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ORIGINAL ARTICLE

Effect of Fungal Fermentation on Enhancement of Nutritional Value and Antioxidant Activity of Defatted Oilseed Meals

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Abstract

Agro-industrial residues contain high nutritive value. Nowadays, various advanced researches have been done for the production of various value-added products, using these wastes as substrates in the fermentation media. Flaxseed, mustard, and rice bran meal, residues of oil industry, were used as substrates for fermentation. Submerged fermentation with soil-isolated fungal species of the genus *Aspergillus* sp. was done for oil production by using these substrates in the fermentation media. Effect of fermentation by the oleaginous species of *Aspergillus* on the nutritive value and functional properties of flaxseed, mustard, and rice bran meal has been discussed for the first time in the present study. After fermentation, the seed meals showed substantial increase in the protein and ash content. The fungal strains utilized the carbohydrate present in the seed meals for the production of highly nutritional metabolites, which decrease the sugar contents of the meals. The fungi also showed extracellular amylase and cellulase activities which helped to hydrolyze the carbohydrates present in these meals, to utilize them for their metabolism. The enhancement was also observed in terms of antioxidant activity of the meals. Increase in the total phenolic and flavonoid contents was observed after fermentation along with radical scavenging activity of 1,1-diphenyl-2-picrylhydrazyl and 2,2-azino-bis-3-ethylbenzthiazoline-6-sulfonic acid reagents and ferric reduction potential. These effects of fermentation modify these cheap waste materials into nutrient dense substrates, which could be further used in the formulation of value-added products.

Keywords Oilseed meals · Antioxidant activity · Nutritive value · Enzyme activity · *Aspergillus* sp

Introduction

Oil seed meals are by product of oil manufacturing industry and they contained high nutritional value; mainly, they are rich in various macro- and micronutrients along with important bioactive compounds which are beneficial for health [1]. Flaxseed meal (FSM), the byproduct

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