

ANTIOXIDANT EFFECTS OF MALAYSIAN PLANT EXTRACTS IN MECHANICALLY DEBONED CHICKEN MEAT SAUSAGE

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Introduction

Consumption of poultry meat and poultry meat products is growing all over the world. For several reasons people prefer this kind of meat to beef and pork. The use of mechanically deboned chicken meat (MDCM) in frankfurters, various loaf products, fermented sausages and restructured products has been well documented (Froning, 1976; Lai *et al.*, 1991). A major problem with products manufactured with MDCM is the rapid onset of oxidative rancidity which results in off-flavours and odours (Mac Neil *et al.*, 1973). It has long been known that herbs and spices possess antioxidative and antimicrobial effects, and since ancient times they have been used to prolong shelf-life and improve the taste of meat products. In various studies rosemary belonging to the mint family (*Labiatae*), has shown to be the most potent natural antioxidant among the common species (Hermann, 1981; Madsen and Bertelsen, 1995). Thus, this study was carried out to investigate the effectiveness of two types of local plants water extracts, *kesum* and *tenggek burung* incorporated in the refrigerated MDCM sausage stored for 6 months in comparison with rosemary extracts, BHA/BHT and a control treatment without antioxidant.

Materials and Methods

Preparation of MDCM sausage

MDCM was purchased from Dinding Poultry Sdn. Bhd., Sitiawan, Perak, Malaysia and kept frozen prior to use. Five MDCM sausages with and without plant extracts were prepared. They were F1: Control; F2: with 200 ppm BHA/BHT; F3: with 200 ppm *kesum* water extract; F4: with 400 ppm *tenggek burung* water extract and F5: with 400 ppm commercial rosemary extract.

Plant material and extraction

Plant materials were extracted according to Duh (1998).

Peroxide value

Peroxide value (PV) was determined using AOAC methods (1984).

TBA analysis

Thiobarbituric acid reactive substances (TBARS) assay was performed as described by Buege and Aust (1978).

Statistical Analysis

The statistical analysis was performed using SAS 6.12 package (SAS Institute, 1995).

Results and Discussion

Antioxidant activity

In general all formulations showed an increased in POV after a period of time after which it started to decline, after 3 months storage for control and rosemary treated sausage while after 4 months for samples treated with BHA/BHT, *kesum* and *tenggek burung* water extracts (Fig 1). The increase in oxidation as reflected by POV increase was expected even though the sausages were kept at -18°C. Igene *et al.*, (1979) reported that the triglycerides and phospholipids played significant roles in the oxidation process of MDCM. Crapiste *et al.*, (1999) reported maximum POV will be attained and started to decline after the decomposition of hydroperoxides to other products. However POV of treated samples were significantly lower than the control throughout the 6 months storage. This indicated that the plant extracts and the synthetic antioxidant can lower the initial lipid oxidation rate. TBARS value is routinely used as an index of lipid oxidation in meat products in store (Raharjo & Sofos 1993) and is shown in Figure 2. Malonaldehydes react specifically with thiobarbituric acid showing an increase in TBARS values after 6 months of storage in all samples. TBARS values of model systems that had been treated with *kesum* and *tenggek burung* extracts were much lower than the control thereby indicating protection of the meat constituents of the extract against autoxidation; complementary research supports the view that the compounds providing antioxidant activity are polyphenolics. In this study, samples treated with *kesum* extract were found to be significantly better than the synthetic antioxidant BHA/BHT after 6 months storage.

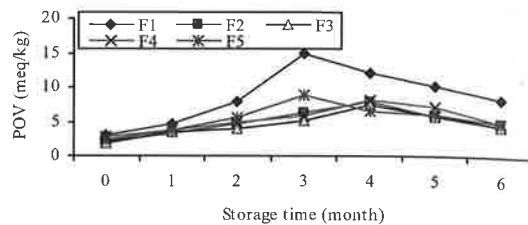


Figure 1: Effects of plant extracts and BHA/BHT on the POV in frozen MDCM sausage.

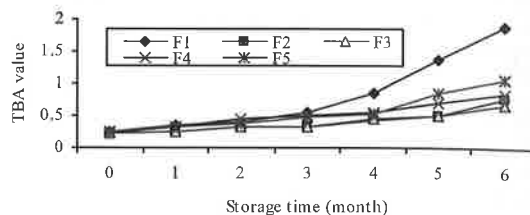


Figure 2: Effects of plant extracts and BHA/BHT on 2-thiobarbituric acid (TBA) value in frozen MDCM sausage.

Conclusions

This study concluded that *kesum* and *tenggek burung* water extracts provide antioxidant benefits to MDCM sausage during frozen storage. Of the two extracts studied *kesum* demonstrated the most potent effect in terms of antioxidative activity which is comparable to that of BHA/BHT.

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