Micronutrient Fortification of Mass-Consumed Commodities: A Question of Priorities

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The below paragraphs, taken from Venkatesh Mannar’s Regional Approaches to Fortification of Staples and Complementary Foods (4), published by the Micronutrient Initiative, Ottawa, Canada, in June 2000, as part of the Fourth World Report on Nutrition, are an exceptional introduction to this paper.

“The human body requires tiny amounts of essential vitamins and minerals for normal, healthy growth, development and functioning. In the absence of these nutrients, individuals and families suffer serious consequences including learning disabilities, impaired work capacity, illness and death. These deficiencies can be prevented and even eliminated if populations consume small quantities of the nutrients on a continuous and ongoing basis. Several tested delivery mechanisms are available. They range from high-dose supplements to consumption of micronutrient-rich foods (natural and fortified) to public health measures. For more than 50 years, some economically advanced countries have largely eliminated these vitamin and mineral deficiencies. This happened through multiple delivery systems that include diets enriched with micronutrients in fortified foods and the addition of supplements mostly provided by the private sector.

“In Asia, micronutrient deficiencies affect a majority of the population. Usually most people suffer from deficiencies in more than one nutrient. Iron and iodine deficiencies are the most common and widespread nutritional problems. About half the reproductive age women in most of the developing countries suffer from iron deficiency anemia (IDA). Other high risk groups include preschool and school-age children and adolescents. Iodine deficiency disorders (IDD, assessed as goiter in school-aged children) strike from 20% to 60% of people in different areas. Vitamin A deficiency has been widely recognized though at a lower clinical prevalence (around 1% in preschool children). However, vitamin A deficiency at a sub-clinical level (based on serum retinol assays) is thought to be around 10% to 25. This is associated with increased mortality risk in children and pregnant women.

“Also, there are other deficiencies that are certainly widespread but far less well recognized. Rickets in young children, associated with calcium and vitamin D, is probably widespread in China and possibly elsewhere. Dietary intake surveys and limited biochemical indicators show that zinc deficiency is likely as widespread as that of IDA. Selenium and as well as several other micronutrients (folate, vitamin E) may have major role in reducing risks on chronic disease (e.g. cancers, heart diseases).

“Micronutrient malnutrition is much more than a health sector problem. It is indeed an economic problem. The World Bank (1994) estimates that the cost of micronutrient malnutrition to developing economies is at least 5% of their gross domestic product (GDP). The rationale for public investment in addressing micronutrient malnutrition is based on the fact that human capital improvement is essential for economic development and micronutrient nutrition is an important building block for human capital development, especially in the child, reduce chronic adult disease, support safe motherhood and sustain economic growth through human capital development… The public sector should have a leading role in addressing micronutrient malnutrition early in life to improve mental and physical development of the child, reduce chronic adult disease, support safe motherhood and sustain economic growth through human capital development. Programs achieving these results have been piloted and some positive results (such as global progress in the elimination of IDD through salt iodization and reduction in VAD [vitamin A deficiency] in young children through supplementation) have been reported. The conclusions are clear and loud. Micronutrient malnutrition is devastating, however it is preventable. Responding to this new understanding on the prevalence and liability of micronutrient malnutrition, the 1990 World Summit for Children ratified the global goal to eliminate micronutrient malnutrition by the year 2000. As a result, in the 1990s we have witnessed an increased awareness of the micronutrient problem and increased action by national leaders.

“The global progress made toward reaching the micronutrient elimination goals set out at the World Summit for Children, although impressive, falls short of permanent and complete elimination. Most previous efforts that have focused on the elimination of micronutrient malnutrition have been driven by national programs and activities dominated by the public sector. The role and participation of the private sector was very limited. Partnership with the private sector through the food fortification strategy outlined in this document offers the possibility of achieving the goal by 2010.
“Food fortification is the addition of nutrients to commonly eaten foods so as to maintain or improve the nutritional quantity and quality of a diet of a community. Since the early 20th century, food fortification has played a major role in improving the health and performances of the population globally. Over the last 40 years several nutritional deficiencies have been eliminated from Europe and North America. In addition to the virtual elimination of VAD and IDD and the substantial reduction of IDA, diseases as varied as xerophthalmia, pellagra, beri-beri, rickets, goiter and ariboflavinosis have essentially disappeared.

“In the developing world, there has been a rapid growth in fortifying a wide range of foods. The most successful global fortification experience is the fortification of salt with iodine. Fortification of other staple foods such as flour, oils, sugar, condiments, dairy products and a range of processed foods with other minerals and vitamins are also growing… The private food industry has compelling reasons for shifting production to fortified foods if they are profitable. In many instances the private sector will/should fortify staple foods even if they are only marginally profitable, or require the industry to absorb the cost of fortification. Raising product quality through fortification will stimulate demand for regional products and intensify competition and trade with and beyond the region. Economics of scale for fortified foods as competitors follow product leaders will lower prices and reach new consumers.

