

Evaluation of Antidiabetic and Antiobesity Effects of Underutilized Starch Sources Compared to Refined Wheat Flour

N.S. Nirmani¹, C. Jayathil², R. Liyanage³, I. Wickamasinghe¹, and M.A. Jayasinghe^{1*}

¹Department of Food Science and Technology, Faculty of Applied Sciences, University of Sri Jayewardenepura, Nugegoda, Sri Lanka

²National Institute of Fundamental Studies, Hanthana Road, Kandy, 20000, Sri Lanka

³School of Medicine, Case Western Reserve University, 10900 Euclid Ave., Cleveland, Ohio, 44106, USA

*madhura@sci.sjp.ac.lk

Abstract

Unconventional and underutilized flours are rich sources of phytochemicals compared to refined wheat flour. Phytochemicals are key secondary metabolites inhibiting digestive enzymes like α -amylase and pancreatic lipase, crucial in glucose and triglyceride absorption. Replacing refined wheat flour with these unconventional flours may offer a natural alternative for managing hyperglycemia and hyperlipidemia without the side effects associated with synthetic drugs. This study explores the antidiabetic and antiobesity activities of flours from Jaggery palm (*Caryota urens*), Palmyra tuber (*Borassus flabellifer*), Defatted Coconut (*Cocos nucifera*), Waterlily seed (*Nymphaea lotus*), Cycad seed (*Cycas circinalis*), and Jackfruit seed (*Artocarpus heterophyllus*), comparing them with refined wheat flour. The inhibitory properties of refined wheat and underutilized flour extract against α -amylase and pancreatic lipase were evaluated using soluble starch and p-nitrophenyl butyrate (p-NPB) as substrates, respectively. Synthetic inhibitors Acarbose and Orlistat were used as positive controls for the α -amylase and lipase inhibitory assays. All analyses were performed in triplicate and compared using Tukey's test. All unconventional flours exhibited significantly higher ($P \leq 0.05$) α -amylase inhibitory activity compared to refined wheat flour, with waterlily seed flour showing the highest activity (2.88 ± 0.27) followed by flours from *Cycas circinalis* (12.07 ± 0.16), Jackfruit seed (15.57 ± 0.14), Jaggery palm (25.26 ± 0.22), Coconut (27.47 ± 2.17), and Palmyra (33.29 ± 1.52). Lipase inhibitory activity of the flours ranged from 46 mg/ml to 21 mg/ml, with Palmyra (23.50 ± 7.62), Defatted Coconut (21.04 ± 5.42), Waterlily (28.49 ± 4.09), and Jackfruit seed (26.88 ± 1.42) showing significantly ($P \leq 0.05$) higher activity than refined wheat flour. Jaggery Palm (44.79 ± 0.91) and *Cycas circinalis* flours (46.96 ± 1.08) had lower ($P \leq 0.05$) inhibitory activity than refined wheat flour. Overall, all flour extracts except waterlily seed flour exhibited weaker α -amylase and lipase inhibition than the synthetic drugs. While waterlily seed flour showed α -amylase activity comparable to Acarbose, its lipase inhibition was inferior to Orlistat.

Keywords: Antidiabetic, Antiobesity, Refined wheat, Underutilized, Flour

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