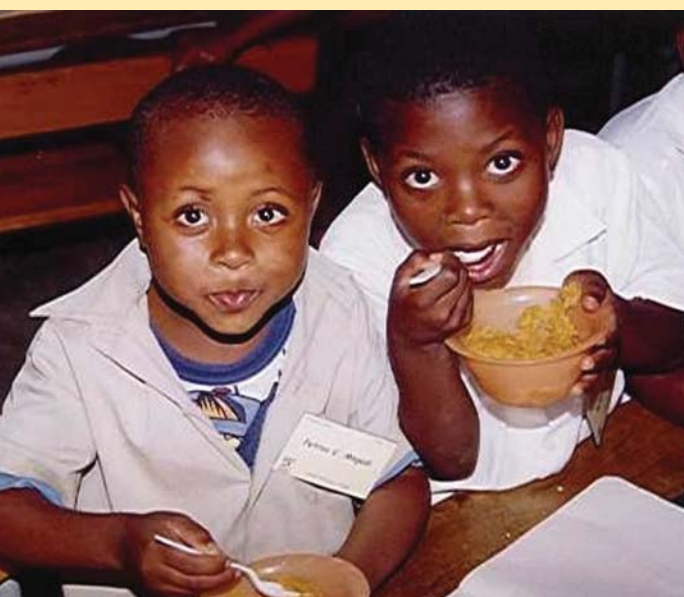




# Is there evidence that OFSP improves vitamin A status?

Promoting orange-fleshed sweetpotato (OFSP) as a food based approach to address vitamin A deficiency (VAD) is based on sound scientific evidence. Summaries of five studies that investigated the effects of OFSP intake on vitamin A bioavailability and status are presented below.



■ School children in South Africa in OFSP efficacy trial

**Jalal, F., M. C. Nesheim, Z. Agus, D. Sanjur, and J. P. Habicht. 1998. Serum Retinol Concentrations in Children are Affected by Food Sources of Beta-carotene, Fat Intake, and Anthelmintic Drug Treatment. American Journal of Clinical Nutrition 68, no. 3: 623-9.**

A study carried out in Sumatra, Indonesia examined the effect of food sources of beta-carotene, extra dietary fat, and *Ascaris lumbricoides* (a worm/helminth) infection on serum retinol concentrations in children. Serum retinol is a proxy indicator for vitamin A (VA) status in many community level studies. Meals and snacks with various amounts of beta-carotene and fat

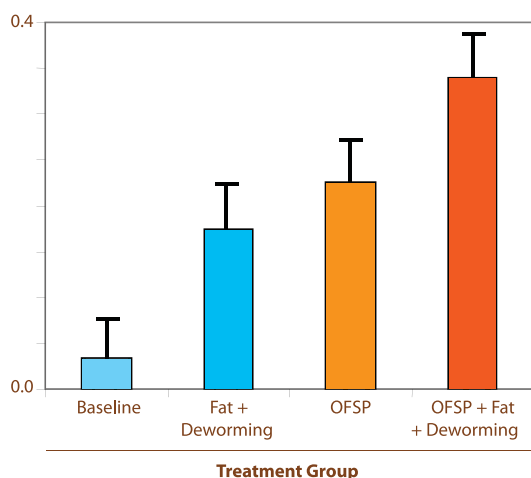
were fed at midday to children 3-6 years of age for 3 weeks. Some groups of children were dewormed with the drug levamisole before the feeding period, whereas others remained infected. Results showed that the incorporation of beta-carotene sources (mainly OFSP) into the meal significantly increased serum retinol concentrations. The greatest rise occurred when meals contained added beta-carotene sources and added fat and the children were dewormed (Fig. 1). Adding more fat to the meal and deworming the children caused a rise in serum retinol similar to that seen when feeding additional beta-carotene sources. When the meal contained additional beta-carotene sources, added fat caused further improvement in serum retinol concentrations only if *A. lumbricoides* infection was low. These results indicate that food-based interventions in VA deficient areas are warranted and that interventions such as increasing dietary fat intake and anthelmintic treatment should be considered alongside increasing use of beta-carotene-rich foods.

