P-05-32

Potato peel powder as a functional ingredient in breakfast pork sausages (#590)

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Introduction

Potatoes (*Solanum tuberosum L., Solanaceae*) are an important constituent of human diet around the world. Despite potato consumption having decreased, processed products such as french fries, chips, and puree have experienced growing popularity. The major waste of potato processing are peels (Schieber et al. 2001). Losses caused by peeling range from 15 to 40%. Food processing industries particularly potato-crisp manufacturers generate between 70 and 140 thousand tonnes of peels worldwide annually (Chang, 2011). Moreover, the discarded potato peel (PP) represents a severe disposal problem to the potato industry as the wet peels are prone to microbial spoilage (Hossain et al. 2014). Nevertheless, potato waste could also be considered an opportunity for recovery of target compounds that possess anticarcinogenic and anti-inflammatory effects (Wang et al. 2011; Kenny et al. 2013). PP powder has been included as a functional additive in different food products (Schieber et al. 2001; Hossain et al. 2014) and it could have a positive effect on physicochemical and functional properties of meat products (Kanatt et al. 2005; Farvin et al. 2012). In fact, PP powder has reduced lipid oxidation in irradiated lamb (Kanatt et al. 2005) and minced mackerel (Farvin et al. 2012). The aim of this investigation was to evaluate PP powder as a functional ingredient in breakfast pork sausage.

Methods

PP powder was obtained as of fresh PP from a vegetables processing facility, dried with a cross-flow air dryer at 70 °C for 5 h and ground in a mill through a 1 mm sieve. Thereafter, pH, color (redness a*), water holding capacity (WHC) and oil holding capacity (OHC) of the PP powder were evaluated (Joshi et al. 2015). Breakfast pork sausages were formulated according to USDA (2013), and randomly allocated into the following treatments: Control (30% fat in the final formulation, w/w); T1 (20% fat in the final formulation, w/w; 8.69% water and 1.19% PP powder, w/w for both); and T2 (10% fat in the final formulation, w/w; 17.41% water and 2.39% PP powder, w/w for both). All samples were stored at 2 °C/9 days/under dark, and assessed for lipid oxidation (LOX) by measuring thiobarbituric acid reactive substances (TBARS), as well as color (a* values), WHC, and cooking loss weight (CLW) (Espinoza-García et al. 2015). Data were subjected to ANOVA and means were separated with the Tukey's test ($P<0.05$).

Results

The pH, a*, WHC, and OHC values for PP powder were 4.76, 6.4, 7.3 and 4.5%, respectively. Inclusion of PP powder in the pork patties affected ($P<0.05$) initial a* values. On the last day of storage (day 9), samples treated with PP powder showed higher ($P<0.05$) a* values (>3.0) than control counterparts (Figure 1A). TBARS (Figure 1B) and CLW (Figure 1C) values increased ($P<0.05$) during storage for all treatments; the lowest LOX and CLW values resulted from patties treated with 2.39% of PP powder and were different ($P<0.05$) from the control. No significant differences ($P>0.05$) were found in WHC (ca. 95%) among treatments.

Conclusion

The evaluation of functional properties of several natural flours has determined its acceptability and application as an ingredient in food systems (Okezie & Bello, 1988). Color, WHC, and OHC parameters of a flour can influence moisture content, texture and appearance of a food product, which in turn, are associated with its pH values (Chau & Cheung, 1998; Sharma et al. 2016). In agreement with our study, it has been demonstrated that the addition of PP powder reduces color changes, CLW and the generation of toxic metabolites such as malondialdehyde, which may be related to the antioxidant activity of PP powder (Espinoza-García et al. 2015)]. In addition, it is noteworthy that the phenolic content varies with the potato variety (Al-Saikhan et al. 1995). These results indicate that PP powder possess antioxidant activity, which could extend the shelf life of breakfast sausages.

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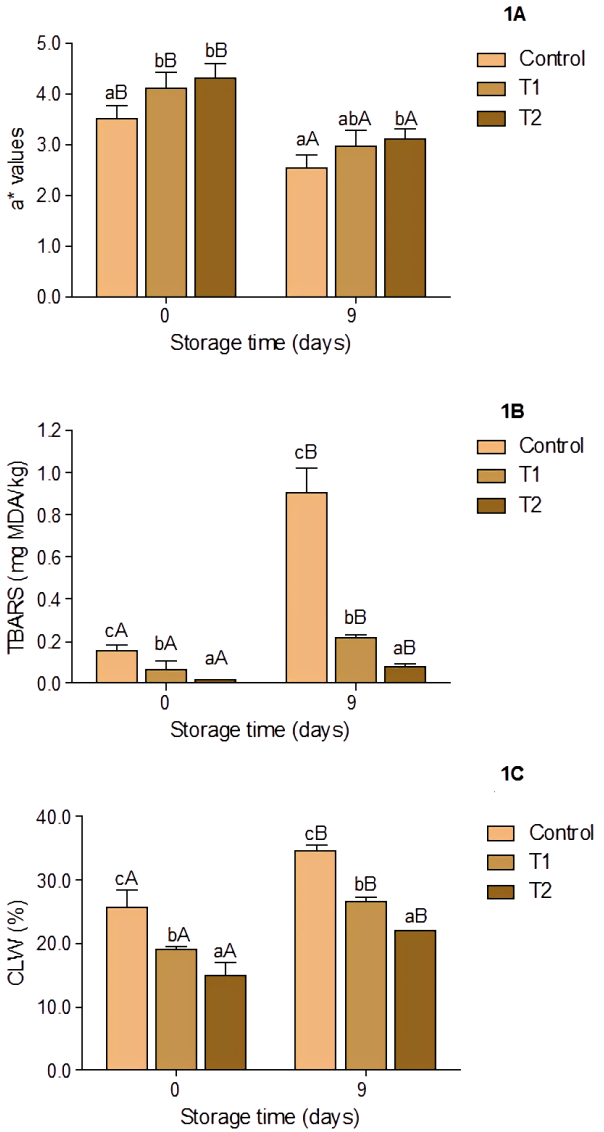

Figure 1 Figure 1. Redness (a* values) (1A), LOX (1B) and CLW (1C) of breakfast pork sausage with PP powder during storage time. Different superscripts within the same storage day (a-c) and across storage days (A-B) indicate differences (P<0.05).

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