

REPLACEMENT OF BEEF FAT IN EMULSION TYPE SAUSAGES BY OLIVE OIL

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Introduction

Fat plays a major role in the texture, juiciness and flavour of meat products, so technological aspects associated with the processing low- fat meat products include problems with texture, flavour and mouthfeel (Keeton,1994). Olive oil is the most monounsaturated vegetable oil (IOOC, 1984).Some research works have been carried out on low-fat frankfurters with olive oil showing that these products were lower in procesing yield, firmer and less juicy (Paneras and Bloukas, 1994) and they had a darker red colour (Bloukas et al., 1997) but the effect on quality depends on the formulation used (Papa et al., 2000). Interesterified olive oil was also evaluated in frankfurters (Vural and Javidipour, 2002; Vural et al., 2004) and Turkish-type salami (Javidipour et al., 2005). The aim of this study was to investigate the effects of replacing beef fat with olive oil on some characteristics of emulsion type sausages.

Materials and Methods

Beef and fat were separately ground through a 3 mm plate. Fat emulsion was prepared with salt, caseinat, water and soy protein. Control sample (C) was prepared with 10 % beef fat and 10% tail fat. For the other two treatments, olive oil was added at this stage 60%(O60) and 90% (O90) of the total fat amount. Ground meat was chopped in the cutter and mixed with the fat emulsion, curing ingredients, seasonings, binder and extender additives and ice. After chopping the batter of each treatment was vacuum stuffed into synthetic casings and smoked at 45°C for 105 min. The sausages were then boiled at 80°C for 20 min. After the sausages were showered, vacuum packaged. Moisture content (AOAC, 1990), fat (Flynn and Bramblett, 1975), protein (Anonymous, 1979) and pH (Landvogt, 1991) of sausages were measured. Jelly end fat separation was measured as described by Bloukas and Honikel (1992). Purge accumulation and process yield values of samples were determined according to Bloukas et al. (1997). The penetrometer value of samples was measured with a Sur-penetrometer, model PNR 6 (Sur-Berlin, Germany). Total cholesterol content of sausages were determined according to Naeemi et al. (1995). Cholesterol analyzes were performed using a gas chromatography (HP 5890).

Results and Discussions

Moisture, fat, protein contents and pH value of sausages are given in Table 1. No differences ($P>0.05$) were found in moisture, fat, protein content and pH value of treatment groups.

Table 1. Moisture, fat, protein, cholesterol content and pH values of sausages

Sample	Moisture (%)	Fat (%)	Protein (%)	Cholesterol (mg/100g)	Product pH
C	59.4	19.9	13.5	29.0 ^b	5.93
O60	58.9	21.8	12.8	16.8 ^a	6.00
O90	56.4	22.0	13.0	14.7 ^a	6.03

Replacement of beef fat with olive oil resulted significantly ($P<0.05$) decreament in cholesterol value of samples (Table 1). The frankfurters containing %90 olive oil had the lowest cholesterol value Similarly, Marquez et al. (1989), determined significantly lower cholesterol value in frankfurters with 60 % peanut oil of beef fat. Jelly and fat separation values, processing yield, purge accumulation are indicative of hydration/binding properties which represents the ability of the meat emulsion to retain moisture and fat upon further processing. Usage of olive oil in sausage formulation had no significant effect on jelly and fat separation and purge accumulation ($P>0.05$) (Table 2). According to these results, emulsion stability was succesfully obtained with using of olive oil up to 90% of animal fat. Similarly olive oil (Lurueña-Martínez et al., 2004) and sunflower oil (Ambrosiadis et al., 1996) were not found significantly effective on jelly and fat separation of frankfurters.

Usage of olive oil in sausages increased significantly the processing yield of the samples ($P<0.05$). These results were not in agreement with Bloukas and Paneras (1993) who found lower processing yield for low fat frankfurters with olive oil. Differences in results may be due to the variety of the product formulations.

Table 2. Effect of olive oil on hydration/binding properties and texture of sausages.

Sample	Jelly and Fat Separation (%)	Processing Yield (%)	Purge Accumulation (%)	Penetrometer value (mm)
C	6.3	91.6 ^a	0.9	7.6a
O60	6.7	93.6 ^b	0.9	8.1b
O90	6.5	94.3 ^b	1.1	8.6c

One of the most important problem adding vegetable oils into the meat products is the softening in texture. The results showed that the penetrometer value changed significantly ($p<0.05$) as the level of olive oil in the treatments increased. Similar results were reported by Vural and Javidipour (2002) for olive oil and Bishop et al. (1993) for corn oil used products.

Conclusions

Substitution of animal fat with olive oil in emulsion type sausages did not affect the hydration/binding properties. On the other hand a significant decreament was obtained in cholesterol content. However olive oil caused a softening in the texture of sausages.

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