Original Article

Food component safety: Risk benefit analysis in developing countries

Deon Mahoney DipAppSc, GradDipAgrMicro, MScAgr, MAIFST

Food Safety Consultant, World Health Organization, Hanoi, Vietnam

Novel foods and novel food ingredients are making a rapid appearance in countries such as Vietnam. They are likely to gain acceptance by the consumers because medicinal and health properties of food are traditionally sought by people in the region. Although these foods offer potential benefits to the population in terms of increasing the nutritional adequacy of the diet, they also pose potential problems. Inadequate laws and enforcement as well as a underdeveloped capacity to deal with the safety, nutritional impact and provision of information to the population have the potential for undesirable consequences for the introduction of novel foods. The solutions are to build technical capacity, to develop the legal and enforcement government infrastructure and to adequately inform the consumer about the risk and potential benefits of novel foods.

Key words: capacity building, novel food, risk assessment, Vietnam.

Vietnam snapshot

Vietnam has a population of almost 80 million people, of which 80% live in rural settings. Vietnam boasts one of the fastest growing global economies, yet one of the overriding barriers to the development and expansion of the local food and beverage markets is the lack of purchasing power of most Vietnamese people. Low levels of disposable income are especially pronounced among the very large number of farmers living at subsistence level. The purchasing power resides in the major cities among the more affluent population groups.

Novel foods: what are they?

Food supplies all around the world are changing rapidly. Some of the changes are due to changing lifestyles and changing demands of people for different and new food products. Other drivers of the change include changing technologies that offer the potential for new types of foods and the marketing needs of the industry to find and fill niches in the food supply. Developing countries are experiencing the same influx of novel foods into their food supply as developing countries have over the last decade or so.

Novel foods discussed here include foods or food ingredients not previously consumed widely by a population. They may include foods with novel ingredients such as phytoestrogens, phytosterols, fat replacers that are not absorbed through the gut, new sweeteners and food fortified by micronutrients, amino acids, active compounds such as caffeine and so on. Novel foods can also be considered to include foods produced with new technologies such as foods produced with the use of biotechnology, irradiation and ohmic heating.

Novel foods aim to meet many perceived or real needs, such as a longer shelf life to accommodate changing lifestyles, increased micronutrient contents to address insufficiencies and/or to compensate for busy lifestyles, inclusion of ingredients purported to confer health benefits, and foods for which production may be more beneficial to the environment. Many novel foods are specially marketed as contributing to health and nutrition of the consumer. One of the most recent and often quoted novel foods that is potentially beneficial for developing countries is genetically modified golden rice and other pro-vitamin A-enhanced rice varieties that have the potential to help millions of people suffering from vitamin A deficiencies.

Cultural aspects of food consumption in Vietnam

Vietnam is a country in transition, including substantial changes in food consumption patterns. The situation may be characterized by increasingly reduced intake of staple foods, and increased consumption of meat, sugar, fat, and processed foods. Furthermore, there is an increasingly affluent new generation, drawn to processed and packaged foods and beverages that often include new foods that are either novel themselves or contain novel ingredients. This segment of the population is increasingly being targeted by product marketing and advertising. The local industry is expanding to capitalize on these changes in Vietnam and to create and meet the need of this changing environment.

Correspondence address: Deon Mahoney, World Health Organization, PO Box 52, Hanoi Vietnam.
Tel: + 84 4 943 3734; Fax: + 84 4 943 3740
Email: mahoneyd@vtn.wpro.who.int

Changes in consumption patterns offer many challenges to the health sector as well as many opportunities to address nutritional and health issues in Vietnam. The advent of novel foods and foods containing novel food ingredients are a part of this challenge and opportunity. Vietnamese people traditionally regard food as both a food and medicine, ascribing many medicinal properties to different types of foods, eating certain foods during specific days of the month to achieve health benefit and deliberately mixing foods with plants, herbs and spices and other products for their perceived or real antibiotic, analgesic, life-prolonging, or other beneficial properties.

