

## Potential of Using QBmix to Prevent Micronutrient Deficiencies in Emergencies

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Household survey on how QBmix is used



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### Box 1 A guide to Pellagra

Pellagra is caused by Niacin (Nicotinic acid) deficiency. The condition can be fatal and is often associated with other B vitamin deficiencies. Niacin (vitamin B3) is a water-soluble vitamin widely distributed in plant and animal food, but in very small amounts. Rich sources of niacin include groundnuts, fish, meat and pulses. The body can synthesise niacin from the amino acid tryptophan.

The recommended daily requirements range from 13 to 15 mg nicotinic acid equivalent for women and 16 to 19 mg for men. During pregnancy and lactation, an additional 2 and 5 mg nicotinic acid respectively, are required. For infants and children, 6 and 11 mg daily are recommended, respectively.

The initial clinical features of pellagra are non-specific and include anorexia, prostration, weight loss, headache and a burning sensation in the mouth. The fully developed syndrome, described by the "three D's", consists of dermatitis, gastrointestinal symptoms (diarrhoea), and finally mental impairment (dementia). The dermatological signs are usually most prominent, symmetrically affecting sun exposed areas like the arms ("pellagra gloves"), the cheeks in a butterfly distribution, and the neck and upper chest ("Casal's necklance"). Eventually the fourth 'D' can occur - death. When a niacin and/or tryptophan - deficient diet is consumed, the lead-time for developing signs of pellagra is about 2 to 3 months.

Populations consuming maize or sorghum and little else are at risk of pellagra. Niacin deficiency is now endemic at very low levels amongst the rural poor in Africa where maize is the principal cereal. Examination of rural health centre records may show a few cases - especially during the 'hungry season'. However, outbreaks of pellagra have only occurred in recent years amongst emergency affected populations, including Mozambican refugees in Malawi, Bhutanese refugees in Nepal, emergency-affected populations in Angola, and refugee returnees to Mozambique.

Strategies to prevent outbreaks of pellagra in emergencies include diversifying the general ration to include bioavailable sources of niacin, fortification of foods when maize is a staple food in the ration, allocation of surplus foods to allow food sale or food exchange for another food commodity, vitamin tablet supplementation, and cultivation or production of foods by the affected population.

Adapted from: Pellagra and its prevention and control in major emergencies. WHO/NHD/00.10 Available online at [http://www.who.int/nut/documents/pellagra\\_prevention\\_control.pdf](http://www.who.int/nut/documents/pellagra_prevention_control.pdf)

*This article describes an assessment by MSF of using a micronutrient-rich food product, QBmix, in Angola and outlines possible strategies for the future in preventing micronutrient deficiency outbreaks in emergency affected populations<sup>1</sup>.*

Since the 1990s, Médecins Sans Frontières-Belgium (MSF-B) have worked in Kuito, Angola, as well as in several IDP (internally displaced person) camps around Kuito town. One of these camps, Kaluapanda, was established in March 2002 and has an estimated population of 4,400 people. During this period, MSF have been involved in a number of large scale emergencies in Kuito. However over the past year (2003), the situation has become much more stable, with the displaced population beginning to return home. The current MSF programme focuses on treatment of malaria and TB. MSF have also been implementing a pellagra treatment programme, which at the time of the study described in this article, was receiving 20-30 new patients every week. Most of those in this treatment programme were living in the city.

Between June 1999 and November 2002, there were four outbreaks of pellagra in Kuito town<sup>2</sup>. A total of 3859 cases were recorded during this period. During the first two outbreaks in 1999, the displaced population was the main group affected, with an attack rate of 4.7 per 1000 population. During the latter two outbreaks (2001 and 2002), it was the resident population who were most affected, with attack rates of 7.1 (in 2001) and 5.5 (in 2002) per 1000 population. In all outbreaks, women aged 15 years and older were the largest affected group.

Strategies to deal with micronutrient deficiency disease outbreaks like these, include food fortification, dietary diversification and supplementation (see box 1). However, these strategies all have inherent difficulties. For example, fortification requires that

<sup>1</sup> Micronutrient supply in emergencies. Logistic feasibility and population acceptability of food supplementation with QBmix, Kuito, Angola. Evelyn Depoortere, January 2004

<sup>2</sup> See Field Exchange 10, A Pellagra Epidemic in Kuito, Angola, by Sophie Baquet and Michelle van Herp

**Box 2 Profile of QBmix**

QBmix is manufactured by Nutriset. It has a shelf life of one year after manufacturing date, but studies are ongoing to improve this. It is recommended to store the product in a cool, dry place, below 30°C.

Use: QBmix is added to the family meal, like a condiment, after cooking only (not to destroy the vitamins). Preparation guidelines state to prepare the meal as usual, add QBmix® to the dish and mix well.

Recommended dose: One 210 g sachet meets the needs of 10 people for 2 weeks. A daily intake is not necessary - 21 g per person for a period of 2 weeks is sufficient (1.5 g/day) in 2 or 3 intakes per week. Overdosing is unlikely due to the very salty taste.

