Solid state fermentation effects on pistachio hulls antioxidant activities

ABSTRACT

Pistachio (Pistacia vera L.) is a small tree native to mountainous regions of Iran. The seed has a mauvish skin and light green flesh, with a distinctive flavor. The hulls contain high amount of phenolic and flavonoid compounds, which are known as source of antioxidant. Recently, the use of natural additives found in plant material as preservative in food and cosmetic products received considerable attention. On the other hand was know processing method to improve the antioxidant activity of agriculture byproducts and reduce the anti-nutritional metabolites. Therefore, this experiment was carried out to determine the effect of solid state fermentation on pistachio hulls antioxidant activities using five types of fungi namely White rot fungi (ATCC 64897), White rot fungi (ATCC 90467), Aspergillus terreus (ATCC 74135), Rhizopus oligosporus and Aspergillus oryzae. Pistachio hulls were subjected to fermentation process for the period of 10 days. Freeze-dried samples were extracted with 80% methanol. The result showed that the samples contained varied concentration of phenolic compounds from 0.721 to 2.277 mg gallic acid equivalent/g DM, and total flavonoids varied from 0.249 to 1.204 mg rutin equivalents/g DM. The highest antioxidant activity of 50.39% at a concentration of 300 μg/ml of crude extract was found in crude methanolic extract of control while the lowest antioxidant activity of 31.19% was found in crude methanolic extract of hulls fermented by white rot fungi (ATCC 90467). The result indicated a reduction in the antioxidant activities of pistachio hulls when undergoing solid state fermentation. Therefore, it is not a recommended method to improve the antioxidant activities of pistachio hulls.

Keyword: Antioxidant activity; Pistachio hulls; Solid-state fermentation; Flavonoid; Phenolic compounds