**Jaarsveld, P. J., M. Faber, S. A Tanumihardjo, P., Nestel, C.J. Lombard, A.J. Benade, 2005.  $\beta$ -carotene rich orange-fleshed sweet potato improves the vitamin A status of primary school children assessed with the modified-relative-dose response test. American Journal of Clinical Nutrition. 81, 1080-7.**

This Kwazulu-Natal Province study in South Africa sought to determine the efficacy of daily



**Figure 1.** Change in Serum Retinol (Vitamin A status indicator) (Jalal, et al., 1998)



OFSP consumption in improving the vitamin A status of primary school children (5-10 years). The treatment group (n=90) consumed 125 g of boiled, mashed OFSP, while the control group (n=90) ate white-fleshed sweet potatoes for 53 school days. VA status was measured by the modified-relative-dose-response test, a superior method to serum retinol determinations.

The treatment group showed significant improvement in VA liver stores compared to the control group, with the proportion of treatment children with normal VA status increasing from 78% to 87% after the intervention. There was no significant change in VA liver stores among the control group (86% to 82%).

**Low, J., M. Arimond, N. Osman, B. Cunguara, F. Zano and D. Tschirley, 2006. A food-based approach introducing orange-fleshed sweet potatoes increased vitamin A intake and serum retinol concentrations in young children in rural Mozambique. *Journal of Nutrition*. 137: 1320-1327.**

This 2 year quasi-experimental intervention study assessed the effectiveness of OFSP on serum retinol level over two agricultural seasons among young children (mean age at baseline 13 months) in two intervention districts (n=498) compared with a control group (n=243) in a non-intervention district in rural Mozambique. In intervention districts, OFSP was disseminated and promoted through community-level nutrition messaging and market development. Intervention children

consumed OFSP 3 or more days in the last week and had significantly higher VA intakes (426 vs. 56 µg retinol activity equivalent) compared to control children. The study also documented a significant increase in mean serum retinol in intervention children compared to baseline levels; no significant increase was recorded for the control group. A 15% decline in prevalence of VAD is attributable to the intervention.

**Haskell, M.J. K.M. Jamil, F. Hassan, J.M Peerson, M.I. Hossain, G.J. Fuchs, K.H Brown, 2004. Daily consumption of Indian spinach (*Basella alba*) or sweet potatoes has a positive effect on total-body vitamin A stores in Bangladeshi men. *American Journal of Clinical Nutrition*. 80:705-714.**

This study, undertaken to determine the relative efficacy of provitamin A carotenoids from plants sources for improving VA status, assessed quantitative changes in total body stores of VA in 70 Bangladeshi men. The researchers used the paired deuterated-retinol-dilution technique, measuring plasma (blood) retinol and carotenoid concentrations before and after 60 days of supplementation with four treatments: OFSP, Indian spinach (a green leafy vegetable) and synthetic vitamin A in two forms (retinyl palmitate or beta-carotene).

Mean changes in the VA pool size in the groups that consumed Indian spinach, vitamin A and beta-carotene were significantly larger than the control group. However, although the mean change in the OFSP group was larger compared to the control, the difference was not significant. Mean plasma retinol concentrations were significantly higher in all supplemented groups compared with the control. The study determined a conversion factor of 13:1 for OFSP cooked and pureed with a small amount of oil.

**Burri, B. 2011. Evaluating sweet potato as an intervention food to prevent Vitamin A deficiency. *Comprehensive Reviews in Food Science and Food Safety*, Vol. 10: 118-129.**

The study reviews the body of evidence concerning OFSP. Based on these results, the amount of OFSP needed to address VAD among the most at risk population globally is estimated at 2-11% of current world sweetpotato production.

The Reaching Agents of Change (RAC) Project advocates for increased investment in orange-fleshed sweetpotato food-based approaches to combat vitamin A deficiency (VAD) among children less than five years old and their mothers. RAC also builds institutional capacity to design and implement gender sensitive projects to ensure wide access and utilization of orange-fleshed sweetpotato in selected African countries. Its efforts contribute to the broader Sweetpotato for Profit and Health Initiative (SPHI) which aims to improve the lives of 10 million African families by 2020.

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