

THE ROLE OF INDUSTRY IN MICRONUTRIENT INTERVENTION PROGRAMMES

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The global control of micronutrient deficiencies is a realistic goal, notwithstanding the magnitude of the task and the many challenges and constraints that remain to be resolved. The development of successful programmes for micronutrient fortification of foods calls for active collaboration between several sectors: the scientific community, national and local governments, non-governmental organisations (NGOs), the food industry, the media, consumer groups, and donor agencies, all of which must display commitment, trust and action, if the programme is to be successful (Fig. 1).

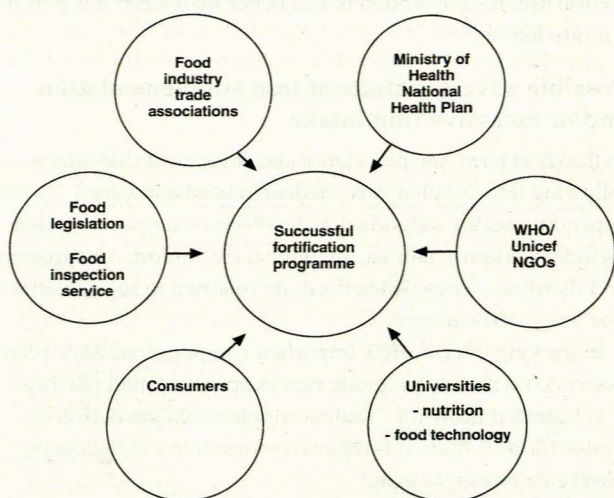


Fig. 1. Food fortification — a multidisciplinary approach.

The scientific community will need to research, develop and provide workable technologies that can be implemented in developing countries. National and local governments must have the political will, provide the administrative support, and prescribe the framework within which the solutions can be implemented and regulated. The food industry needs to be motivated to become an active partner in this effort and to recognise the economic and social benefits that it could derive from a food fortification programme. The media should be used to educate the population on the problems of micronutrient malnutrition and on the importance and safety of fortified foods. The consumer should be educated regarding



the benefits and low cost of fortified foods in order to create a demand, to which industry will have to respond. Internal and bilateral aid agencies could provide the link and the co-ordination between the different sectors to implement the programmes and make them self-supporting and sustainable.

The following recommendations are made with a view to identifying and promoting opportunities for food fortification, highlighting the role of industry as an important component in the elimination of micronutrient deficiencies (Tables I and II).

1. Food fortification is a unique example of a situation where industry and trade, working in a largely commercial environment, are required to participate and play a leading role in health intervention programmes. To have an efficient and sustainable fortification programme, it is vital that the health and industry sectors collaborate closely and explicitly understand and recognise each other's viewpoints, concerns and interests.

2. The food industry should be motivated to comply with the establishment and sustainability of an effective micronutrient delivery system, and penalties should be enforced for non-compliance.

3. A detailed, technical problem-solving exercise should be carried out to confirm that a food fortification process is feasible and does not alter the food vehicle in any way, and that nutrient losses during storage and cooking are within tolerable limits. Industry should be involved in technology development, production and quality control. Companies with research and development facilities could provide a rich source of technical expertise.

4. There is a need to co-ordinate the development of multiple fortification programmes. Technology is now available to a limited extent, and more extensive and co-ordinated research and development are needed. Technology development will have to be supported by field and pilot commercial trials to evaluate the techno-economic feasibility and consumer acceptability of the product. There should be a mechanism for transfer of technology from available sources to countries or companies that need them.

5. With aid from industry, food fortification programmes should be planned to dovetail into a country or region's existing food production and distribution systems with minimum disruption and cost.

6. Food quality should be regulated through legislation and effectively enforced. In countries where there is no political will, it may be difficult to enforce legislation. Consumer unions can play an important role in ensuring that the food sector complies with food legislation by informing the consumers about the importance of fortification and lobbying the government and food industry to fortify specific foods.

All available media should be used to educate the population on the consequences of micronutrient malnutrition and on the importance and safety of fortified foods. Consumers should be educated to demand better products.

7. Regardless of external input, nothing can succeed without

Table I. Basic criteria for food fortification: contribution by industry

- Demonstrate the need for the nutrient
- Vehicle must reach the population — centralised processing is preferable
- Amount of fortificant added must supply adequate intake when the vehicle food is consumed in normal amounts
- Amount of fortificant added is not harmful or toxic to individuals who consume high amounts of the vehicle food
- Fortificant should be biologically available and stable
- Fortificant should not cause any organoleptic changes to the food, e.g. flavour, shelf life, colour, texture or cooking properties of the vehicle food
- Fortification should be technically feasible
- There should be no significant change to the cost of the fortified food

Table II. Tasks to be accomplished by the food industry

- Development of food fortification technology
- Development of micronutrient product forms which are suitable for food fortification
- Development of a quality control programme
 - Assessment of micronutrient stability
 - Development of analytical methods and skills
- Development of a marketing strategy
- Consumer survey studies (consumer attitudes, product positioning)
- Assessment of costs and effects on food pricing

adequately and well-trained people. Specialised training is especially called for in the assessment, fortification, quality control and monitoring and evaluation procedures, much of which could be assisted by industry.

