

Effect of Pre-Treatments and Drying Methods on Physical and Microstructural Properties of Potato Flour

Ariel Buzera

Université Evangélique en Afrique, Bukavu

Corresponding author: Evelyne Gikundi, Irene Orina, Daniel Sila

Jomo Kenyatta University of Agriculture and Technology (JKUAT). P.O. Box 62000-00200 Nairobi, Kenya

✉ arielbuzera@gmail.com

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Abstract

This study evaluated the effects of pre-treatments (blanching (60°C and 95°) and boiling) and drying methods (freeze-drying and oven drying) on quality characteristics of potato flour derived from three potato varieties, namely Shangi, Unica, and Dutch robjin. The percentage flour yield, color, particle size distribution, flow characteristic, microstructural and functional properties of the potato flour were determined. Unica recorded the least peeling loss, while Dutch robjin variety had the highest. The color parameters were significantly ($p < 0.05$) affected by the pre-treatments and drying methods. Freeze drying produced lighter potato flour ($L^* = 92.86$) compared to the other methods. Boiling and blanching at 95°C followed by oven drying recorded a low angle of repose and compressibility index indicating better flow characteristics. The smallest particle size (56.5µm) was recorded for Freeze-drying treatment while boiling followed by oven drying had the largest particle size (307.5µm). Microstructural results indicate that boiling and blanching at 95°C followed by oven drying resulted in damaged starch granules while freeze-drying and low-temperature blanching (60°C) maintained the native starch granule. Particle size and the solubility index of potato flour showed a strong positive correlation. This study revealed that the pre-treatments and drying methods affected potato flour's physical and microstructural parameters differently, resulting in changes in their functionality

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Ariel Buzera Faculty of Agriculture and Environmental Science, Université Evangélique en Afrique (UEA), P.O Box 3323 Bukavu, Sud-Kivu/RD Congo.