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Detoxification of Plum kernels (Prunus domestica L.): A novel and potentially economical approach towards sustainable development goals

Abstract:

In the present scenario, the valorization of agri-food wastes to produce value-added products for potential applications in food sectors can minimize waste generation and reduce environmental pollution. Plums (Prunus domestica L.) are amongst the most significant fruits in terms of customer preference, delicious taste, and nutritional properties, grown globally at around 12.1 million metric tons per year. Plum kernels contain abundant nutrients and constitute an economical source of good-quality oils (45.95 to 50.00%), dietary proteins (35.9 to 40.0%), and other bioactive compounds that are irretrievably lost during processing. However, these kernels have not been effectively exploited due to the presence of toxic compounds such as amygdalin (range 0.1-17.5 mg g-1). To reduce the amygdalin content below the permissible limit, a response surface methodology was used to optimize hydrothermal treatment conditions. Under the optimized conditions, the reduction of amygdalin content was 68.72 %, which was also not under the permitted limits. However, the Combined effect of microwave and hydrothermal treatments appeared to be most effective in improving the nutritional profile and reducing the amygdalin content to undetectable amounts. The combined treated samples revealed considerable amounts of good-quality, oils, proteins, and bioactive compounds. The recovery of these elements appeared to be a non-conventional source of great value in human nutrition owing to the nutritious, highly functional, and affordable food ingredients. The extracted oils and isolated proteins from detoxified kernels showed typical features to scavenge hydroxyl radicals beyond their nutritional and techno-functional properties with a plethora of desirable characteristics for product formulations.

Biography

Mohd Aaqib Sheikh is a distinguished National Post-doctoral Fellow (NPDF) at the National Institute of Technology, Rourkela, Odisha. He holds a Ph.D. in Food Engineering and Technology and an M.Tech in Food Process Engineering. Previously, he served as an Assistant Professor in the Department of Food Technology at Eternal University Baru Sahib HP. He has been honored with the NPDF, SRF, ASRB NET, ICAR AICE-JRF/SRF (PGS), and Quality Publication Awards. He has published more than 15 research papers, 2 review articles, and 13 book chapters in reputed journals. He serves as an active reviewer for numerous reputable scientific journals.