One 1.5 g dose of QBmix contains 7 mg iron, 400 mg folic acid, 34 mg selenium, 7 mg zinc, 600 mg vitamin A, 1.2 mg vitamin B1, 1.3 mg vitamin B2, 16 mg niacin, 5 mg vitamin B5, 1.3 mg vitamin B6, 2.4 mg vitamin B12, 90 mg vitamin C and 10 mg vitamin D. The equivalent of the height of the screw top gives 1.5 g of QBmix.

*Adapted from the Nutriset QBmix guidelines for usage*

all people vulnerable to deficiency consume the food 'vehicle', while the use of supplement tablets or capsules may place a considerable strain on an already overworked local health system.

The recent development of QBmix<sup>3</sup>, a mineral and vitamin rich condiment, offers an alternative to the above strategies (see box 2). In order to assess the feasibility and acceptability of using QBmix in an emergency-affected and food aid dependent population, MSF-B and Epicentre collaborated with the Nutrition Department in the Ministry of Health to test the product out in Angola. Specific objectives of the study were to:

- compare the overall cost involved of using Corn Soya Blend (CSB) and QBmix<sup>4</sup>
- describe advantages and difficulties related to introduction and use of QBmix
- describe the population's perception and acceptance
- make recommendations to MSF regarding the integration of QBmix in their future response to nutritional emergencies.

**Study design**

Two different groups were sampled for the study. The first group consisted of pellagra patients admitted in the MSF treatment programme, while the second group targeted recently displaced families dependent on external food aid, and therefore at risk of micronutrient deficiency disease.

As the two target populations were different, they were treated as independent samples. Overall, 116 of the 168 pellagra patients who had received QBmix, and a random selection of 233 displaced families in Kaluapanda, were interviewed.

Acceptability of QBmix was assessed through a questionnaire administered during a population survey and was expressed as the proportion of families that used the product correctly and liked it. A total of 10 interviewers were trained to administer the questionnaire. Questions address-

**Table 1 Acceptance of QBmix in pellagra patients and displaced families in Kuito, Angola**

	Pellagra patients (n = 116)		Displaced families (n = 232)*	
	n	%	n	%
Frequency of QBmix use				
• Every day	108	93.1	229	98.7
• 2 or 3 times a week	7	6.0	3	1.3
• Other	1	0.9	0	0.0
Easy to use QBmix	109 <sup>†</sup>	94.0	232	100.0
Easy to add right quantity	111 <sup>†</sup>	96.5	228 <sup>‡</sup>	98.7
Used screw top as measure	112	96.6	227	97.8
Added QBmix after cooking	115	99.1	228	98.3
QBmix left over	80	69.0	53	22.8
Like to use	115 <sup>†</sup>	100.0	232	100.0
Like the sachet (packing)	114 <sup>†</sup>	99.1	232	100.0
Easy to dose	111 <sup>†</sup>	96.5	232	100.0
Clotting	32 <sup>**</sup>	27.8	3	1.3
Like the texture	113	97.4	232	100.0
Like the colour	116	100.0	232	100.0
Like the smell	112	96.6	232	100.0
Like the taste	116	100.0	232	100.0
Too salty	5	4.3	0	0.0
Refused by family	10 <sup>†</sup>	8.7	4	1.7
Family wants more	110	94.8	229 <sup>**</sup>	99.6
Someone felt unwell	7 <sup>†</sup>	6.1	2 <sup>**</sup>	0.9

\* The one family who did not use the QBmix is no longer included in the denominator  
<sup>†</sup> One missing value, <sup>\*\*</sup> two missing values, <sup>‡</sup> three missing values

**Table 2 Comparison of CSB and QBmix needs for 1000 persons for 30 days**

	60g CSB/p/d	100g CSB/p/d	QBmix
Total quantity	1800 kg	3000 kg	45 kg
Volume	72 bags	120 bags	215 sachets
Buying price	738,72 euro	1231.2 euro	361.2 euro
International transport	3600 euro	6000 euro	90 euro
National transport (truck)			
• MSF truck	• 28 euro	• 16.8 euro	• 0.42 euro
• Rented truck	• 223.2 euro	• 372 euro	• 5.58 euro

Source: MSF-B logistics in Luanda, Feasibility and costs assessment, Kuito, Angola, October 2003  
 Note: Prices originally given in US dollar, were converted to euro at the rate of 1.25 USD for 1 Euro.

sed included confirmation that families received QBmix, verification of how it was used, whether it was accepted by the family, and what was the perceived usefulness of the product.

Feasibility was based on estimating the micronutrient needs of 1000 people for 30 days and the weight, volume and transport costs compared to CSB. Caloric value (which is relevant for CSB but not QBmix) was not considered.

**Acceptability and feasibility of using QBmix**

Both groups, in general, reacted positively and liked QBmix (see table 1). The large majority used it correctly, adding it only after cooking, and using the screw top as a measure. Five pellagra patients (4%) (but no displaced families) said it tasted too salty, while seven (6%) said it made them feel unwell or sick. A small proportion of the pellagra patients (12.9%, n=15) and dis-

placed families (5.2%, n=12) said they would not be prepared to buy it on the market, and various reasons were given for this (also table 1). Only one family did not use the QBmix at all because they did not like it.

