



ABSTRACT BOOK

International Web Conference on
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Fruit of *Adansonia digitata* L. (mukua): A promising source of molecules for nutraceutical application.

FRUIT OF *ADANSONIA DIGITATA* L. (MUKUA): A PROMISING SOURCE OF MOLECULES FOR NUTRACEUTICAL APPLICATION

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The use of plants for medicinal purposes goes back to ancient times. *Adansonia digitata* L. is a tree native to the African continent with many traditional uses, including medicinal and food. The fruit of this tree is commonly known as mukua, and consists of pulp, fibrous tissue, and seeds. The pulp has been approved as a food ingredient by the European Commission and the Food and Drug Administration. Consumers are increasingly aware of what they consume, combining food and health, being their preference characterized for more natural products with health benefits. Therefore, nutraceutical products have received more attention from the consumer, being highly acceptable, and the first choice for exigent consumers.

Thus, the objective of this work is to exploit the nutraceutical potential of mukua pulp, through its nutritional, chemical and bioactive characterization.

The nutritional profile analysis, including proteins, crude fat, moisture, ash, carbohydrates, and energy were performed following the AOAC official methods. Free sugars were identified by an HPLC-RI system, organic acids by UFLC-PDA and fatty acids by GC-FID. For the determination of the bioactive potential, the antioxidant activity was verified through the cellular antioxidant assay (CAA) and the inhibition of thiobarbituric acid reactive substances (TBARS). Its antimicrobial potential against food borne bacteria, fungi and clinical bacteria was analysed through the microdilution method. Furthermore, cytotoxicity was analyzed in three tumor cell lines (gastric adenocarcinoma (AGS), breast carcinoma (MCF-7) and non-small cell lung carcinoma (NCI-H460)) and a non-tumoral cell line (non-tumour culture from African green monkey (VERO)) through the Sulphorhodamine B method.

Regarding the results, mukua pulp had a very low moisture content (11.9 ± 0.3 g/100 g dw). The macronutrients present in greater amounts were carbohydrates (89.6 ± 0.2 g/100 g dw), followed by proteins (2.7 ± 0.3 g/100 g dw) and by crud fat (1.8 ± 0.1 g/100 g dw), representing an energy value of 386 ± 1 kcal. Three sugars (fructose, glucose, and sucrose) and three organic acids were quantified (oxalic, citric, and succinic), being fructose (2.3 ± 0.2 g/100 g dw) and citric acid (8.73 ± 0.03 g/100 g dw) the most abundant ones, respectively. Regarding fatty acids, twelve compounds were quantified with greater abundance of oleic (C18:1n9c – 81%) and palmitic (C16:0 – 10%) acids. Concerning the antioxidant activity, the pulp inhibited about 32% of cell oxidation in the CAA method and exhibiting an EC50 value (concentration providing 50% of antioxidant potential) of 23.0 ± 0.1 µg/mL for TBARS assay. For antimicrobial activity, the pulp presented bacteriostatic activity against most of the food bacteria, with stronger inhibition against *Yersinia enterocolitica* (minimum inhibitory concentration (MIC) = 0.3 mg/mL), and against the clinical bacteria *Enterococcus faecalis* (MIC- 0.6 mg/mL). Finally, in the cytotoxicity assay, the pulp demonstrates the ability to inhibit cell proliferation against the tested tumor cell lines, especially against AGS with GI50 values of 92 ± 1 µg/mL, with no toxicity for the normal cells.

This study shows that the mukua pulp, in addition to being nutritionally interesting, has a high content of citric acid (scientifically proven preservative power) and high content of oleic acid (multiple pharmacological effects). Furthermore, we proved that the pulp of this fruit, which is so consumed on the African continent, has a high bioactive potential, proving to be a promising candidate to the development of a nutraceutical formulation.

Keywords: *Adansonia digitata* L.; fruit pulp; Bioactive activities; Nutraceuticals



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