Improving meatball quality using different varieties of rice bran as natural antioxidant

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Abstract

Meatballs are very popular in every social class in many developing countries including Indonesia and are produced both under the cottage or commercial meat processing industries. Rice bran contains antioxidants and therefore the substitution of cassava starch (tapioca) in making meatball are expected to improve the functional quality of “bakso” into one of traditional healthy restructured meat product. Rice bran has antioxidant activity which different among varieties and agronomical environment. Therefore, the objective of this study was to determine the bioactive compounds such us antioxidant activity of crude extract of rice bran from Bramo, Serang and Menthik rice varieties, those were obtained from East Java, Indonesia and to study the efficacy of utilization the above rice bran to improve functional quality of meat ball. Results of the study showed that the best substitution preferred by panelists was the substitution of tapioca starch with 50% Serang rice bran with organoleptic scores of 4.98; 4.84; 4.93; 4.6; 4.5 and 4.9, respectively, for color, aroma, hardness, chewiness, taste, and flavor. This substitution treatment also increased (p<0.05) the antioxidant activity from 16.75% to 35.78% and total phenol of meatballs from 37.82 mg/100 g to 90.81 mg/100 g. The results also showed that substitution of tapioca starch with 50% Serang rice bran obviously improved the eating quality of the meatballs as a community healthy food.

1. Introduction

Meatballs are restructured meat products which can be produced from ground beef, pork, chicken or fish and beef meatballs being the most popular in Indonesia. This product is prepared by mixing finely ground beef with cassava starch (tapioca), cooking salt and sodium tripolyphosphate (STP) and the meatball batter are formed into marble of pingpong ball size or smaller/bigger, and boiled until well cook (Romans et al., 1994; Purnomo and Rahardiyan, 2008). According to Fischer (1996), beef meatballs are made of 53% lean beef, 17% fat and starch, STP, salt, monosodium glutamate (MSG) 30% ice cubes. While Rahardiyan (2002) reported that Indonesian meatball or better known as “bakso” are prepared using finely ground beef mixed with cooking salt, starch and garlic.

Beef meatballs are very popular in every social class in Indonesia are being produced in cottage industries as well as by commercial meat processing manufactures (Purnomo and Rahardiyan, 2008). Since meatball is a popular meat product, it would be ideal to improve its nutritive value and functional quality such as enhancing its antioxidant content to produce a healthy food.

Antioxidants act as radical scavenger, can decrease oxidative stress, so it plays a vital role in prevention of various disease. The use of natural antioxidant in food is more preferable compared to the use of synthetic antioxidant for the consumers (Lobo et al., 2010). Therefore, substitution of cassava starch (low in antioxidant content) with rice bran as source of natural antioxidant, and it can be a viable option to develop meatball into one of traditional functional restructured meat product.

Rice bran is the cuticle between paddy husk and rice grain produced during rice milling and is mainly sold cheaply as animal feed (Kahlon, 2009). Rice bran is reported to contain fiber and also high in energy and protein and also contain zinc, iron, folic acid and other nutrients but no cholesterol (Rabbani and Ali, 2009). It also contains phytochemicals including phytosterols, vitamin B group and polyphenols, and polyphenols are commonly known as antioxidants (Rabbani and Ali, 2009). All these constituents contribute to the lowering blood serum cholesterol, have anti-cancer properties and