

Drumstick leaves as source of vitamin A in ICDS-SFP.

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OBJECTIVE: This pilot study is about to assess the feasibility and acceptability of introducing dehydrated drumstick leaves, (DDL) (*Moringa oleifera*), as a source of vitamin A, into the salty recipes provided by the supplementary food (SF) component of the Integrated Child Development Scheme (ICDS) along with nutrition communication (NC). **METHODS:** An integrated approach was adapted in this study which included comprehensive training sessions for the staff of the ICDS and Non-government organization (NGO) involved in the SF preparations. Prior to the acceptability trials, data were elicited on the socio-economic profile and knowledge about vitamin A, from 60 children of 1-5 year of age attending two anganwadi centres of the ICDS. **RESULT:** From these, 40 children attending one anganwadi were supplemented with pre-tested DDL incorporated recipes (5-7 g DDI/100 g product) along with NC for one month. Spot observations and organoleptic evaluation results indicated high compliance of the DDL-recipes by the children. The results also indicated that the recipes were highly acceptable to the ICDS authorities as well as the NGO staff. **CONCLUSION:** The pilot study indicated that integration of NC along with the introduction of unconventional DDL, into the ICDS-SF, was feasible and can be endeavoured for a longer duration in the existing national programmes.

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Bioavailability trials of beta-carotene from fresh and dehydrated drumstick leaves (*Moringa oleifera*) in a rat model.

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Male albino rats (Charles Foster, n = 40) were fed a synthetic diet deficient in vitamin A for 4 weeks. Six rats died during the depletion period. Of the 34 surviving, 5 rats were continued on the vitamin A deficient diet for 4 more weeks and 24 were repleted with vitamin A (4000 IU/kg diet) in the form of vitamin A acetate (group A, n = 8), fresh drumstick leaves (group B, n = 8) or dehydrated drumstick leaves (group C, n = 8) for 4 weeks. The remaining 10 rats were continued on the vitamin A adequate diet for 4 (n = 5) and 8 weeks, respectively (n = 5). A marked reduction in food intake, body weight, accompanied by clinical signs of vitamin A deficiency and a decline in serum vitamin A (29.2 to 19.1 microg/dL) and liver vitamin A (3.7 to 2.0 microg/dL) were seen at the end of 4 weeks of feeding a vitamin A deficient diet. On repletion significant improvements in clinical signs, food intake and body weights were noted in the three groups compared to the baseline (n = 5) and at the end of 4 weeks of

depletion. The gain in body weight was highest for the group repleted with dehydrated drumstick leaves. Among the repleted groups, the serum vitamin A was highest for group A (34.7 microg/dL) given synthetic vitamin A, compared to group B (25.8 microg/dL) and group C (28.2 microg/dL) given drumstick leaves. All these were significantly higher than the serum vitamin A values seen at the end of 4 weeks of depletion (19.1 microg/dL). A significant improvement was also observed in the liver retinol levels on repletion for 4 weeks in the three groups, compared to the vitamin A depleted rats. These results imply that beta-carotene from drumstick leaves was effective in overcoming vitamin A deficiency although serum vitamin A levels remained somewhat lower compared to the group repleted with vitamin A acetate. In terms of growth parameters, the fresh and dehydrated drumstick leaves were better than the synthetic vitamin A. It is therefore concluded that in the developing countries like India, sources of vitamin A such as drumstick leaves are valuable in overcoming the problem of vitamin A deficiency.

Bioavailability of thiamine, riboflavin and niacin from commonly consumed green leafy vegetables in the rural areas of Andhra Pradesh in India.

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The physiological availability of thiamine, riboflavin and niacin from three green leafy vegetables -- amaranth (*Amaranthes gangeticus*), gogu (*Hibiscus cannabinus*) and drumstick leaves (*Moringa oleifera*) was calculated from individual dose response curves. The bioavailability of thiamine and riboflavin was higher from drumstick leaves curry, while the availability of niacin was higher from gogu curry. But the differences in the bioavailability of the vitamins from the experimental curries was not significant.

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