All pellagra patients and displaced families considered QBmix to be good for health. Between 15% (patients) and 27% (displaced) said they did not add salt to a meal with QBmix.

Table 2 shows a comparison, in volume and cost, between CSB and QBmix. In order to meet micronutrient needs for a food aid

<sup>3</sup> QBmix is a registered trademark and is part of a range of products patented by IRD/Nutriset  
<sup>4</sup> The World Food Programme (WFP) policy dictates that fortified Corn Soy Blend (CSB) is provided for populations completely dependent upon food aid and, therefore, at risk of micronutrient deficiency disease

## Field Article

dependent population, 60 100g/person/day of CSB are needed compared to 1.5g of QBmix/person/day. Thus for the equivalent micronutrient supply for 1000 people for 30 days, 40-66 times the weight of CSB is needed compared to QBmix. CSB needs to be transported by ship, which takes about 3 weeks to arrive in Luanda and 2-3 weeks for custom clearance. For QBmix, transport can be by plane (and therefore quicker) or ship.

Storage conditions for CSB and QBmix are similar, both needing dry conditions. CSB comes in plastic bags of 25 kg, while QBmix comes in aluminium sachets of 210g (70 sachets in 1 carton box). QBmix must be stored below 30 Centigrade. The shelf life for CSB is between 6-18 months but vitamin content declines over time. Shelf life for QBmix is at least 12 months, during which time the micronutrient content remains stable.

As required quantities of CSB are much greater, there is a time element involved in setting up appropriate distribution systems, whereas sachets of QBmix can be given out quickly. However, given its unfamiliarity, it does take time to explain why and how to use QBmix. For beneficiaries, it is obviously easier to take home a few sachets compared to a 9-15 kg bag.

### Discussion

Nearly all QBmix recipients found it easy to use, liked the taste and smell and would like to have more of it available in the future. Moreover, they would be ready to buy the product on the market if it were available. The majority of sachets were empty and many people spontaneously asked to receive more. Also, experience has shown that people in sub-saharan African like salty tastes, e.g. QBmix has been used to prepare meals in a prison in the Ivory coast after an outbreak of beriberi and was well accepted.

Compared to CSB, the volume and weight needed is considerably less for QBmix, leading to lower international and national transport costs. However, CSB also provides calories (380kcal per 100g) and people are familiar with it. In contrast, QBmix has few calories and people are unfamiliar with it, so resources are

needed to explain the role and use of the product.

The results of this study cannot be generalised or extrapolated to other situations. For example, in Afghanistan, mothers in a therapeutic feeding centre did not like an earlier version of the product. A standardised questionnaire has limitations, e.g. it may not capture all the information available from respondents. Furthermore, recipients were in a position of

### Strategies for the future

In Angola, the need for QBmix has become less relevant, as fortified maize is scheduled for distribution and the situation is increasingly stable, with more people having access to a diversified diet. In other situations where MSF intervenes, QBmix and/or other products now on the market such as Topnutri-Fam, a nutrient concentrate that comes in the form of powder, may be more appropriate, and clear operational indications have now been defined. Even though these products are not the solution, they do provide one possible tool to prevent micronutrient deficiencies where there are no other sources of vitamins or minerals.

In large-scale emergencies, when the general ration programme is erratic, or unbalanced in terms of micronutrients, ready-to-use micronutrient supplementation products should systematically be distributed to vulnerable populations. This type of supplement can also be used in other situations. For example, for hospitalised patients, patients in TB or HIV treatment programmes, or in a prison setting, where the product could be systematically added to prepared meals 2 or 3 times per week. Although medical humanitarian agencies may not be directly involved in the distribution of general food rations, they do have a role in ensuring people have an adequate supply of micronutrients. Activities for such agencies could, therefore, involve lobbying for the use of this form of micronutrient supplementation with those agencies resourcing and/or implementing nutritional interventions, and social marketing in order to promote and explain the use of this type of product.

When introducing this type of new product onto the market, clear and adapted information should be given to the target population. For example, specifically for QBmix, key information to give at the time of distribution should include the following practical messages:

- the mix contains vitamins and minerals essential for health
- use one screw top per person
- use every day if possible, but 2-3 times per week is sufficient
- salt can be added if desired
- the mix should be added to the meal after cooking.

In order that the recipient population fully comprehend the role and significance of a product like QBmix, 'reference' persons from the community should be appointed who can be referred to at all times.

In conclusion, new products are now available on the market, which should facilitate the prevention of micronutrient deficiencies in food aid-dependent populations in emergencies. Aid agencies should be aware of the existence of these products and be ready to use them when indicated.

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dependence on food aid so they may have not felt free to say what they really thought. They may have been afraid of being excluded from food distribution and felt that if they said what was expected, this would ensure they received the product again.

In the pellagra group, interviews were not necessarily conducted with those who prepared the meal. It was the patient who received the QBmix who was interviewed, so that the information was second hand.



Explaining the use of QBmix

<sup>5</sup> Produced by DANature Foods/Compact AS, Norway.