8. Effective monitoring of process and outcome variables is critical as programmes are developed and implemented. Measurement of food quality and fortificant levels in the foods at different levels from production to consumption is an essential step to ensure that adequate quantities of nutrients are reaching the population. This must be combined with periodic estimation of clinical and biochemical indicators to evaluate the impact of the intervention. Programmes should be envisioned as long-term, with evaluation as an essential component to identify progress, problems and needs.

9. Intersectoral and international mechanisms of co-operation and co-ordination should be established to control distribution and marketing of fortified foods. An initiative may be called for to ensure that all wheat flour, maize meal, dry skimmed milk powder, salt and processed foods exported to the developing countries are fortified with micronutrients at a level that the importing country may specify.



TECHNOLOGY AND EQUIPMENT REQUIREMENTS OF THE FOOD INDUSTRY

Flour and maize meal

Using a premix of micronutrients ensures that there is a greater likelihood of the correct concentration of micronutrients as well as an even distribution of micronutrients in the food which is fortified. Furthermore, the logistics of adding micronutrients to food will be simpler and the quality assurance system is more likely to be effective.

The fortification process for flour and maize meal is accomplished by adding the micronutrients through a volumetric feeder which is located towards the end of the milling process. The amount of premix added to the flour or meal can be modified by changing the motor speed. The concentration of premix added to the flour or meal is calculated by weighing the amount of premix deposited by the feeder in one minute divided by the volume of flour or meal passing underneath at the same time.

Sugar

As the quantity of vitamins added to sugar is usually small, production of a homogeneously fortified product is facilitated by diluting the vitamins in a small amount of sugar to form a premix. This is mixed in a blender with a spraying device attached to it, which allows the vitamin mix to be added during the mixing operation. The addition of this premix to sugar can be accomplished manually or automatically. In manual operations, the premix is added into the centrifuges, which is not ideal owing to the fact that the accuracy is dependent on the operator. In automatic operations, feeders are placed at different sites along the production lines, preferably just before packaging.

COSTS OF FORTIFICATION

The cost of fortification is much lower than is generally recognised.

Considering the mandatory addition of nutrients to flour in the USA (6.4 mg/kg vitamin B₁, 4.0 mg/kg vitamin B₂, 52.9 mg/kg niacin, 44.1 mg/kg iron) and assuming the average wheat consumption is 205 g per person per day, the total cost of fortification is US\$0.07 per person per year or less than US\$1.00 per metric ton of flour.

Adding vitamins A, B₁, B₂, B₆, niacin, folic acid and iron to maize meal to ensure that 25% of the RDA after cooking in a serving size of 200 g of dry product is provided, would cost US\$2.3 per ton of meal.

In Guatemala, where sugar is fortified with vitamin A, the fortified sugar costs only 2% more than the non-fortified sugar. The costs of sugar fortification, including capital investments (i.e. building and equipment costs), personnel costs, premix

and fortified sugar production as well as monitoring and evaluation costs, is in the region of US\$9.51 per metric ton of sugar or US\$0.36 per person per year.

LEGISLATION

Effective fortification programmes need to be supported by suitable legislation and regulations. The entire process must be legally controlled by the existence of suitable mechanisms, which should be supported by industry. The assumption cannot be made that the mere existence of legislation and regulations will ensure that fortification takes place. Awareness among all role players, particularly policy makers, together with legal control, will assist in accelerating the fortification process and help to protect the consumer from irregular practices.

Private industry is often capable of taking appropriate action to fortify foods even in the absence of legislation or regulations. Encouraging such an action requires some level of advocacy and activities to create the need. Sometimes in place of legislation, it is more effective to enforce a regulation based on a food law. Regulations do not have to be officially passed by parliament. It is important to monitor any amendment proposed by others that might weaken the regulation or law, making the programme difficult to administer. Effective enforcement and penalties for non-compliance are absolutely essential. However, it is more important to motivate the food industry to comply through education. Marketing advantages may also be gained by industries that take the initiative to fortify appropriate foods.

CONCLUSION

Fighting against micronutrient malnutrition, the food industry is playing an increasingly complex and critical role throughout the world. It is hoped that the food industry in South Africa, in conjunction with all relevant role players, will expand this food fortification concept into a long-term and sustainable solution to this global problem.

Bibliography

Lofth M, Venkatesh Mannar MG, Marx RJHM, Naser-van den Heuvel P. *Micronutrient Fortification of Foods. Current Practices, Research and Opportunities*. Ottawa: The Micronutrient Initiative, 1996.