P-01-25

Product development of beef patties with varying texture (#481)

Behannis J. Mena Chalas[1], Phyllis Shand[2], Robyn D. Warner[1]

[1] The University of Melbourne, School of Agriculture and Food, Parkville, Australia; [2] University of Saskatchewan, Department of Food and Bioproduct Sciences, Saskatoon, Canada

Introduction

To develop meat products for older adults, it´s important to consider texture as one of the main traits for acceptability, pleasant eating experience and oral processing capability. From an industry point of view, cooking yield is very important. Fillers (non-meat substances high in carbohydrates), hydrocolloids, binders and nutritional additives are commonly used in the processed meat industry to enhance the production of meat products and achieve a desirable range of textures. The aim was to develop beef patties with different textures, i.e, soft, medium and hard.

Methods

Patties were manufactured using 57-82% boneless, lean beef topside, 12-17% pork fat, 0.5% salt (sodium chloride) and 0.2% sodium bicarbonate with varying amounts of water (0 to 35%) and food additives (0.005 to 10%; gelatin, carrageenan, xanthan, gellan gum, sugarcane flour, potato starch, Davidson´s plum powder, egg) to make up to 100%. For preparation of patties, minced beef was mixed with minced fat, sodium bicarbonate, salt, food additives as specified above, and water. The batter was then refrigerated at 4°C for 30 min, patties were formed (113 ± 2g each) using a patty press mould (FED 602201, APEX, NSW, Australia). Some patties were cooked fresh (day 0) while others were stored cold for 1 or 4 days, and then cooked either using a griller or oven, to an internal temperature of 75°C; and then cooled to room temperature. At 30 minutes post-cooking, hardness was measured using a texture analyser (Lloyd Materials Testing, METEK®, LS5, Largo, FL, USA) fitted with a 20 mm diameter cylindrical probe set to 50% depth. A load cell of 500 N was used at a speed of 200 mm/min with 0.1 s delay descent. Cooking yield was determined by weight difference before and after cooking. Data was processed using Microsoft Excel.

Results

Comparison of sugarcane flour and potato starch: Results for treatments containing either sugarcane flour, potato starch or a combination of both ingredients are shown in Table 1. In batch 1, grilled patties with 28% water and 2.4% sugarcane flour, had decreased cooking yield, compared to patties with less water content, independent of the duration of storage (1 or 4 days). In batch 2, all patties were tested on day 0. In a comparison across formulations, it is evident that the highest cooking yield was obtained with grilled patties containing 2.5% potato starch/25% water and with oven-cooked patties containing either sugarcane flour or sugarcane flour combined with potato starch and 18.2% water. The softest patties were obtained from the grill and oven cooking and formulations containing 2.5% potato starch with 25% water and a combination of sugarcane flour and potato starch with 18.2% water. In general, hardness was the highest with no water addition. Patties containing potato starch were softer than those with sugarcane flour, however, cooking yield remained similar. Oven-cooked patties with 2.5% potato starch and 25% water were 2x harder than those grilled, confirming that cooking method influences hardness of meat products. Combining sugarcane flour and potato starch resulted in higher yield. The softest texture was achieved with 1.3% sugarcane flour, 2.7% potato starch and 17.9% water.

Comparison of all other additives: Fig. 1 shows the influence of formulation (type of additive and water content) and cooking method (grill vs oven) on hardness (N) of beef patties. Grilled patties were softer than oven-cooked in all cases. Patties containing Davidson´s plum powder were the softest.

Conclusion

A softer beef patty can be obtained by grilling the product instead of oven cooking. A soft patty can also be achieved by using Davidson´s plum powder, High Acyl Gellan Gum, or a combination of sugarcane flour and potato starch. In addition, the highest cooking yield was observed with the combination of sugarcane flour and potato starch.

Notes