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Measuring phenolic compounds in Mankai: a novel polyphenol and amino rich plant protein source

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Abstract

Mankai is a cultivated strain of *Wolffia globosa*, an aquatic plant, one of the smallest plants on earth, belonging to the family *Lemnaceae*, known commonly as Duckweeds. Mankai is being considered as a high-quality substitute for animal protein, and a potential source of vitamin B12⁽¹⁾. In fact, it contains all 9 essential amino acids and its protein profile is extremely close to that of egg. Recently, it has been granted GRAS status, and chosen as a test food in a long-term intervention DIRECT-PLUS (ClinicalTrials.gov identifier (NCT number): NCT03020186) which aims to compare the effect of green-Mediterranean diet (composed with polyphenol enriched food including Mankai) + physical activity (PA) vs. Mediterranean diet + PA vs in 300 volunteers suffering from cardiometabolic disease. Mankai is also rich in iron and has been shown in humans to maintain Iron-Homeostasis and to reverse Anemia in Rats⁽²⁾. However, molecular characterization of phenolic composition of Mankai plant has not previously been reported. Our initial measurements of total phenolic content determined by Folin-Ciocalteu assay classifies Mankai amongst the foods highest in polyphenols content (8606.7 mg/kg)⁽³⁾. This poster presents the characterization of Mankai polyphenols according to Vrhovsek *et al.* 2012 [4] using UHPLC-ESI-MS/MS system, identifying 26 different polyphenols. One of the main advantages of Mankai is its hydroponic cultivation that optimizes yield throughout the year. Light source, water and mineral management can influence the composition of phenolic content. We quantified Mankai polyphenols in 30 different plant batches and 52 different treatments to assess how quality of light may play a major role in the accumulation of secondary plant compounds. Notably, led light seems to enhance the glycosylated form of luteolin and quercetin compared to sunlight and the aglycone form of luteolin and quercetin are higher in sunlight treatment. The present analysis confirms the high polyphenol status of Mankai, profiles its major polyphenol components and provides new information on how production process in terms of light quality determines polyphenol content.

Conflict of Interest

There is no conflict of interest

References

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