A Food-Based Approach Introducing Orange-Fleshed Sweet Potatoes Increased Vitamin A Intake and Serum Retinol Concentrations in Young Children in Rural Mozambique\textsuperscript{1–3}

Jan W. Low,\textsuperscript{4,10*} Mary Arimond,\textsuperscript{5} Nadia Osman,\textsuperscript{6} Benedito Cunguara,\textsuperscript{7} Filipe Zano,\textsuperscript{8} and David Tschirley\textsuperscript{9}

Abstract

Vitamin A deficiency is widespread and has severe consequences for young children in the developing world. Food-based approaches may be an appropriate and sustainable complement to supplementation programs. Orange-fleshed sweet potato (OFSP) is rich in \( \beta \)-carotene and is well accepted by young children. In an extremely resource poor area in Mozambique, the effectiveness of introduction of OFSP was assessed in an integrated agriculture and nutrition intervention, which aimed to increase vitamin A intake and serum retinol concentrations in young children. The 2-y quasi-experimental intervention study followed households and children (\( n = 741 \); mean age 13 mo at baseline) through 2 agricultural cycles. In y 2, 90\% of intervention households produced OFSP, and mean OFSP plot size in intervention areas increased from 33 to 359 \( m^2 \). Intervention children (\( n = 498 \)) were more likely than control children (\( n = 243 \)) to eat OFSP 3 or more d in the last wk (55\% vs. 8\%, \( P < 0.001 \)) and their vitamin A intakes were much higher than those of control children (median 426 vs. 56 \( \mu g \) retinol activity equivalent, \( P < 0.001 \)). Controlling for infection/inflammation and other confounders, mean serum retinol increased by 0.100 \( \mu g \) retinol activity/L (SEM 0.024; \( P < 0.01 \)) in intervention children and did not increase significantly in control subjects. Integrated promotion of OFSP can complement other approaches and contribute to increases in vitamin A intake and serum retinol concentrations in young children in rural Mozambique and similar areas in Sub-Saharan Africa. J. Nutr. 137: 1320–1327, 2007.

Introduction

Vitamin A deficiency (VAD)\textsuperscript{11} is widespread in young children in the developing world; globally, 127 million children are estimated to be affected (1). VAD can limit growth, weaken immunity, cause xerophthalmia leading to blindness, and increase mortality (2). The problem is severe in Mozambique, with an estimated prevalence of 71\% in children 6–59 mo (3). The 3 most common strategies for combating VAD are distribution of vitamin A supplements, food fortification, and food-based approaches that aim to increase access to and intake of vitamin A-rich foods. Although supplementation and fortification programs can be effective, sustainability has been an issue in some contexts, and an integrated strategy may be optimal (4).

Food-based approaches have been reviewed and judged to have a promising role in integrated strategies (5), but many gaps in knowledge were identified; more well-designed studies on efficacy, effectiveness, cost effectiveness, and sustainability of food-based approaches are needed. Recently, several small, controlled feeding trials showed increased serum retinol or improvements in vitamin A status after relatively short periods (3 wk–4 mo) of feeding \( \beta \)-carotene-rich plant foods, in some cases in combination with a fat source and/or deworming (6–11). In 3 of these trials, \( \beta \)-carotene was provided by orange-fleshed sweet potato (OFSP) (6,10,11).

\begin{thebibliography}{11}
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\bibitem{3} Supplemental Figure 1, Table 1, and the English version of the survey instrument (parts A and B) are available with the online posting of this paper at jn.nutrition.org.
\bibitem{4} J. W. Low was with the Department of Agriculture Economics, Michigan State University at the time of this study.
\bibitem{5} Abbreviations used: CRP, C-reactive protein; DBS, dried blood spot; FCT, food composition table; MISAU, Nutrition Division, Ministry of Health, Mozambique; OFSP, orange-fleshed sweet potato; RAE, retinol activity equivalent; SSA, Sub-Saharan Africa; VAD, vitamin A deficiency.
\bibitem{10} To whom correspondence should be addressed. E-mail: j.low@cgiar.org.
\end{thebibliography}