

Sharing of the maternal food supplement by the family members is a major problem of supplementary nutrition programs for underprivileged pregnant and lactating women.

The objective of the present investigation was to formulate a special food supplement for the pregnant and lactating beneficiaries of the Integrated Child Development Services (ICDS), specially in Western India, with a focus on reduction of sharing and therefore targeting the food to the actual beneficiaries. The choice of the food supplement was a biscuit with the flavor of fenugreek (*Trigonella foenum graecum*) seeds. This was based upon a traditional food called **methipak** (methi-fenugreek; pak-a sweet meat) specially consumed during pregnancy and lactation in Western India. It was hypothesized that the sharing would be reduced because (1) fenugreek is consumed during pregnancy and lactation (in the form of methipak) for its therapeutic properties and therefore the women might not be inhibited from consuming it themselves and (2) fenugreek seeds impart a characteristic bitter flavor and therefore the product might be less acceptable to the children who are reported to be the major sharers of the maternal supplement.

Four inter-linked studies were carried out. In the first study, the habits, beliefs and consumption practices of methipak were explored by interviewing 662 pregnant, lactating or nonpregnant-nonlactating women from low, middle and high income groups of Baroda. The practice of consuming methipak was far stronger in lactation (85%) than in pregnancy (27%). Major perceived benefits in lactation were minimizing bodyaches, galactogogic and strengthening qualities; and in pregnancy lessening body aches and easy delivery. the major negative quality was its 'hot' and abortifacient nature. Important reasons for non-consumption in low-income group (main target) were inability to afford it and/or ignorance. It was consumed in the last trimester of pregnancy and 10 days post-partum for approximately one and a half months. Approximately 50 g were consumed every day in the morning. Generally, methipak prepared for pregnant and lactating women was not shared by family members. Thus it was concluded from this survey that methipak would form a good basis for product development. However, the belief that it could cause abortions needed to be scientifically proved.

To establish the safety of consuming fenugreek seeds during pregnancy and also to determine if fenugreek seeds increased milk secretion, albino rats of Charles Foster strain were fed diets with 5% or 20% fenugreek seed powder during pregnancy and lactation. The birth outcome and the lactational performance of the fenugreek fed dams were compared with those fed casein diets without fenugreek. The results showed that the number of implantations and resorptions, placental and fetal weights

in the fenugreek fed groups were comparable to those in control groups. The growth<sup>2</sup> of the pups also was equally good in experimental and control groups. Thus the beliefs that fenugreek seeds caused abortions or increased milk secretion was not sustained by the experiments conducted on rats. It was concluded that it would be safe to incorporate fenugreek seed powder in the maternal supplement upto a level of 20%.

The purpose of the next study was to develop the product in such a way that it would be acceptable to the pregnant and lactating women but not acceptable to the children-specially the preschoolers. Biscuits were made with varying levels of fenugreek seed powder (0-6 g %) and were given for testing to the preschool children attending the ICDS centres in Baroda. It was observed that at or beyond 3% level of fenugreek, the acceptability of the biscuits was least among these children. Biscuits with 3% fenugreek seed powder were acceptable among majority of the pregnant and lactating women enrolled in the same ICDS centres. Since the biscuits were required in bulk, the recipe was also standardized by a local biscuits manufacturer i.e. the Windsor Foods Products Ltd, Baroda.

The final recipe contained fenugreek seed powder at a level of 4%. The biscuits had about 470 kcal and 12 g protein and were shelf stable for a minimum of 4 months under conditions of room temperature and humidity. The cost of the biscuits was approximately Rs. 1.40/- per 100 g which is the ration/subject/day.

In the last study, methi biscuits were field tested in ten ICDS centres for acceptability, regularity of collection, sharing characteristics and consumption. For comparison sweet biscuits were used. It was observed that the acceptability of methi biscuits was high as 85% pregnant and lactating subjects wanted to consume them. The regularity of collection for methi biscuits was fairly good as most of the women came to collect the biscuits for more than 70% of the distribution days. Sharing of methi biscuits was remarkably low as compared to sweet biscuits and more than 50% women consumed the complete daily ration of 100 g given to them. This resulted in substantial increase in their caloric intake, although the energy gap was not completely bridged. The women strongly associated methi biscuits with methipak and ascribed several therapeutic benefits to the biscuits. Thus it was feasible to use methi biscuits as a maternal supplement.

Based on the results of the foregoing studies, it is proposed that the present supplement for pregnant and lactating women in selected ICDS projects in Gujarat and Maharashtra be replaced by methi biscuits for a trial period of six months and the feasibility of using it in a reality situation be assessed.