GE crop: Many countries have implemented different types of GMO regulatory approval systems, before environmental release and utilization of GMOs. Here, the major concerns are the assessment of human safety and environmental risk. Broadly, two diferent regulatory approaches are adopted by diferent countries mentioned as product based and process-based regulations.

Product-based regulation: In this regulation, the health, and environmental risk should be assessed based on the fnal product rather than the process used to generate the fnal product. It seems to be closer Molecular Biology Reports 1 3 to conventional breeding than genetic modifcations. Canada is the paradigmatic case for this regulatory framework, where any "plant with a novel trait" has been considered for risk assessment. The inserted trait must be novel to the environment, considered to impact how the plant is used, and efects associated with health or environmental safety. Similarly, the USA and Argentina have adopted the same approach for risk analysis and regulation of edited crops.

Process-based regulation: The techniques used for the generation of a product are assessed for risk analysis via reviewing the procedure, not the products in the process-based regulatory system. In 2018, the European Union, Court of Justice (ECJ) ordered that all genome-edited organisms ought to be categorized as GMO. Thus, GMO is subjected to substantial regulatory burdens under the EU GMO Directive But, the chemical and radiation mutagenesis techniques are exempted from the EU GMO Directive due to a history of safe use [5]. Similarly,, New Zealand also regulates genome editing technique with similar GM biosafety rules. This is a precautionary approach that also helps in endorsing public confidence in genome editing technology. Thus, crops with genetic modification procedures are subjected

to the same/similar regulatory reviews in these countries. But, this procedure has also become an obstacle to innovations in the area of plant breeding



Central govt exempts genome-edited crops from stringent GM regulations:

Genome editing was discovered back in 2012, but Indian regulators took a decade to realise its potential for developing nutritionally superior crops resistant to biotic and abiotic stresses.

In a far reaching move, the Central government has for the first time issued an order exempting certain types of genome edited crops from the stringent regulations applicable on genetically modified or GM crop thus giving a big boost to their further research and development.

The ministry of environment and forest in an order issued today exempted SDN1 and SDN2 genome edited plants from Rules 7-11 of the Environment Protect Act (EPA) for manufacture, use or import or export and storage of hazardous microorganisms or genetically engineered organisms or cells rules-1989.

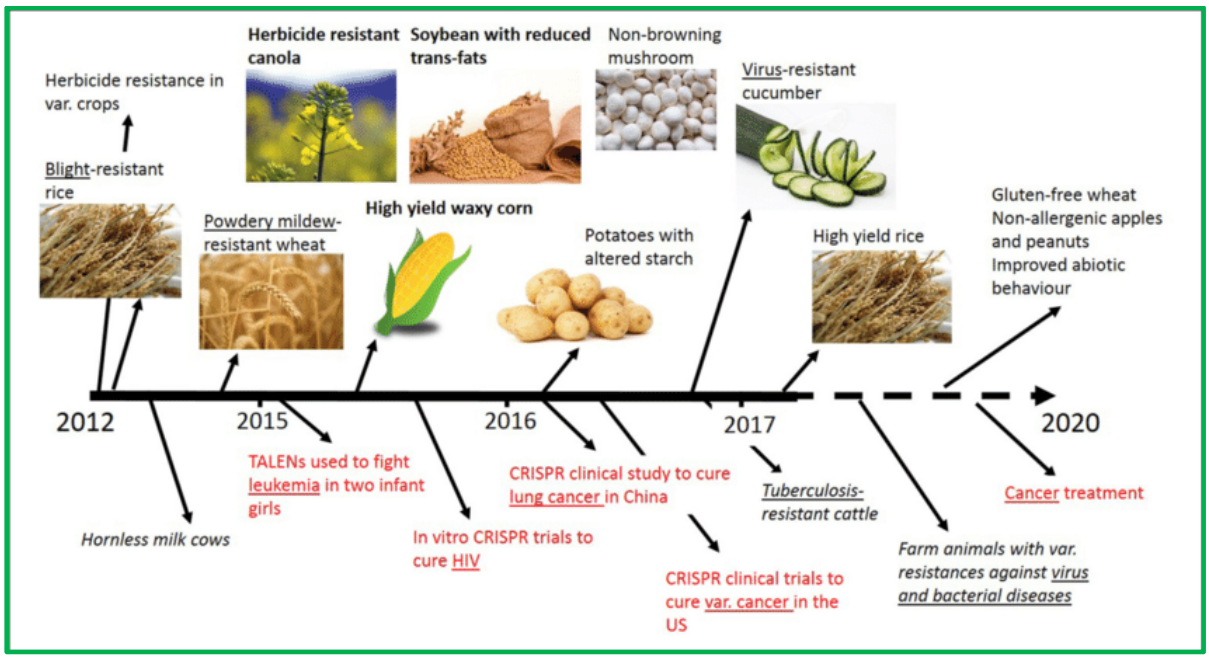
"The notification would pave a path for the government to approve and notify the guidelines on genome edited plants pending since early 2020," Bhagirath Choudhary, Founder Director of the South Asia Biotechnology Centre (SABC) said.

In the recent past, many countries have either developed or approved for commercial cultivation of vegetables, fruits, oilseeds and cereals developed through genome editing such as Gamma-aminobutyric acid or GABA tomato, high oleic canola and soybean, non-browning mushroom etc.

Recently, China too approved guidelines for genome editing that will spur research into crops that have high yields and are resistant to pests and climate change.

Genome editing or gene editing was discovered back in 2012, but Indian regulators took nearly a decade to comprehend its potential for developing crops resistant to biotic and abiotic stresses and with nutritional superiority.

"The current notification exempting some categories of genome-edited plants from cumbersome regulations will incentivize breeders and researchers to harness the power of genome editing for the welfare of the farming community.



Timeline of selected traits modified by genome editing in plants

Conclusion

The various potential products of GM crop carry the promise to contribute to solving many of the great challenges of the twenty-first century, from medical and health issues to food and agricultural production. This may certainly be one of the reasons why the 2020 Nobel prize in Chemistry was awarded to Emmanuelle Charpentier and Jennifer Doudna for their discovery and development of one of the most popular GEd tools; CRISPR-Cas. Regulatory policy cannot keep pace with the fast-moving scientific advances. To name just some of the challenges: the speed at which new technologies are being developed, new technologies not fitting into old regulatory definitions and paradigms, difficulties with international coordination, lack of harmonized definitions and laws, lack of public understanding and trust, lack of regulatory certainty for developers, lack of political will, and regulatory policies taking longer to put in place than the uptake of breakthroughs in the global scientific community. Regulatory and policy officials are frequently tasked with the sometimes conflicting goals of ensuring public and environmental safety while addressing public perception and expectations and doing so without slowing down innovation.

The common conclusions in these opinions include imposing regulatory scrutiny based on the documented risks of the product, rather than on the process used to breed them, and that many products of GM may not warrant additional regulation beyond those required for conventional plants, especially if they could have been generated using 'conventional' methods of breeding.