

# Effects of Pre-treatments and Drying Methods on Chemical Composition, Microbial and Sensory Quality of Orange-Fleshed Sweet Potato Flour and Porridge

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**Abstract** This study was aimed to evaluate the effect of pre-treatments and drying methods on the chemical composition (proximate composition,  $\beta$ -carotene content and phytochemicals), functional properties, microbial and sensory of orange-fleshed sweet potato flour and porridge. Physical (blanching) and chemical (1% salt, 0.5% citric acid solution soaked for 20 min) of the sliced OFSP followed by drying (sun, solar and fluidized bed dried) with complete randomized design for chemical composition, functional properties, and microbial load analysis and randomized complete block design was used for sensory analysis. The moisture (4 - 8%), protein (4 - 8%), fat (0.9 - 2.5), ash (4 - 8%), fiber (3.5 - 7%), total carbohydrates (80 - 84%) measured as a function of treatment and drying. The energy contribution of OFSP was determined by difference of the proximate excluding the fiber (352.9-365.6kcal/100g). The salt treated and FB dried had significantly lowest moisture content and highest ash content, citric acid treated and FB dried had significantly highest protein content and gross energy, control and FB dried had significantly highest fiber content, control and sun dried had significantly highest fat content and blanched and FB dried had significantly highest total carbohydrates. The  $\beta$ -carotene (82 -127 $\mu$ g/g), tannin (74 -108mg/100g) and phytate content (51 - 98mg/100g) was measured. Blanched and FB dried was observed better in retention of  $\beta$ -carotene and reduction of phytochemicals (tannin and phytate). The salt treated and FB dried was measured increment with WAC, viscosity and lowest LGC, blanched and FB had highest OAC and high bulk density in the control. The microbial analysis showed OFSP porridge within microbiological acceptable limit. The sensory acceptability showed OFSP was accepted in all sensory attributes. In conclusion, the blanching and FB drying techniques were the best approach in retaining the nutrients.

**Keywords:**  $\beta$ -carotene, chemical composition, drying method, orange-fleshed sweet potato, pre-treatment, microbial quality, sensory acceptability

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## 1. Introduction

Sweet potato (*Ipomoea batatas*L.) ranks seventh among the most important food crops in the world [43]. Sweet potatoes are a good source of minerals [22], carbohydrates, fiber, antioxidants, starch and vitamins [4,28]. Orange-fleshed sweet potato (OFSP) is rich in beta-carotene, which is a precursor to vitamin A. Contributes in alleviating vitamin A deficiency. Vitamin A deficiency is a major public health problem in developing countries of the most vulnerable groups [21]. The short shelf life of sweet potato due to its perishability of sweet potato [41] is a challenge in developing countries [46]. In Ethiopia sweet potato cultivation is currently being encouraged because of its numerous potential for food security; even though

most of the Ethiopian farmers have the challenge of sweet potato tuberous roots storage after harvest like other parts of developing countries [41].

Drying methods are commercially accepted and economic of the raw and intermediate potato products to preserve by reducing the bulk weight [10,42,52]. Blanching, soaking in solution inactivate the enzyme activities (quality reduction and deterioration reduced), and improve product acceptability [9,12]. The futures of Orange-fleshed sweet potato in the developing country for target consumers with micronutrient supplemented porridge, bread, traditional doughnut, chapatti and cake is promising [31]. OFSP is a source of energy and nutrients, natural sweetener, color, flavor and dietary fiber [48].

## 2. Materials and Methods

# Effects Of Pre Treatments And Drying Methods On Chemical

**Albert A Gayle**



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