

Topic: Molecular tools in food, feed and seed analysis.

Molecular biology tools are now major instruments in the analytical scene, having proved their usefulness various sectors such as food authenticity, tracability of food and feed supply chains, food safety, allergen detection, and the identification of individual and family relations. Since the use of transformation and transduction in microorganisms in the early 20th century, these technologies have extended their use to higher organisms including human and their food. Technology based on molecular biology has made it's way to the forefront largely due to the development of GM or genetically modified foods and the debate surrounding their acceptability.

In Europe, some governments have decided to accept GM foods but others still hesitate to accept them. The situation is unpredictable but research has never stopped, with information exchanges and personal interactions in countries like the U.S.A., Brazil, China and India which have accepted and permitted commercial production and sales. It is clear that the number of nations accepting GM foods will increase as time passes, because neither accident nor health problem has been found in the past 20 years. A few incidents have been reported but none of them have been proven by repeated experiments. National academies, major scientific and medical societies which include many Nobel laureates, support the use and sale of GM foods. However, a significant number of European nations continue to study the safety of these foods and, recently, have released GM food safety risk assessment recommendations. Thirteen different European countries and 65 partners including representatives from various sectors, have reached major conclusions and recommendations on this topic: (1). Existing test methods for safety assessment of GM organisms are efficient and ensure that GM foods that have passed the test are as safe and nutritious as native foods; (2). There

is no indication that unintended alterations in the composition of plants are more likely to occur in GM crops; (3). Reliable documentation systems to trace the origin of ingredients and analytical methods to detect and quantify the amounts of GM derived ingredients are available; (4). It is important to explicitly address public concerns and to develop new methods for shareholders' involvement and public consultation. They say that future research projects should address ways to formalize engagement and consultation into new working procedures, to be followed by a permanent evaluation and discussion on the assessment of all types of new foods. Scientific papers, whether printed or electronic, will contribute to establishing conclusions and recommendations at any time. Thus, studies on GM organisms, animals, plants or microbes, must continue.

In Japan, although a limited amount of research is carried out in national laboratories and larger universities, most local governments and industries avoid GM food research because the negative attitude of the public towards GM foods. Consumer stop buying products of companies and from farmers who carrying out GM research, even in a minor scale. Consumer suspect that food for sale may contain GM materials because of their distrust of their government. Japan's self sustainability in food is extremely low (less than 40%) and, the import of seed, feed and food is indispensable. An increase in GM foods put the Japanese into a difficult situation. Japan produces only 4% of soybeans needed for many food products such as soysauce, miso and various fermented food; thus the majority must be imported from the U.S., whose products are more than 70% GM and net percentage is increasing. So, the Japanese government allows GM soybean import as long as it is used after some treatment, and the public eats GM soybean products with

or without its knowledge. Labels often say "This product is made from Japanese beans" or "This is not a GM food" but the origin of such foods could be from GM organisms.

Scientists are very much concerned about public attitudes and knowledge, which could inhibit research on an increase in the production and the quality of food. Genetic manipulation is much faster and is a more efficient method to produce desired organisms but requires trained personnel and back ground knowledge which can only be maintained by continuous study and training. Prohibiting and/or refusal to accept these will lead Japan and the Japanese people to starvation and a loss of culture.

Health conscious individuals often love naturally grown or organic foods but the toxins and microorganisms accompanying them are

often more harmful than insect-resistant GM foods. Recently dioxin was found in free-range eggs. German consumers were worried by media reports that expensive organic eggs from free range hens were more likely to be contaminated. This contamination was found in most of states, not locally, and free-range eggs have been removed from the market. On the other hand, eggs from GM chicken may stimulate your health in the near future. GM animals, such as cows, pigs and chickens, can be fed on GM plants, like peas, wheat, or corn, to produce better meat and eggs. Preparation of GM plants through the introduction of a desirable gene(s) is much easier and seeds can be obtained. In every step, selection should be performed, but seed, feed and food chain must be established.