“Food fortification is a unique example where industry and trade that work in a largely commercial environment is required to participate and play a leading role in a health intervention endeavour. Thus to succeed, it requires a multi-sectoral partnership between industry, national governments, international agencies, expert groups and other players. This will create an environment for the partners to work closely on specific issues relating to technology development, food processing and marketing, free-market approaches with minimum price support mechanisms, standards, quality assurance, product certification, social communications and demand creation, monitoring and evaluation. This coalition will benefit private sector partners, not only to improve performance in the marketplace, but also to show that the private sector gains social benefits. The alliance also benefits the public sector. The government, which has a mandate to improve people’s lives, will accomplish its goal faster with less cost. It will also allow national and international development agencies to provide the technical support and seed money in an efficient, economical way. Note, to have an effective and sustainable fortification program, it is vital that the public and private sectors work in close collaboration, explicitly understanding and recognizing each other’s view points, concerns and interests.”

Venkatesh Mannar has expressed the reason for micronutrient fortification of mass consumed commodities much better than I could have done; however, the perspective that I would like to share with readers is the fact that implementation, and therefore the benefits, of fortification has not been shown to be successful in the expected level of success as it relates to the investment (cost/benefit) made in all kinds of resources by the private sector, nongovernmental organizations (NGOs), and other international agencies.

The basic consideration to be made is that a fortified product is not a drug or medication, yet if the product offers to supply additional nutrients, in this case micronutrients, these have to be present, and it is here where quality enters the overall picture.

“The quality of a fortified food or the service of making it available to the target populations and of fulfilling its intended purpose is measured by the degree of satisfaction of the consumer’s expectations.

“Quality, in synthesis, is fulfilling what is promised—all the time.

“Quality does not happen by chance, it is the result of a concerted effort of all relevant actors in an organization, from top management on down. The often belief that quality products can be obtained by applying controls or inspections at the end of the production line is simply not true. Quality needs to be considered from the very early stages of a project: the product concept and its development, it needs to address the selection of appropriate ingredients and focus on the manufacturing process and it must not forget packaging, distribution, handling and consumer acceptance.

“In the particular need of alleviating nutritional deficiencies, through food fortification, quality considerations are a most important determinant. The success of any program is dependent on providing an appropriate nutritional fortificant in a vehicle of wide consumption and at the right levels of nutrients that address the needs of the target population. Further the nutrients should be effective and not deteriorated by climate, time or other factors. Finally, to render the service effective, the fortified food should reach the target population and should be used according to the intended manner.

“Particular emphasis should be made on food safety; this regrettably is not a primary preoccupation in nutritional programs in developing countries. Nothing could be more irresponsible. The need to provide healthy and wholesome foods is an obligation and is independent of the social or economic status of the consumer. Fortified foods may be low risk, in terms of bacterial contamination (cereal products, sugar, salt or oils, for instance) but there are distinct health hazards when the food is mishandled or quality considerations are not included in the programs”.  

Years of experience in the area of fortified food quality have led me to conclude that as a QA model, definitely one size does not fit all. Fortunately, there is a great assortment of models available.

There are numerous prominent professionals in the quality area, and they have written profusely and even have established many training and quality service institutions. In reviewing their basic principles, there is a common thread and constancy.

The salient points are:

• Quality does not happen by chance, it is the result of a concerted effort, good planning, and careful execution;
• Quality can only happen in the right climate. This requires a commitment and participation of the highest authority (management) in the emprise;
• The pursuit of quality is everyone’s concern and is a full-time job;
• People are the key players and are more meaningful than equipment, materials, or installations;
• Training and motivation are the basis for the good performance of personnel;
The search for quality is an ongoing process, not a finite program. Continuous improvement is the road to excellence.

A Question of Priorities

It is clear, at least for me, that there is wisdom in Phil Crosby's statement "Quality is free, what costs money are the no-quality things—all the actions that involve not doing jobs right the first time" (2).

But, and here is the underlying premise, which, in my opinion, has given way to the fact that is mentioned above, relative to the quality of the deliverables—Who is responsible for quality?

The answer is simple. All stakeholders are responsible. Obviously the private sector is responsible—as mentioned above, by assuring the quality of the product produced and the compliance with specifications—but the government is also responsible for verifying that what the producers are indicating in the product labels is correct and that through food control, surveillance, and monitoring actions, the effectiveness of the fortification programs has been verified. Lastly, but equally as important as the other parties, the consumer is responsible in insisting on the adequate and timely delivery of the micronutrients by the fortified consumer products.

