

# Current status and applications of biotechnology in the malaysian food industry.

[Technology](#)



TOPIC: CURRENT STATUS AND APPLICATIONS OF BIOTECHNOLOGY IN THE MALAYSIAN FOOD INDUSTRY. The term “ biotechnology” refers to the use of living organisms or their products to modify human health and the human environment. ‘ Food biotechnology’ is a process scientists use to enhance the production, nutritional value, safety, and taste of foods. It can also benefit the environment by improving crops so that they need fewer pesticides.

Modern food biotechnology is a refined version of this same process. Today, scientists obtain desired traits by adding or removing plant genes. The application of biotechnological processes (food biotechnology) in the production and modification of foods and food ingredients by the local food industry is not widespread, although foods and food ingredients produced by traditional biotechnology like fermentation technology processes are already familiar with the consumers. Examples of such products are tempeh, yogurt, nata, tapai, soy sauce and budu. The major advantage in using such processes is that they utilize living organisms or their products such as enzymes to accelerate the rates of reactions that occur during the production or modification of food materials. Biocatalytic conversion of raw materials, thus, can lead to the production of novel foods and food ingredients, or modification of existing food or food ingredients.

Research in this aspect of catalysis is essential because the output of the research is often new food products and process technologies. This surely will help improve the economy of Malaysia especially when the raw ingredients (e. g. palm oil, sago starch, fruits etc.

) used are indigenous to the country. Food biotechnology has also yielded high quality clarified fruit juices. Currently biotechnology processes, which are being employed by the food industry in the private sector, are the production of monosodium glutamate, vinegar, yeast, and syrups (glucose, fructose and maltose). Utilization of microorganisms and enzymes for the production and improvement of starch-based food and food ingredients has also been carried out. Current research also focuses on using enzymes to modify palm oil, sago starch and local fruit juices. Fermentation processes using bioreactors is used to produce food agro-food biopolymers, including those derived from microorganisms e.

g. microbial cellulose, gelatin substitutes etc. The newer biotechnologies such as those involving plant cell culture technology was be developed to produce useful food ingredients such as natural colours and flavours. In general, applications of food biotechnology in Malaysia mostly involve fermentation reactions and biocatalyst reactions. Although Malaysia has not yet produced a biotechnology crop commercially, several genetically modified crops containing traits of value have been produced at the experimental stage. At the Malaysian Agricultural Research and Development Institute, rice has been successfully modified to resist the tungro virus, and papayas manipulated to resist ring-spot virus infection and to have a prolonged shelf life.

Other crop plants such as pineapples are manipulated to resist “ black heart”, bananas and papaya for delayed ripening, chili for virus resistance, and sweet potatoes (albeit, preliminary), for delivery of edible vaccines.

Malaysia is also developing genetically engineered oil palm, with a focus on increasing value-added products from the palms, such as high oleate and high stearate oil, nutraceuticals (vitamin A and E), biodiesel and bioplastics. Presently biotechnology receives large-scale support from the Malaysian government. Biotechnology was earmarked as one of the areas of advancement under the 8th Malaysia Plan (2001-2005).

Biotechnology, being one of the five core technologies that will accelerate Malaysia's transformation into a highly industrialized nation by 2020 has received strong governmental support and commitment. Accordingly, the government has encouraged the development of biotechnology through financial support for its research and development (R), infrastructure and human resource development (HRD). Currently, the majority of biotechnology R activities are being carried out in the public sector. The private sector on the other hand, has focused primarily on plant tissue culture.

