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Report Highlights:

Singapore does not have any domestic commercial production of plant biotechnology. As of October 2019, a total of 41 genetically engineered (GE) plant products have been approved for use as food or food ingredients in the country (an increase of six compared to the previous year). In April 2019, the Singapore Food Agency replaced the Agri-Food and Veterinary Authority as the national body that determines the final regulatory approval of products containing GE materials for use in the country.

EXECUTIVE SUMMARY

Plant biotechnology product development in Singapore is minimal and has been limited to just one unfinished project to date. There is no commercial production of genetically engineered (GE) plants in the country.

Singapore is a large importer of processed food products, many of which (e.g. corn syrup, soybean oil, etc.) may have been derived from GE crops. In 2018, Singapore imported over \$6.9 billion in consumer-oriented food and beverage products with the top suppliers being Malaysia, Australia and the United States. As of October 2019, a total of 41 GE plant products have been approved for use as food or food ingredients in the country (an increase of six compared to the same time the previous year).

The Singapore Food Agency (SFA) has replaced the Agri-Food and Veterinary Authority (AVA) as the national body that regulates GE crop market access in Singapore. This occurred in April 2019, when AVA was restructured into two separate agencies: SFA, which now exclusively manages food security and food safety matters, and the Animal Veterinarian Services, which manages all non-food plant and animal matters. The multi-agency Genetic Modification Advisory Committee (GMAC) was established under the country's Ministry of Trade and Industry in 1999 to provide science-based advice on research, development, production, release, use, and handling of GE events in Singapore. Developers who wish to gain market access for GE products in Singapore must first submit a proposal to GMAC for a safety evaluation. SFA then considers GMAC's recommendations (and may conduct further safety evaluation) before making an official regulatory decision.

Currently, Singapore does not have any specific guidelines on the labeling of GE products. As a member of the Codex Committee on Food Labeling (CCFL), Singapore closely monitors international developments and collaborates with other CCFL members on acceptable GE food labeling guidelines.

Singapore's animal biotechnology development is limited to research activities in fish hatchery technology. There is no commercial animal biotechnology production in the country.

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CHAPTER 1: PLANT BIOTECHNOLOGY

PART A: PRODUCTION AND TRADE

a) PRODUCT DEVELOPMENT:

Plant biotechnology product development in Singapore is minimal and has been limited to just one unfinished project to date.

In 2015, the Singapore Agri-Food and Veterinary Authority (AVA) granted approval for a local company, JOil (S) Pte. Ltd, to conduct small scale field trials for genetically engineered (GE) *Jatropha* kernels with high oleic acid content for the biofuels industry. Industry contacts report the field trials are still ongoing.

b) COMMERCIAL PRODUCTION:

There is no commercial production of GE plants in Singapore.

c) EXPORTS:

Singapore does not export any GE crops.

d) IMPORTS:

Singapore's imports of GE agricultural products in bulk form are negligible, as the local livestock industry is insignificant. However, the country is a large importer of processed food products, many of which (e.g. corn syrup, soybean oil, etc.) may have been derived from GE crops. Data on the exact percentage of imports derived from GE plant products is unavailable. In 2018, Singapore imported over \$6.9 billion in consumer-oriented food and beverage products with the top suppliers being Malaysia, Australia and the United States.

e) FOOD AID:

Singapore does not provide or receive food aid.

f) TRADE BARRIERS:

There are no special barriers for the import of GE plant products into Singapore, providing the products are already approved for commercial use by official regulators in the country of origin and by the Singapore Food Agency (SFA) in Singapore. Also, there are currently no mandatory guidelines on the labeling of foods, seeds, fibers, oils, or feeds that are derived from biotech crops.

PART B: POLICY

a) REGULATORY FRAMEWORK:

SFA has replaced AVA as the national body that officially regulates GE crop market access in Singapore. This occurred in April 2019, when AVA was restructured into two separate agencies: SFA, which now exclusively manages food security and food safety matters, and the Animal Veterinarian Services, which manages all non-food plant and animal matters.

The multi-agency Genetic Modification Advisory Committee (GMAC) was established under the country's Ministry of Trade and Industry in 1999 to provide science-based advice on the research, development, production, release, use, and handling of GE events in Singapore. GMAC's objective is to "ensure public safety while maintaining an environment that is conducive for commercial exploitation of GE products". As an advisory committee, GMAC works closely with other national bodies and the regulatory agencies, particularly SFA and the Ministry of Health (MOH). GMAC published [Guidelines on the Release of Agriculture-Related "GMOs"](#) (1999) and [Biosafety Guidelines for Research on "GMOs"](#) (2006, revised in 2008 and January 2013). Also, GMAC endorsed as a separate Annex on their website, the document [Risk Assessment of Stacked Events](#) (2016). As a non-regulatory committee, GMAC's guidelines are not legally binding, and SFA gives final approval.

