SUPPLEMENTATION FOR PREGNANT AND BREAST-FEEDING WOMEN WITH *MORINGA OLEIFERA* POWDER

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Malnutrition is a worldwide scourge. It is rampant both in under-developed countries, as an outcome of food deficiencies resulting from under-nourishment, and in developed countries, where it is due to obesity resulting from wealth and over-eating. Under-nourishment and over-eating both have harmful consequences for the health of the individual.

In Africa, malnutrition is linked with several factors:
- geographical: arid climate, drought;
- economic: poverty, unemployment;
- social: ignorance, bad eating habits, food taboos for pregnant and breast-feeding women;
- demographic;
- political: war, refugees, displaced persons.

All these factors make the malnutrition phenomenon difficult to control.

In Senegal, the prevalence of malnutrition among pregnant and breast-feeding women tallies with the rate of malnutrition among children; this rate rose from 5.8% in 1986 to 12% in 1993.

The devaluation of the CFA franc in 1994 made households, whose purchasing power was already low, even more impoverished. In such circumstances the whole family is affected; pregnant women, breast-feeding women, and children in particular.

Malnutrition aggravates all pathological conditions and further weakens pregnant and breast-feeding women. It is also involved, either directly or indirectly, in infant and maternal mortality and disease. The rate of maternal mortality in Senegal is 580 per 100,000 live births and the rate of infant and juvenile mortality is 143 o/oo according to the 1997 EDS (survey on health indicators).

In the face of this public health problem, the government of Senegal, together with the World Bank (World Food Programme--WFP) and German government cooperation, has introduced a community-based strategy to fight malnutrition. It concerns pregnant women as from the sixth month of pregnancy and up to six months of breast-feeding, and children aged between six months and three years. This PNC (community nutrition) programme promotes use local products such as millet, maize and beans for improving nutrition. However, follow-up evaluations have shown that these target groups, which are supplemented for a six-month period, are malnourished again after twelve months of no supplementation. So the supplementation strategy lasting for a given period of time has not produced the anticipated results.

The solution to malnutrition lies in prevention and this can be done in several ways. But the choice of product must comply with certain criteria: accessibility, availability on the market, low cost, ease of preparation, general acceptance, of benefit to the entire family, ease of cultivation. In a nutshell, a product that solves the problem in a lasting way.

This product might well be *Moringa oleifera*, because scientific research has shown not only the rich content of the powder made from its dried leaves in terms of proteins, energy, mineral salts, vitamins and fibres, but also its ability to meet daily nutritional requirements for pregnant and breast-feeding women by the administration of small quantities (25 g.). With a dose of 25 grammes of *M. oleifera* leaf powder, the requirements of pregnant and breast-feeding women are met as follows: protein 21%, calcium 84%, iron 94%, vitamin C 143%, vitamin A 69%, magnesium 26%.

Moringa oleifera powder has been tested among pregnant women at the Belfort clinic (Ziguinchor) to remedy cases of anaemia. Supplementation is carried out on the basis of the following table

Pre-natal consultation / Haemoglobin level	PNC1	PNC2	PNC3	Breast-feeding period
11-14g	tbsp twice daily	1tbsp twice daily	1tbsp twice daily	1tbsp twice daily up to 6 months for pregnant women & 1 tsp 3 times daily for children
7-10 g	tbsp 3 times daily	tbsp 2 times daily + 1 100g iron tab + 1 250g ViC tab every three days	tbsp 2 times daily + 1 100g iron tab + 1 250g ViC tab every three days + 250 ml moringa juice from fresh leaves	1 tbsp twice daily up to six months for pregnant women & 1 tsp 3 times daily for children from sixth month
6-3.5g	tbsp 3 times daily + 1 100g iron tab + 1 250g ViC tab every three days + 250 ml moringa juice from fresh leaves	tbsp 3 times daily + 1 100g iron tab + 1 250g ViC tab every three days + 250 ml moringa juice from fresh leaves	tbsp 3 times daily + 1 100g iron tab + 1 250g ViC tab every three days + 250 ml moringa juice from fresh leaves	1 tbsp twice daily up to six months for pregnant women & 1 tsp 3 times daily for children from sixth month

Supplementation is based on the stage of the pregnancy and the haemoglobin level. The possibility of giving birth by breach delivery or Caesarean section must always be assessed previously.
This experiment shows that, with *Moringa oleifera* leaf powder, anaemia is remedied after six weeks of regular doses of 25 grammes a day. Haemoglobin checks are made at each pre-natal consultation and readjustments made based on the box corresponding to the new haemoglobin level.
Out of 320 pregnant women taking *Moringa oleifera* supplement (April 1999 to April 2001), 248 gave birth at the clinic. The weight of the newborn infants is summarized in the following chart:

Number of infants	Weight
21	4 kg +
48	between 3.5 and 3.9 kg
161	between 3 and 3.4 kg
8	between 2.5 and 3 kg
10	<2.5 kg, including 8 twins

No maternal deaths or still-births were recorded among these women taking supplements.

Assessment limits

Monitoring and follow-up were expensive for these women, because they have to be sent to the reference centre for haemoglobin check, there being no haemogram in the service.
There were also problems meeting the demand for *Moringa oleifera* powder

The drop-out rate was 22.5% of the women.

Among breast-feeding women, consumption of *Moringa oleifera* powder increases milk production, which means that this product offers not inconsiderable back-up for women exclusively breast-feeding their infants.
Consumption of *Moringa oleifera* protects infants from certain infectious diseases. Monitoring the weight of breast-feeding infants (weighing sessions) reveals that 80% of the children out of the 248 have an ideal weight in relation to their age, and the health of mothers taking *Moringa oleifera* is satisfactory.

Conclusion

Assessment of supplementation using *Moringa oleifera* powder among pregnant and breast-feeding women is for the most part positive and satisfactory. I should be pleased to see training classes about the nutritional properties of *Moringa oleifera* spreading throughout Senegal, and I should like to see *Moringa oleifera* being introduced into the National Nutrition Programme, so as to eradicate malnutrition at family and community levels.