The obstacle, specifically in developing countries, basically stems from two main sources: 1) nutrition does not have a high priority within these governments, and 2) aspects of quality assurance require resources that are scarce and compete with higher priority items like education, health services, etc., in the public budgets.

In reviewing the literature and other advocacy documents (see www.micronutrient.org, www.mostproject.org, www.usaid.gov, www.ilsi.org, and www.aed.org/Projects/atozmicro.cfm), it is very clear that when confronted with these issues, governments, especially of developing countries, indicate their interest in the subject due to the fact that since world agencies have gotten involved with this issue, the benefits of micronutrient fortification and their return on the investment has been an important and convincing point of the advocacy proposals.

Also, the cost/benefit of fortification has been demonstrated again and again (see above mentioned websites). The Micronutrient Initiative (www.micronutrient.org) very clearly expressed these benefits (in dollars and cents) in 1998. According to Mannar, micronutrient fortification is effective at 1) preventing up to four out of ten childhood deaths; 2) lowering maternal deaths by more than one third; 3) increasing work capacity up to 40%; and 4) improving population IQ by 10–15 points (4). The World Bank has also claimed that food fortification is capable of raising the GDP by up to 5% (8).

The second aspect, that of total quality assurance programs, should include adequate and significant legislation that comprises standards, specifications, and technical data sheets of all items in the program; food control and inspection beyond the manufacturer's warehouses; standardized and acceptable sampling methods; analytical laboratories; an adequate feedback process (to inform quality findings to industry and authorities); a surveillance program that includes epidemiological sampling before the fortification program starts and adequate follow-up to confirm its benefits; proper sampling and analytical testing of the product (once in the market place) and of those subjects being tested to ascertain the programs effectiveness; adequate communication amongst the interested parties, i.e., government, industry and consumers; and many other activities that can be found in the WHO/FAO Guidelines on food fortification with Micronutrient (1).

It becomes relatively easy to verify that the above mentioned activities in many cases are not priority number one for developing countries, but the intention is there. What usually happens is that only part of those activities mentioned are established and implemented, breaking the so called “fortification cycle” (5), and thus eliminating the leveled playing field. If we consider that it is industry that fortifies and they are in business to make a profit, sometimes the opportunity of better returns is preferred and the programs lose their effectiveness.

Many ways of reaching the desired goals have been tried, including the donation of equipment needed for fortification; the gift of vitamin and mineral mixes to industry; NGO-supported training and technical support for other agencies, governments, and industry to improve the personnel implementing the program’s objectives; and much more. At the end, we always find that the only way that a program is sustainable and therefore beneficial to the population is if the government installs the minimum programs (monitoring) to assure that the mass consumed commodities are fortified. When this happens, the industry commits to the fortification and absorbs some costs and the consumers demand fortified products via their support and purchasing power.

It is the author’s experience that the programs require full participation by all interested parties from the very beginning of the process—the support of ministers and top officials of the government in a constant and public fashion, the active participation of consumer groups, and, most important of all, the constant communication amongst the stakeholders.

GAIN (3), the Global Alliance to Improve Nutrition, is a partnership that (see http://www.gainhealth.org/gain/ch/en-en/index.cfm?page=/gain/home/about_gain) has empowered countries to install fortification programs by making grants and funds available under conditions that tend to make these programs sustainable. Some of the effectiveness of fortification results can be seen in the GAIN website at www.gainhealth.org/gain/ch/en-en/index.cfm?page=/gain/home/why_food_fortification/fortification_works.

As the reader might have realized, ending the hidden micronutrient hunger (7) is very possible. The relatively simplistic technology to fortify the cited commodities exists and has been proven to attain the objectives of fortification. As a conclusion, I can offer that this project really becomes a business proposition rather than an investment in research and development in which the participants—public sector, private sector, and the consumer—have to work together in order to accomplish the objectives. Unfortunately, in many instances, this is unattainable because the political will is lacking as well as the efforts that have to be done by the private sector and sometimes also the consumers.

Whenever those interested in government and public health programs decide to give higher priority within their government’s programs to fortification, and fund them appropriately, they will be able to see that these actions benefit not only the consumer, but also the food industry, the safety and security of the agricultural and food product supply, the advocacy actions by consumers, and eventually the country benefits economically by eliminating or at least lowering the levels of the hidden hunger due to the lack of adequate levels of micronutrients in the diets of those that need them most.

As mentioned above, the advocacy efforts have shown very positive results, but when the time comes for implementation, over and over again this just does not happen! Action and commitment is needed and requires the support of all interested parties. Where there is the will, there is the way.

References


5. Mannar, V. *The food fortification programming cycle*. Published online at www.micronutrient.org/dubai/Background_papers/Section%204/Food%20Fortification%20Program%20Cycle.pdf. The Micronutrient Initiative, Ottawa, Canada, 2002.


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