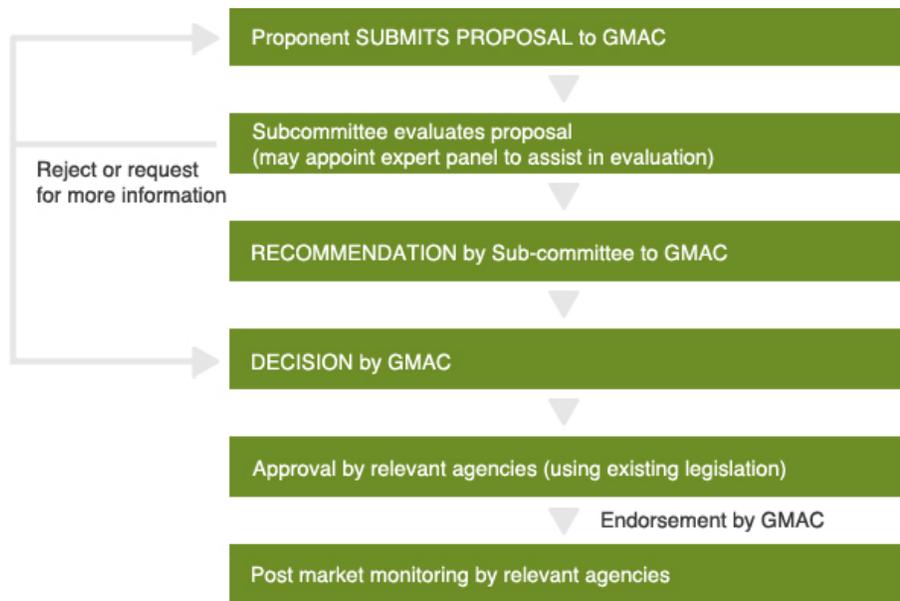
GMAC's *Guidelines on the Release of Agriculture-Related "GMOs"* provide a common framework to assess risks of agriculture-related GE products to human health and environment and approval mechanisms for their release in Singapore. Under the guidelines, a proposal has to be submitted to GMAC and its subcommittees (please see details below). Collectively, they will review the application, including an examination of the GE product's origin, the experimental procedures used in its development and the methods used to prove it is safe for consumption. Following the review process, GMAC decides whether or not to endorse the application. GMAC's decision is then forwarded to SFA, which determines final regulatory approval.

GMAC's members are from local regulatory agencies and academic institutions, and they serve on a voluntary basis. The GMAC Main Committee is currently chaired by Professor Prakash Kumar from the National University of Singapore. The other members come from 12 agencies/institutions, including SFA, MOH, the Ministry of Manpower, the National Institute of Education International, the Nanyang Technological University and the Consumer Association of Singapore (CASE). Please click [here](#) for more information on GMAC and the list of current GMAC Main Committee members.

In addition to the Main Committee, GMAC has four Subcommittees. For details on the Subcommittees and a list of Subcommittee members, please refer to the following:

- Subcommittee for Release of Agriculture-Related "GMOs" (please click [here](#) for details)
- Subcommittee for Research on "GMOs" (please click [here](#) for details)
- Subcommittee for Labeling of "GMOs" (please click [here](#) for details)
- Subcommittee for Public Awareness (please click [here](#) for details)

Approval Process for GE Products in Singapore



(Source: GMAC)

b) APPROVALS:

A total of 41 GE plant products have been approved for use as food or food ingredients in Singapore. For an updated list of the approved events (as of October 2019), please click [here](#) (Source: SFA).

c) STACKED OR PYRAMIDED EVENT APPROVALS:

In July 2016, GMAC endorsed a document on stacked events that was prepared by the Subcommittee for Release of Agriculture-related “GMOs”. The document, [Risk Assessment for Stacked Events](#), was uploaded to the GMAC website in 2017 and addresses the risk assessment and evaluation of breeding stacked events.

d) FIELD TESTING:

AVA granted approval in 2015 for a local company, JOil (S) Pte Ltd, to conduct small scale field trials on Semakau Island for GE *Jatropha* kernels with high oleic acid content for the biofuels industry. Industry contacts report the field trials are still ongoing. The GE plant is not to be introduced (planted) in any other parts of Singapore’s environment, and it is also not to be used for propagation in the country.

e) INNOVATIVE BIOTECHNOLOGIES:

Market analysts report Singapore is deliberating on regulatory and ethical issues arising from innovative biotechnologies and has yet to develop a harmonized regulatory framework.

f) COEXISTENCE:

There are no rules on coexistence, as there are no GE crops approved for domestic commercial cultivation at this time.

g) LABELING AND TRACABILITY:

Currently, Singapore does not have any specific guidelines on the labeling of GE products. However, according to market analysts, GE labeling is receiving increased public attention, and the GMAC Subcommittee for Labeling of “GMOs” was created to consider the issue.

