

Unlocking the Potential of Neglected Cereal Resources Waste: Exploring Functional Properties of Algerian Pearl Millet Starch via Wet Milling and Ultrasound Techniques

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Abstract : In the context of global waste management and sustainable resource utilization, millets emerge as a vital yet underutilized cereal resource. Despite their exceptional nutritional profile and resilience to harsh environmental conditions, their potential remains largely untapped. This study aims to contribute to the valorization of seven Algerian pearl millet landraces (*Pennisetum glaucum* (L.) R. Br) from the southern region by focusing on the characterization of their starches. Utilizing both conventional wet milling, incorporating sodium azide as a microbial growth inhibitor, and a novel green technology—Ultrasound-assisted isolation, we explore avenues for enhancing the functional properties of these starches. Analysis of key functional properties such as swelling power and water solubility index reveals significant enhancements, particularly during heat treatment near the gelatinization temperature [70 - 80 °C]. Furthermore, our investigation into the influence of pre-treatment methods on isolated starches highlights the potential of Ultrasound-assisted isolation in reducing absorbency and water solubility compared to conventional methods. Through rigorous data analysis using SPSS software (Version 23), we ascertain the efficiency of Ultrasound-assisted isolation, underscoring its promising role in the valorization of pearl millet waste. This research not only sheds light on the functional properties of pearl millet starch but also underscores the imperative of sustainable waste management in harnessing the full potential of underutilized cereal resources.

Keywords : isolation, solubility, starch, swelling, ultrasound

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