

# FORTIFICATION OF FLOUR WITH IRON



BASED ON A JOINT WHO / UNICEF / MI STRATEGIC  
DEVELOPMENT WORKSHOP ON FOOD FORTIFICATION WITH  
SPECIAL REFERENCE TO IRON FORTIFICATION OF FLOUR, HELD  
IN MUSCAT, OMAN, 26 - 30 OCTOBER 1996

# IN COUNTRIES OF THE EASTERN MEDITERRANEAN MIDDLE EAST AND NORTH AFRICA



WORLD HEALTH ORGANIZATION  
UNITED NATIONS CHILDREN'S FUND  
THE MICRONUTRIENT INITIATIVE

**FORTIFICATION OF FLOUR  
WITH IRON  
IN COUNTRIES OF THE  
EASTERN MEDITERRANEAN  
MIDDLE EAST  
AND NORTH AFRICA**

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World Health Organization/UNICEF/Micronutrient Initiative  
Strategic Development Workshop on Food Fortification with Special  
Reference to Iron Fortification of Flour, which was held in Muscat,  
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## ***Foreword***

Iron deficiency anaemia is a serious public health problem in all countries of the Eastern Mediterranean Region of the World Health Organization (WHO) and the Middle East and North Africa Region of the United Nations Children's Fund (UNICEF), and can have a profound effect on psychological and physical development, behaviour and work performance. It is the most common nutritional disorder, both in the Region and in the world as a whole.

Iron-deficient individuals are significantly less productive than those with normal haemoglobin levels. Even mild anaemia can decrease performance in physical labour. An impaired work capacity results in a reduced ability to care for the family, reduced productivity and reduced income. Anaemia in pregnant women can lead to intrauterine growth retardation, low birth weight, increased perinatal mortality and increased maternal morbidity and mortality. Morbidity from infectious diseases is increased in iron-deficient populations because the immune system is adversely affected. This is compounded by vitamin A deficiency, even in a subclinical form. Last, but not least, iron deficiency negatively affects cognitive behaviour and learning capacity. It is estimated that iron deficiency may result in as much as a 10-point reduction in a child's potential intelligence quotient (IQ), although this must be seen in light of other nutritional deficiencies prevalent in the Region which also have a negative effect on learning capacity, notably iodine deficiency.

Iron deficiency is a function of the body's requirements, losses from the body and dietary intake. The total dietary iron intake in the Region is generally below recommended levels. This situation is made even worse by the high consumption of foods rich in iron-absorption inhibiting factors, such as tea and unleavened bread. In addition to dietary factors, childbearing patterns, parasitic infections and consanguinity contribute to the high prevalence of iron deficiency anaemia in the Region.

Most countries in the Region have programmes that aim at routine supplementation of pregnant women with iron/folate tablets. However, it is clear from the persistently high prevalence of anaemia that no real improvements have been achieved to date.

In view of the persistence of the problem and the lack of real progress in reaching the target of a reduction of 1990 anaemia levels by 30% agreed at the World Summit for Children (1990) and the International Conference on Nutrition (1992), WHO and UNICEF called a consultation of experts, in October 1995, to develop effective strategies for the control of iron deficiency which would be suitable for countries in the Region.

The consultation recommended that such strategies should address improvement of iron intake, enhanced absorption of the iron consumed and

reduction of iron losses. The strategies agreed upon were dietary measures, including changing eating behaviour, iron supplementation of vulnerable groups, food fortification and public health measures. Based on these strategies, the consultation developed guidelines for iron deficiency control programmes, with priorities for intervention in different socioeconomic settings. These guidelines have been published as a WHO/UNICEF document, *Guidelines for the control of iron deficiency in countries of the Eastern Mediterranean, Middle East and North Africa*.

The consultation recognized that fortification of suitable foodstuffs, notably flour, had been the single most effective means of improving iron intake in industrialized countries and recommended that countries explore the feasibility of flour fortification as a long-term strategy.

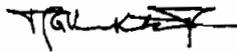
WHO, UNICEF and the Micronutrient Initiative (MI) decided therefore to organize a workshop to share the experiences already gained in countries within and outside the Region and to address the issues involved in food fortification, ranging from the practical details at the technical level to the broader issues of legislation, monitoring and evaluation.

The present document is based on the deliberations and decisions of the workshop and should assist all countries in the Region in the fortification of flour with iron, and possibly with other important micronutrients such as zinc and folic acid. It addresses many important issues in flour fortification with iron, such as mandatory versus voluntary fortification, legislation and standards, technical issues and monitoring and evaluation, and gives Region-specific options and solutions based on the deliberations of the workshop and the consensus reached by the participants.

We expect that this document will be an important guide for countries in the Region in their endeavours to reduce the burden of iron deficiency and anaemia.



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## **Executive summary**

### **Introduction**

A joint WHO/UNICEF/MI Strategy Development Workshop on Food Fortification with Special Reference to Iron Fortification of Flour was held in Muscat, Oman from 26 to 31 October 1996. Representatives from ministries of health, the milling industry, bureaus of standards and ministries of commerce from 11 countries in the Region<sup>1</sup> participated in the workshop.

The general objective of the workshop was to achieve effective food fortification with essential micronutrients, especially iron, by the year 2000 in countries in the Region.

The specific objectives were

- to develop the capacity for effective food fortification at the national level, including technical know-how, legislation, monitoring and evaluation mechanisms
- to develop a regional support mechanism for follow-up of food fortification in terms of technical expertise, exchange of experiences, standards and legislation and quality control
- to establish a working relationship between the public and private sectors and the consumers in the area of food fortification.

The following is a summary of the decisions taken and actions proposed by the participants to combat iron deficiency anaemia in the Region.

### **Iron deficiency anaemia**

Anaemia, largely due to inadequate intakes of iron, is a major problem in all countries in the Region. The prevalence of anaemia is highest in women and children. Anaemia in children impairs both physical and mental development. Anaemia in pregnancy contributes to maternal mortality and poor pregnancy outcome. In most countries in the Region the prevalence of anaemia in women and children was reported to be moderate or severe.

Participants noted that all of their countries had accepted that the high prevalence of anaemia in their populations was unacceptable, and through various international agreements, for example at the World Summit for Children and the International Conference on Nutrition, had made the commitment to improve the situation.

Micronutrient fortification of food is an effective strategy for improving nutrition. In particular, the fortification of wheat flour with iron could

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<sup>1</sup> The Region refers to the countries of the Eastern Mediterranean Region of WHO and countries of the Middle East and North Africa Region of UNICEF, many of which are the same (Annex 5).