Additionally, as a member of the Codex Committee on Food Labeling (CCFL), Singapore is closely monitoring international developments on acceptable GE food labeling guidelines.

h) MONITORING AND TESTING:

SFA monitors for the presence of GE products in the market. As GE foods are controlled items in the country, they are subject to special declaration, review, inspection, and testing procedures implemented by SFA’s Food Control Division. This includes taking samples and testing in SFA laboratories. GE product detection methods and reference materials are required by SFA as part of the market access approval process. There are no precedents on unapproved events in Singapore.

i) LOW LEVEL PRESENCE (LLP):

Singapore does not have a threshold established or specific policy on LLP. However, the country has demonstrated sensitivity to instances of inadvertent release of unapproved events. Additionally, LLP is connected to Singapore’s policy on labeling, and GMAC is actively monitoring developments on the labeling of GE products internationally.

j) ADDITIONAL REGULATORY REQUIREMENTS:

None at this time.

k) INTELLECTUAL PROPERTY RIGHTS (IPR):

While Singapore does not have any commercial production of GE crops, the country does have intellectual property legislation covering patents.

l) CARTAGENA PROTOCOL RATIFICATION:

Singapore is not a party to the Cartagena Protocol on Biosafety.

m) INTERNATIONAL TREATIES and FORUMS:

Singapore is an active member of the Asia-Pacific Economic Cooperation (APEC) forum and Codex Alimentarius. The country is also one of the 16 countries negotiating the Regional Comprehensive Economic Partnership (RCEP) and one of the 11 signatories of the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP). Singapore is a member of the International Union for the Protection of New Varieties of Plants (UPOV), and the International Plant Protection Convention (IPPC). It is also a member of the Association of South East Asian Nations (ASEAN) and is the lead country for ASEAN's "GM" Food Testing Network (AGMFTN) sub-group that caters to regulatory and scientific exchanges on issues related to GE food analysis.

n) RELATED ISSUES:

Singapore has a multi-pronged strategy to promote food security, with research and development using modern agriculture technologies playing a key role. For example, the Singapore government in late March 2019 announced they allocated a budget of \$105 million for urban food production research in the country. The fund is part of the overall \$14 billion budgeted in 2016 for the Research, Innovation and Enterprise 2020 (RIE) plan for Singapore's science and technology research over the next several years. According to local government contacts, Singapore plans to produce 30 percent of its nutritional needs by 2030.

PART C: MARKETING

a) PUBLIC/PRIVATE OPINIONS:

Market analysts report that although cautionary letters and demands for stringent labeling occasionally appear in public forums, overall opposition to GE foods is insignificant in Singapore.

Singapore's position on GE labeling is in tandem with international trends and practices. SFA's fundamental principle is that any labeling must be "practical, scientifically-driven and effectively implementable across countries". SFA and GMAC are expected to continue monitoring international developments closely.

b) MARKET ACCEPTANCE/STUDIES:

In response to a public query on the safe consumption of GE food in Singapore, AVA (SFA's predecessor) stated in a 2012 letter that it wanted to assure the public that all commercially available GE products in Singapore have undergone GMAC and AVA safety assessments based on Codex Alimentarius principles. Additionally, GMAC states on its website that its objective is to "ensure public safety while maintaining an environment that is conducive for commercial exploitations of "GMOs" and "GMO" derived products".

CHAPTER 2: ANIMAL BIOTECHNOLOGY

PART D: PRODUCTION AND TRADE

a) PRODUCTION DEVELOPMENT:

Singapore's animal biotechnology development is limited to research activities at SFA's Marine Aquaculture Center (MAC) located at St. John's Island. MAC has undertaken several research activities to develop large-scale hatchery technology, including upstream molecular applications, genetic selection to facilitate fish breeding, and the development of fish vaccines & diagnostic kits. Please refer to the following link for details on MAC activities: <https://www.sfa.gov.sg/food-farming/aquaculture-services/marine-aquaculture-centre>

b) COMMERCIAL PRODUCTION:

There is no commercial production of animal biotechnology in Singapore.

c) EXPORTS:

None

d) IMPORTS:

None

e) TRADE BARRIERS:

There is no commercial production or trade in animal biotechnology. As a result, there are no applicable trade barriers.

PART E: POLICY

a) REGULATORY FRAMEWORK:

The approval process for animal biotechnology is the same as the approval process for plant biotechnology (please refer to the PLANT BIOTECHNOLOGY REGULATORY FRAMEWORK section above).

b) APPROVALS:

There are no approved animal biotechnology events for commercial use in Singapore.

c) INNOVATIVE BIOTECHNOLOGIES:

There is no specific regulatory status for innovative biotechnology in animals.

d) LABELING AND TRACEABILITY:

Currently, Singapore does not have any specific guidelines on the labeling of GE products. Also, there is no traceability mechanism in effect.

e) INTELLECTUAL PROPERTY RIGHTS (IPR):

There is no current legislation that addresses IPR for animal biotechnologies.

f) INTERNATIONAL TREATIES and FORUMS:

Singapore regularly sends officials to Codex forums.

g) RELATED ISSUES:

None

PART F: MARKETING

a) PUBLIC/PRIVATE OPINIONS:

Few discussions of GE animals, cloned animals or products derived from cloned animals take place in Singapore.

b) MARKET ACCEPTANCE/STUDIES:

FAS Singapore is unaware of any studies on animal biotechnology market acceptance.

Attachments:

No Attachments