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## Optimisation of Oven-Drying of Baobab Leaves Using a Central Composite Design

AHOTONDI MECHAK GBAGUIDI<sup>1</sup>, FLORA JOSIANE CHADARE<sup>2</sup>, VALÈRE SALAKO<sup>3</sup>, VANESSA IDOHO<sup>1</sup>, ACHILLE ASSOGBADJO<sup>4</sup>

<sup>1</sup>National University of Agriculture, Laboratory of Food Science, Benin

<sup>2</sup>National University of Agriculture, Laboratory of Food and Bio-Resources Science and Technology and Human Nutrition, Benin

<sup>3</sup>University of Abomey-Calavi, Lab. of Biomathematics and Forest Estimations, Benin

<sup>4</sup>University of Abomey-Calavi, Lab. of Applied Ecology, Benin

### Abstract

Baobab (*Adansonia digitata*) leaves represent a key nutritional resource; although their consumption is apparently restricted to local communities, mainly as a sticky sauce, cosmetics and a variety of purposes. Ready-to-use powder of oven-dried baobab leaves can improve the availability of the product on markets, and hence its utilisation and shelf life. This study was carried out to optimise the oven-drying temperature and duration for the best conservation of baobab leaf powder and its sustainable availability for multipurpose uses. Different combinations of values of temperature and drying duration were generated, using a central composite design, in response surface methodology framework. These combinations were applied to freshly collected young baobab leaves; and the derived dried leaves were analysed by assessing the dry matter, the colour and the gelling property. Findings showed that dry matter ( $93.4 \pm 1.8 \text{ g} \cdot 100 \text{ g}^{-1}$ ), hue ( $109.6 \pm 6.1^\circ$ ), chroma ( $14.0 \pm 1.9$ ) and lightness ( $51.8 \pm 5.8$ ) were significantly influenced by oven-drying temperature and duration; while the least gelation concentration ( $7.2 \pm 1.3 \text{ g} \cdot 100 \text{ mL}^{-1} \text{ dw}$ ) was significantly influenced by the temperature. Significant correlations were revealed out between the least gelation concentration and the hue value, and between the lightness and the chroma. Based on leaf dry matter, hue and chroma models, the optimal oven drying conditions for baobab leaves for good preservation leading to human consumption and other purposes are set at  $45^\circ \text{C}$  for 23.5 hours. Drying in these optimal conditions lead to a leaf powder with  $92.0 \text{ g} \cdot 100 \text{ g}^{-1}$  of dry matter and a high rate of leaves colour preservation. These drying conditions should be adapted to local populations' capacities, based on the tropical countries conditions, and the solar drying systems.

**Keywords:** *Adansonia digitata*, colour, dry matter