Since biotechnology is carried out mainly in local universities and R institutions, a National Biotechnology Directorate (BIOTEK) was established in 1996 to promote and coordinate biotechnology R activities in the country and to promote private-public sector participation in the national biotechnology program. Under the management of BIOTEK, biotechnology R activities in the country are categorized into seven sectors. These are namely molecular biology, plant biotechnology, animal biotechnology, medical biotechnology, environmental & industrial biotechnology, biopharmacy and food biotechnology. In Malaysia, the focus of biotechnology work is on the

needs of the nation and since Malaysia is basically an agriculture-based country, it is not surprising that agricultural and food biotechnology have received greater emphasis. Improving food production has been, and will always be, one of the top priorities and commitments of government agencies involved in biotech. The economic crisis of the late '90s has prompted the Government to take a second look at, and a new stance on, the importance of agriculture, especially in food production, to the national economy.

The Government has stressed the need for producing sufficient food for national security and stability. The huge and growing budget for food and feed imports clearly indicates the need to transform our agricultural sector, so that it can produce enough food for the people. Therefore, the Government is well aware of the potential benefits of genetically modified (GM) crops. At the same time, their impact on consumers as well as producers is recognised. The Government is aware and has become more cautious about food safety and the potential risks of transgenic food crops. Consequently, it has the responsibility to assure the public of the safety and the “halalness” of the genetically modified crops, as well as to safeguard against any adverse effects on human health and the environment.

Despite the many R activities that have been undertaken in Malaysia, the country has not experienced a significant growth in its biotechnology industry. Global benchmarks such as the number of biotechnology companies founded or the number of biotechnology-related patents that have been issued to Malaysian inventors all indicate that the considerable

investment the country has made in biotechnology has not captured the opportunity to translate the nations biotechnological assets into the growth of the K-economy. The greatest causes underlying this unfortunate state of affairs are the lack of a critical mass of co-located innovators, lack of state-of-the-art facilities and the lack of a strong entrepreneurial environment and mechanism for commercialization. Given the current state of biotechnology in Malaysia, there is now a tremendous opportunity to capitalize on developments in biotechnology by addressing the two major shortcomings in the Malaysian biotechnology industry. The BioValley project has been designed specifically to do this. Understanding of biotechnology is generally low among Malaysians, which may lead to low acceptance of biotechnology-derived products.

As biotechnology is becoming more and more a commercial reality, its impact on consumers as well as producers is well recognized. As past surveys have shown, there is significantly more support among those who said they had heard a lot about GMOs than those who heard little about them. As a result, the National Biotechnology Directorate is stepping up its efforts to implement public awareness programmes on biotechnology. The programmes include arranging lectures at public forums and schools, preparing and distributing pamphlets about biotechnology, and promoting a better understanding of biotechnology through the media.

Although modern biotechnology products developed by Malaysian researchers are not being commercialized yet, modern biotechnology products from other countries are slowly coming in. With globalization

coming our way, two new issues have to be addressed: transfer of technology and the threat of globalization. It is also the challenge to a country like Malaysia to acquire expertise and capability in biotechnology as it moves forward in the era of globalization. To make Malaysia more competitive in this industry, the Government, under the Ninth Malaysia Plan, implements the strategic thrust of the National Biotechnology Policy, with the active participation of private sector. The “ BioNexus” concept will be adopted to strengthen the existing institutions along with a parallel development of the industry. BioNexus Malaysia is essentially a network of centres of excellence throughout the country, comprising companies and institutions which specialise in specific biotech sub-sectors.

Research in food biotechnology should be emphasized and enhanced because Malaysia is a producer of many primary agricultural products such as oils and starch. The diversification of the end uses of these materials will naturally add to their value and competitiveness in the global marketplace. Tax incentives currently endorsed by the Government to food industries adopting biotechnology in their processing methods should open up the way for existing and new industries to participate in the production of foods and food ingredients that are produce using biological agents as the catalysts. As the world moves into the era of globalization, where economy becomes borderless, enhanced efficiency, competitiveness, productivity and quality will take precedence in determining our success in the global arena. Malaysia is positioning herself to face the in-coming challenges being brought by globalization.

Technology, such as biotechnology, will be a strong driving force energizing the shift into a knowledge-based economy. Intensive application of high technology and competency building will enhance this transformation process to position the country where it can look forward to emerge as a stronger economy.