This perception that food is also medicinal is likely to predispose Vietnamese people to ready acceptance of supplements but especially novel foods or novel ingredients if these are marketed to demonstrate that they contain medicinal or health-enhancing properties. Certainly the market for health supplements is already strongly addressed and increasingly supplied by local processors and imports.

The health of Vietnamese is currently known to be affected by three micronutrient deficiencies of public health significance.[1] These are iron, vitamin A, and iodine deficiency disorders. Sub-clinical vitamin A deficiency is recognized as a cause of increased morbidity, mortality, and retarded growth in children. The Vietnam government is attempting to ameliorate these deficiencies with specific fortification and supplementation strategies that are just beginning to be implemented across the country. Sugar fortification with vitamin A is in the pilot stage, and some research has also involved biscuit fortification with this vitamin. Current control and prevention of iron deficiencies includes iron supplementation of affected and education on dietary diversification. Experimental iron fortification of fish sauce has commenced in some parts of Vietnam. In addition to the three micronutrient deficiencies, there are reports of zinc and Vitamin B_1 insufficiency among the population, although data are limited on these issues.

Addressing issues of safety, efficacy, and the provision of information to the consumer

While novel food and foods containing novel food ingredients are likely to be readily accepted by the Vietnamese population, it is necessary to address issues such as any potential benefits from novel foods (including fortified or supplemented foods), to meet some of the micronutrient deficiencies in the population as well as the impact of the increased intake of these foods and food ingredients on the overall nutritional and health status of consumers. On the first point, it is certainly likely that it is the poorest people who are likely to have micronutrient deficiencies and who are therefore least likely to have a purchasing power to address these deficiencies with novel food products in most cases.

Novel foods may present critical challenges in terms of safety and health. It is essential that the safety of novel foods and novel food ingredients be assured. The proliferation of foods and beverages such as Red Bull®, sports energy drinks, energy foods, caffeine-enhanced children's foods, foods that contain increased levels of additives, and ingredients such as amino acids, nucleotides, and hormonally active molecules such as phytoestrogens etc. may present problems to consumers in developing countries if the ingredients are not tested for toxicological safety in situations where the exposure to the chemical is increased due to increased consumption. Such foods are often marketed to children and young adults, and safety assessment must specifically address the impact on these rapidly growing subpopulations with special nutritional needs and toxicological vulnerabilities. Toxicological safety of foods consumed more widely by the elderly also needs special consideration. The issues of micronutrient interactions, potential to cause deficiencies of one micronutrient by consuming excess of another micronutrient in food, and the potential for deficiencies caused by unbalanced diets also need to be addressed.

Similarly, when novel foods are consumed in such a way that they replace a significant proportion of normal diet, there is a need to assess the impact of the change on the nutritional status of the consumers, with a view to examining nutritional adequacy of the diet necessary for optimum health.

Developing countries such as Vietnam also need to address truth in labelling and truth in representation issues associated with novel foods. False and/or misleading information may result in consumption of unsafe novel food products, or consumption of novel foods to the detriment of health and nutrition.

Legislative control and enforcement

In most developed countries, the safety of the food supply is regulated by the government; as are labelling and information on foods, including novel foods. Governments usually ensure that the labelling provisions of food are adequate to properly inform the consumer and that the labelling and advertising of products are truthful and accurate and that any claims made by the labelling or advertising of the novel food are honest and supported by scientific data and evaluation. Similarly governments in developed countries have legislation, enforcement and technical capability to ensure that the safety of novel foods is examined and that any nutritional and safety consequences of introducing novel foods can be monitored for undesirable consequences.

In contrast, citizens in developing countries such as Vietnam often do not have the same level of protection afforded by their governments. The public health sector in many developing countries is not well resourced, and has a very limited infrastructure that lacks the capacity to address issues associated with the safety, efficacy, labelling, and marketing control of novel foods and novel food ingredients. These countries need to build comprehensive and seamless legislation to cover production, sale, inspection and monitoring of food. They also need to build a comprehensive enforcement system that deals with food safety issues in a prioritized manner, based on demonstrated risk and need. and finally, developing countries need an adequate monitoring

and surveillance system with the capacity to assess food safety risks to its community.

