



Contents lists available at ScienceDirect

Innovative Food Science and Emerging Technologies

journal homepage: www.elsevier.com/locate/ifeset

Mango peel powder: A potential source of antioxidant and dietary fiber in macaroni preparations

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ARTICLE INFO

Article history:

Received 23 March 2009

Accepted 4 October 2009

Editor Proof Receive Date 19 October 2009

Keywords:

Mango peel
Macaroni
Dietary fiber
Antioxidants
Polyphenols
Carotenoids

ABSTRACT

Antioxidants like phenolics and carotenoids both as additives in foods or pharmaceutical supplements can scavenge reactive oxygen species and protect against degenerative diseases like cancer, cardiovascular diseases. Mango peel, which is a by-product obtained during processing of mango products such as mango pulp and amchur, is currently discarded and thus, causing environmental pollution. In the present study, mango peel was incorporated into macaroni at three different levels (2.5, 5.0, 7.5%) and studied its effect on the cooking properties, firmness, nutraceutical and sensory characteristics of macaroni. The total dietary fiber content in macaroni increased from 8.6 to 17.8%. The content of polyphenols increased from 0.46 to 1.80 mg/g and carotenoid content increased from 5 to 84 µg/g of macaroni with 7.5% incorporation of mango peel powder. The macaroni products incorporated with mango peel exhibited improved antioxidant properties. The cooking loss of macaroni increased from 5.84 to 8.71%, and the firmness increased from 44 to 73.45 gf upon incorporation of mango peel powder. Incorporation of 5% mango peel powder into semolina yielded macaroni with acceptable quality. Thus, the results suggest that by incorporating mango peel powder, it is possible to enhance the nutritional quality of macaroni without affecting its cooking, textural and sensory properties.

Industrial relevance: Mango is one of the important tropical fruits. As mango is a seasonal fruit, it is processed into various products and during its processing, huge amount of peel is generated as a by-product and its disposal is a major problem. The peel constitutes about 15–20% of the fresh fruit. The peel contains various bioactive compounds and the peel extract exhibited potential antioxidant properties. In the present study, mango peel was incorporated into macaroni at three different levels and found that incorporation up to a 5% level into the formulation of macaroni yielded an acceptable product with improved nutraceutical properties. Thus, mango peel, a waste from mango industry can be utilized for the preparation of macaroni with improved nutritional properties.

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1. Introduction

Phytochemicals such as phenolics, carotenoids and dietary fibers are gaining increased attention because of their antioxidant, anticarcinogenic, antimutagenic, and other health promoting properties (Block & Langseth, 1994; Hertog, Feskens, Hallman, Katan, & Kromhout, 1993). Diet rich in these phytochemicals impart health benefits. Synthetic antioxidants such as butylated hydroxytoluene (BHT) and butylated hydroxyanisole (BHA) are commonly used in processed foods (Byrd, 2001). Nowadays use of these synthetic antioxidants in food has been restricted because of their carcinogenicity and other toxic properties (Ito, Hirose, Fukushima, Tsuda, Shirai, & Tatematsu, 1986; Chen, Pearson, & Gray, 1992; Sarafian, Kouyoumjian, Tashkin, &

Roth, 2002). The development and utilization of more effective antioxidants of natural origin are more desired. Recently, growing interest in the substitution of synthetic antioxidants by natural one has led to tremendous development in the research on the screening of natural antioxidants from inexpensive and residual sources from agricultural industries. It has been reported that fruit and seed processing by-products such as peel and husks are found to be a rich source of bioactive compounds that can be used as antioxidant agents and nutraceuticals (Larrauri, Ruperez, Borroto, & Saura-Calixto, 1996; Moure et al, 2001; Lu & Foo, 2000; Chau & Huang, 2003; Wolfe, Xianzhong, & Liu, 2003; Ozkan, Sagdic, Baydar, & Kurumahmutoglu, 2004; Butsat, Weerapreeyakul, & Siriamornpun, 2009; Alasalvar, Karamac, Kosinska, Rybarczyk, Shahidi, & Amarowicz, 2009).

Pasta is a traditional cereal-based food product which originates from the first century BC (Agnesi, 1996). Pasta products are well accepted worldwide because of their low cost, ease of production, versatility, sensory attributes and long shelf life (Bergman, Gualberto,

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