

# Regulation and Protection of Genetically Modified Food

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## **Regulation and Protection of Genetically Modified Food**

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### **Abstract**

Genetically Modified foods are now being widely consumed. In 2011, more than 90% of corns and soybeans in the US are genetically modified. Research shows in America the people suffering from allergies are increasing. Some people connected the allergies with the widely consumed genetically modified foods. But other researchers show that genetically modified food bring no harms to human. In fact, genetically modified foods are cheaper and will be a great tool to fight against poverty and hunger. But in countries like Italy, Austria, and the Netherlands, they have fully banned genetically modified organisms, making them the GMO's free <sup>14</sup>try. In the survey conducted, most consumers are not educated enough about GMO. They also concern about the impact of genetically modified food **on human health**, environmental and animal health.

**Keywords:** Genetically Modified Organism, Genetically Modified Food, Regulation, Protection

### **I. INTRODUCTION**

The Center for Ecogenetics and Environmental Health University of Washington (2013) defines genetically modified organisms (GMOs) as organisms that are produced when selected individual genes are transferred from a given donor organism into another organism, typically conferring desired properties to the new organism. The main purpose of producing GMO is to create a new organism that is stronger, more tolerance to diseases or other conditions (such as temperature). With this condition, GMO will reduce the production cost and creating the more affordable product for consumers. The organisms that can be genetically modified include plant, animal, virus, and bacteria.

GMO also being developed not only to fight poverty and hunger but also used for health benefits. Some companies are researching the create a better gene in hope that one day will cure cancer and HIV. The developments of GMO are getting a lot of disapproval from consumers and the public. Education about genetically modified (GM) food is not enough as most consumers do not have enough information about GM food.

### **II. METHOD**

This research uses a statue approach and comparative approach, so that regulations on consumer protection in Indonesia against genetically modified foods can be realized. The discussion will be done descriptively analysis.

### **III. RESULTS AND DISCUSSION**

#### ***Genetically Modified Animals***

In April 1988, Harvard University was granted a patent for OncoMouse, mouse that is susceptible to cancer and became the first animal given patent protection. National Research Council (1994) believes the use of genetically modified mice already raised several important issues and concerns that include the researchers' ability to share important resources. One of these concerns is related to the patenting of

the mice.

The OncoMouse patent was opposed by many scientists as this creates segregation between academic and commercial science. Many believe, the patent should apply only for the process of creating the mice whilst the living result shall not be patent. Murray (2006) claim patent already becoming a part of everyday scientific life, they have a symbolic and strategic role in shaping exchanges rather than the property right to impose the others.

California Biomedical Research Association (2018) states animals can be GM in several ways such as removing or adding genes from the DNA structure. Just four years ago in 2015, the Food and Drug Administration (FDA) has approved genetically modified salmon called AquAdvantage Salmon for human consumption. AquaBounty, a company based in America is the company that creating this salmon. Aqua Bounty, n.d. claim their salmons are better for the environment and consumers.

The salmon are raised in land-based production system away from the ocean, therefore, eliminating the risk of pollutants and other contaminants that will bring danger if consumed. Their location of the production system will also emit 23-25x less carbon than Norwegian or Chilean Salmon in Atlantic sea.

Australian Government (2014) defines fluorescent fish or GloFish™ as the GM fish that their scales expressing fluorescent proteins and enhance their colors. Gail (2014) states GloFish™ were originally developed in Singapore to detect pollutant and later sold as popular pets in the United States for more than USD 10 each.

SAB Biotherapeutics (SAB), a biopharmaceutical company based in Cambridge, United States has successfully developed antibodies called Tc Bovine. SAB, n.d. claims Tc Bovine produce human antibodies, the antibodies are generated by the cattle and made by immunizing into a Tc Bovine with the inactive disease agent. SAB (2016) states Tc Bovine can rapidly produce potent, fully human, immunoglobulins against a variety of disease target.

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According to Gottlieb and Wheeler (2011), the GM animals can deliver substantial improvements in terms of cost, safety and availability of urgently needed drugs and treatments, therefore, will bring substantial public health benefits. The GM animals that have been produced are not only used for environmental improvement but also as a pet. Most GM animals are separated from natural animals so their existence will not disrupt other organisms in nature.

The Royal Society (2001), states the increased allergic reactions, possible toxic effects, change in behavior or physical nature are possible hazards for GM animals. With the GM animals used as a pet and can be purchased publicly, this might cause the encounter between GM and natural animals. GM animals are generally modified to be stronger, this encounter might bring harm to the ecosystem.

### ***Genetically Modified Food***

World Health Organization (2014) believes the genetically modified (GM) food are developed and marketed because there are some advantages and greater benefits for the consumer or producer. This is supported by the European Commission (2010) that claims GM technology as an important tool to fight global poverty and food ins<sup>9</sup>urty.

McClung (2013) states that GM foods are no more risky than comparable non-GM foods. Whilst, Lisowska, K. (2011) believes it is difficult to determine if the GM products can be harmful to health as the result of research performed on animals are giving ambiguous result. Fagan, Antoniou and Robinson (2014) believe GMO will poses risk, resulting in unpredictable organisms, and toxic, allergenic or have unintended nutritional changes in the new organisms. In their book, they provide tons of studies that showed GMO have negative impact on human and environment.