Changes in the legislative and enforcement capacity in countries, such as Vietnam, are unlikely in the short term and the technical capacity to adequately assess the safety of these types of products is also poorly developed. Furthermore, developing countries such as Vietnam have only a limited capacity to assess the nutritional status of their population and lack adequate data systems and monitoring activities that could be used to assess the nutritional and health impact of changing diets, including changes precipitated by increased consumption of novel foods and food ingredients.

Vietnam needs to develop technical capacity to perform safety assessment of food and food ingredients or at least to be able to peer-review safety assessments performed at the international level or by other countries. However, although the safety assessments can be done on an international basis, the exposure assessment for any country must be based on the diets and consumption pattern in that country. Vietnam has little such data and therefore is not in a position to assess the likely impact of novel foods on the nutritional status of its people.

Similarly, a lack of capacity to undertake surveillance means that developing countries are not adequately equipped to assess the impact of changes such as introduction of novel foods into the diet of their populations and any unexpected or adverse consequences of this change on health.

World health organization

The World Health Organization (WHO) has recently released an exposure draft of its Global WHO Food Safety Strategy.[2] The strategy identifies the importance of new technologies in meeting the food needs of developing countries, and the need for a scientific framework for the safety and nutritional assessment of foods derived from biotechnology and other sources.

While the strategy is explicit about foods produced with new technologies, especially food produced with the use of gene technology, the approach intends to also cover novel foods that are not necessarily produced by bioengineering. The WHO is working to achieve consistent standards and criteria for assessing the safety of foods and food ingredients derived from genetic engineering and to provide these safety evaluations to developing countries to facilitate country decisions about their acceptance. The Joint Food and Agriculture Organization of the United Nations (FAO)/WHO Expert Consultation, held in June 2000, established the substantial equivalence approach as a key step for assessing safety and risks and as general guidance for scientific assessment of the risks associated with genetically modified food.

The World Health Organization will continue to provide a scientific framework for the safety and nutritional assessment of foods. Such safety assessment requires an integrated, consistent, case-by-case approach to the evaluation of such foods with consideration of safety and also factors such as health benefits, environmental effects and socioeconomic consequences. The World Health Organization will also contribute to a better understanding of new developments in order to address the concerns of consumers.

The Global WHO Food Safety Strategy also identified capacity building for developing countries as a priority in improving global food safety. The World Health Organization at the central and regional level recognizes that the burden of foodborne illness cannot be addressed in the absence of appropriate infrastructure and technical capability at a country level. Legislation, enforcement, monitoring and surveillance, and data for the assessment of safety and nutritional status of a population are all vital components in ensuring the health and safety of the community. This includes the development of national capacity to undertake risk assessment and foodborne disease surveillance.

Capacity building

A key to assisting developing countries to deal with the issue of novel foods is the development of regulatory and surveillance capacity. An Organization for Economic Cooperation and Development (OECD) taskforce examining novel foods recognized the need for capacity building to assess the safety of novel foods as a priority activity.[3]

The World Health Organization is currently undertaking a project on capacity building for the prevention of foodborne disease in Vietnam. The project is funded by the Asian Development Bank and addresses issues such as legislative needs, food analysis capability, and foodborne disease surveillance in Vietnam. It recognizes that Vietnam needs to develop capacity to perform safety assessments based on risk, develop composition and labelling requirements, and enhance the regulatory approval of novel foods and ingredients.

The World Health Organization is therefore assisting Vietnam in the development of a comprehensive and seamless legislative and enforcement infrastructure that can address issues such as the advent of novel foods and novel food ingredients as discussed in this paper. Technical assistance in the form of training and data gathering is also a part of the assistance currently in progress, building toward a capacity to undertake safety evaluation and nutritional assessments of changing food consumption patterns.

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