PE8.25 Monitoring of quality factors such as nutritional value and fatty acids changes in Iranian chicken sausages stored at 4°C 257.00

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I .Abstract: Quality factors such as chemical changes during storage were investigated in two types of chicken sausages that contain about 80% chicken meat to consider their stability. Chemical analysis comprised fatty acid composition experiments. Total period of investigation was 45 days and all analysis carried out in two samples containing different oil (Canola and Soybean). Statistical analysis were performed with GLM (Repeated Measured) and T-Test. Differences was significant at P<0.05. As a result, almost all the time, sausages containing Canola oil showed lower changes than sausages containing Soya oil.

II. INTRODUCTION:

Meat preservation using mincing, curing, flavoring with spices and packaging in coating refers to thousand years ago [1]. Also, heat is applied to meat products to improve hygienic quality and increase flavor, taste and shelf-life [2]. Generally, we need to consume higher values of long chain unsaturated fatty acids and to intake lower percentage of saturated fatty acids [3]. Fatty acid composition of cell membrane can be changed using consumption of w-3 and w-6 unsaturated fatty acids and in this way, inflammatory activities decreased [4]. Food lipid affects on some metabolic pathways such as ways that are a part from glycemic control process so that type and value of dietary lipid can be effective in control of diabetic type II [5]. Material used in product formulation and also procedure affects on quality factors and has a substantial role in oxidative stability [6]. For example, adding of nitrite to products, in addition to color improvement causes controlling and decreasing of oxidation reactions [7]. Thus, at this study, our purpose is monitoring of fatty acid profile of sausages during storage. Also, because the most producer plants use Soybean oil, as a hypothesis, we suggested that Soybean oil substation with Canola oil can be a turning point in spoilage stability improvement of produced product. So, two types of chicken sausage containing about 80% chicken meat and two different oils were analyzed.

III. MATERIALS AND METHOD:

3.1. Fatty acid profile: Lipid content of samples was extracted using [8]. About 20 gr grinded sample was mixed with 50 ml Methanol and stirred for 30-40 min. Then 40 ml Hexane added to mixture and new mixture mixed for 20 min again. Then the upper phase that was Hexane containing extracted lipid, separated and used for methylation process. Methyl esters prepared according [9] using Methanolic KOH. Fatty acids methyl esters were analyzed using gas chromatography with Flame Ionization Detector and silica capillary column (60m0.25mm0.2µm). Injector and detector temperatures were 250 and 260°C, respectively. Carrier gas was selected hydrogen. After injection of 1µl of sample and 80:1 split ratio, temperature program was selected in this way: 150°C for 5 min, increasing to 175°C with 5°C/min and after 3 min, reached to 190°C with 3°C/min and set on this final temperature for 15 min. Fatty acids at each stage were reported as percent (with regard to total fatty acids).

IV. RESULTS AND DISCUSSION:

4.1. Fatty acid profile: As you seen at Table 3, five fatty acids are reported in our study, which were the most abundant between total fatty acids. [10] investigated the lipidic profile of Swordfish and their study indicated that the palmitic and stearic acids prevail in the saturated fatty acid group and the oleic acid content in the monounsaturated fatty acid. Initially, heating process effect evaluated in samples, and only palmitic acid in sausage containing Canola oil showed significant increase after cooking (P=0.033), so that other fatty acids showed no significant changes after heating. According to [11] the loss of liquid by

evaporation and fat was limited by using a closed medium that this condition applied in our study. Also, in their study, there was no significant effect of cooking for any fatty acids. They stated that the matrix of muscle acts as a protective environment in which losses of fatty acids are minimized when meat is cooked. Except for a marginal decrease after cooking in PUFA/SFA ratio in sausage containing Canola oil, PUFA/SFA ratio increased in sausage containing Soybean oil. [2] observed that the PUFA/SFA ratio for all treatments of pork breakfast sausages (samples supplemented with CLA and control) was over 0.45 that showing cooking had no negative effect on this ratio. Thus, from a nutritional point of view, this no effect would be positive. Also, [12] observed an increase in PUFA levels of meat after cooking. That was in agreement to our study which a negligible increase occurred in PUFA percent after cooking. Along the time, no significant variations were observed in sausages containing Canola oil at each of fatty acid, as [13] did not detected changes in fatty acid profile of lamb during storage at 4°C. In comparison, storage time had significant effect on another batch, so that on day 15 palmitic acid showed a significant increase and stearic, oleic and linoleic acid showed significant decrease that was in agreement to [14] that observed an increase of SFA and a decrease of PUFA proportions after 14 days of storage. On day 30, except for a decrease in palmitic acid, unsaturated fatty acids increased significantly. Also, last results concur with [15] that linoleic and linolenic acids of beef steers fed with Soybean oil showed an increase after 60 days of storage. Finally, palmitic acid decreased on day 45 again but oleic acid increased at this time. [16] stated that the w3/w6 ratio of the Beluga Sturgeon fillets was the lowest on month 12 of frozen storage as we observed in sausages containing Soybean oil. In comparison of two samples, samples containing Canola oil had higher PUFA/SFA and w3/w6 ratio than another one, as [16] reported that the w3/w6 ratio was within recommended for a healthy human diet in group containing Canola oil. Oleic and linolenic acids in samples containing Canola oil were higher than another sample. Also, [14] reported that treatment group with rapeseed (colza) oil had higher percentage of oleic and linolenic acid than control group with Soybean oil supplementation. Furthermore, content of palmitic, oleic and linoleic acids was prominent in sample containing Soybean oil as observed in Sturgeon fillets during frozen storage by [16]. Profile plots of fatty acids are shown at Figure 1 (Dendrogram plot) and Figure 2 (Principal Component Analysis). At these Figures, the odd numbers indicated Canola samples and even numbers represented Soybean samples during 5 stages. As seen at Figure 1, there was approximately a close relationship between samples of each group, except for sample number 3 (Canola sample on day 1) that set at a far placement from other samples in Canola batch. Similar situation observed at Figure 2, that Canola batch sets on the positive part and Soybean batch sets on the negative part of PC1. At this Figure, PC1 explains 75.60% of total variance and PC2 explains 15.44% of total variance. Numbers 11, 12, 13, 14 and 15, present palmitic, stearic, oleic, linoleic and linolenic acids, respectively. In figure 2, well relationship of each batch is illustrated and also sample number 3 is far from other samples in its group. Some evidence of this occurrence is observable at Table 3 that Canola batch on day 1 is a little different from the others in some of its fatty acids percents (especially palmitic and stearic acid). According to Table 3, Canola batch on day 1 has the highest palmitic acid and the lowest stearic acid between other stages. In Figure 2, number 3 has the most distance to stearic acid and is the closest one to palmitic acid between other samples in Canola batch.

V. CONCLUSION:

Fatty acid composition of Canola batch showed lower variation all the time and its w3/w6 and PUFA/SFA ratios were closer to recommended values. As a result, Canola oil can tolerate chemical changes better than Soybean oil during storage.

ACKNOWLEDGMENTS:

Authors thank the National Nutrition and Food Technology Research Institute for financial supports.

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