Verma, Nanda, Singh and Mishra (2011), states there are several studies that result in serious health risks when animals are fed GM food. There are lots of publications and researches that approve the consumption of GM foods especially when the research is conducted by the company itself. In other parts, there is also disapproval of GM foods saying the GM food will cause allergic and harm to the environment. This contradiction will cause confusion to consumers when it comes to deciding the food they eat.

### ***Genetically Modified Food in Consumer Perspective***

Based on the survey on consumer perspective of GM food in China by Cui and Shoemaker (2018), results in Chinese consumer being cautious of GM food. The survey conducted by Sprinter Research (2010), shows in Lithuania, above 50% of respondents have a negative opinion towards GMO and more than 40% are not sure if they are buying and consuming GM food. The survey conducted by Chern and Rickertsen (2001), shows 20% of the Japanese students are very well informed about GM foods, while the Taiwanese student only reaches 2%. More than 50% of the students believe it is very important to label the GM foods.

IFIC Foundation Survey (2018), states in US, 36% of respondents know nothing to very little about GM food. The respondents that avoid GM food are concern about human health (85%), environmental (43%), and animal health (36). A further survey conducted by Kaneko and Chern (2003), shows that consumers are willing to pay 41.2%, 31.4%, 40.9%, and 52.5% of the base prices to avoid GM food, this includes the vegetable oil, cornflakes, and salmon. Consumer Report National Research Center (2016) also shows that 86% of US consumers want the GM food to be labeled.

Purnama (2015), states scientist cannot be 100% sure about the safety of GM foods. All these surveys show most consumer in different nationality, have a negative opinion and trying to avoid GM food. Most of them also believe that GM food should be labeled. The labeling of GM food is part of the consumers right. Consumers should have the ability to know if they are consuming GM food. In Canada, AGRI Committee Meeting (2016), states in 20 years of polling, more than 80% of Canadians want mandatory labeling of all GM foods.

### Regulation

Qian and Xiaoli (2014), states the Hainan (a city in China) provincial agriculture department found illegal GM cotton and corn. Ximeng (2013) states Gansu city in China has banned the use of GM seeds. Based on China national law, it is obligated to label the GM food.

Environment European Green Capital, n.d. states 19 out of 28 member state countries of European Union voted to partially or fully ban the GMO. In 2012, Poland has officially ban GMO and becoming GMO-free country. Other countries that fully ban GMO include Italy, Hungary, Austria, and the Netherlands.

In the US, GM food already widely consume and there is no regulation that required the producer to label GM foods. Harmon (2018) writes The United States Department of Agriculture has proposed new guidelines to label GM food. This GM food also includes the food that contains GMO as the ingredients.

Umeda (2014), states it is legal to plant GM crops but currently, there is no commercial planting on GM food. It is also required to label the GM food in certain cases.

In 2003, a legally binding international agreement named Cartagena Protocol was created in Convention on Biological Diversity. This agreement, aims to ensure the safe handling, transport and use of living modified organisms (LMO). Cartagena Protocol was signed by 50 countries, but it did not cover the damage issues caused by GMO and LMO.

Prianto and Yudhasasmita (2017), believe GMO products are widely consumed in Indonesia and fulfilling the needs of daily food with the presence of biotechnology. In Indonesia, the regulation relating to GM food that protects consumers are not enough. The regulations that cover the safety of GM food can be found in Peraturan Kepala Badan Pengawas Obat dan Makanan Republik Indonesia Nomor HK.03.1.23.03.12.1563 Tahun 2012 Tentang Pedoman Pengkajian Keamanan Pangan Produk Rekayasa Genetika.

Another regulation can be found in Peraturan Pemerintah Republik Indonesia Nomor 21 Tahun 2005 tentang Keamanan Hayati Produk Rekayasa Genetik that covers biological GMO researches and developments. The labeling of GM food is not covered in Indonesia regulations and most countries. Even though consumers have the right to know the food they consume. Parliamentary Information and Research Service (2016) believes that the biotechnology regulatory system should be re-examined regularly, given the speed of innovation.

### IV. CONCLUSION

GM Food can bring a positive impact to human's life. This includes the ability to create cheaper and

faster plants and animals for human consumption. In the other area, GM animals are also developed for the purposes of humans health.

The consumption of GM food arises approval and disapproval from a lot of scientist, researchers, and developers. Some countries such as Poland, Italy, and Austria have banned the use of GMO, making them the GMO free countries. While other countries, such as China and America seem racing in developing the new advance GMO.

The contradiction of positive and negative impact of GM food have caused confusion to the consumers. Most consumers are seeing GM food as negative.

The regulation of GM food usually only covers the procedure and the use of GM food. The most important and easy part seems to be forgotten. In America, as the country with the biggest consumers and producers of C<sub>35</sub> food, it is not mandatory to label it. As in Indonesia, the regulation to label GM food also not exist. Consumers have the right to know the food they buy and consume. The food they fed their families should be labeled. Each consumer should aware of and make their own decisions.

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