EFFECT OF FREEZING ON THE CHEMICAL COMPOSITION AND SOME QUALITY CHARACTERISTICS OF MEAT FROM ARABI LAMBS.

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INTRODUCTION

The main disadvantage of freezing meat is the losses of the water soluble nutrients in the drip during thawing (Lawrie 1968 and Mc William 1979). However there is a lack of informations concerning the amount of nutrients losses during thawing, after deep freezing at-18C, and its effect on the nutritive value of meat from arabi sheep. Therefore this experiment was undertaken to investegate the effect of freezing and storage periods on the chemical composition and some quality characteristics of meat from arabi lambs .

MATERIALS AND METHODS

Twelve Arabi lambs, averaging 46±1.1 Kg live body weight, were slaughtered at the age of one year, after 24 hr. fasting period. The obtained carcasses were chilled at 4°C for 48 hr., according to field et al(1963) recommendation and then after, cut into four quarter. 5-12 ribs of both side of the carcasses were taken and dissected into lean, fat and bone.The cross-section area of longissimus dorsi muscles were measured between 12 th and 13 th rib of each carcass. Longissimus dorsi muscles of the 5-12 ribs cut were taken from both side of all carcasses. Six muscles were chosen randomly for chemical analysis after 48 hr of chilling while the other 18 muscles were stored frozen at-20°C.Three frozen muscles were subjected to chemical analyses at the end of each freezing period(1,30,60,90,

120 and 150 day of freezing). Statistical analysis were applied using completely randomized design to study the effect of the treatments on the characters studied, while L.S.D was used to enable comparison between any two treatments.

RESULTS

Table 1 shows the physical measurements of the slaughtered animals, which indicated a good stage of fattening.This is in agreement with Tahir, et.al.(1985)and Rashid,et.al. (1987). During days 1,30,60, 90,120 and 150 of freezing, the following chemical changes in the frozen muscles were observed:pH was 5.8,5.6,5.5, 5.4,5.6 and 5.6(L.S.D. 0.09); Total volatile nitrogen(mg/ 100 gm) was 14.4,17.8,19.9, 21.2,21.2 and 23.9(L.S.D.0.85) ;Free fatty acid(oleic acid%) was 0.50,0.60,0.64, 0.74,0.80 and 0.87(L.S.D. 0.08);Thiobarbiutric acid (mg malonaldehyde/Kg) was 0.21,0.26,0.31, 0.35, 0.39 and 0.42(L.S.D.0.05) Reduced myoglobin(%) was 59.3, 58.7, 62.0,64.0,63.3 and 62.7 (L.S.D.2.72) and Metmyoglobin (%) was 29.3, 35.3, 36.0, 36.0, 36.7 and 37.3 (L.S.D. 3.7),for the period of freezing 1, 30, 60, 90, 120, and 150 day respectively.

Table 1 Physical measurements

Empty body wt(Kg)		42.7±1.0
Hot carcass	(Kg)	25.8±0.7
Cold carcass	(Kg)	25.6±0.7
Dressing	(%)	59.3±0.8
Fore quartes	(%)	45.8±0.6
Hind quartes	(%)	38.7±0.2
Fat tail	(%)	14.2±0.2
5-12 rib cut		
Lean	(%)	44.9±1.0
Fat	(%)	33.5±1.1
Bone	(%)	21.5±1.0
Rib eye area (Cm^2)		14.0±0.4

the results showed a significant ($P<0.01$)

reduction in frozen meats pH up to 90 days of freezing, This reduction was probably due to the continuous formation of lactic acid until 90 days of freezing,after which the pH was increased.The Iatter change in the pH was probably the results of the accumulation of the end products of protein degradation. Similar results were reported by Mohammed,et.al.(1987) and Al-dailamy (1981).On the other hand a continuous increase in the total volitale nitrogen,free fatty acid and thiobarbiutric acid were observed with advanced freezing.This finding have been supported by Awad,et.al. (1968);Keller,et.al.(1973) and Mohammed,et.al.(1987). Muscles chemical composition were decreased significantly ($P<0.01$) with prolonged freezing.Moisture was 76.4, 69.0,68.6,67.8,67.0,63.4 and 62.9;crude protein was 20.1, 19.3,19.3,19.2,19.1,18.7 and 18.7;Ash was 1.1,1.0,1.0,1.0, 0.9,0.9 and 0.9;crude fat and other nutrients 2.5,2.3,2.3, 2.3,2.3,2.2 and 2.2.On the other hand drip volume(ml/ 100 gm) was increased significantly ($P<0.01$) with prolonged freezing,the values were 0.0,8.4,8.9,9.8,10.7,14.7 and 15.3 for the chilled and frozen muscles for 1,30,60,90,120 and 150 day respectirely.These results are in agreement with forrest.et.al.(1975);Price,et.al (1974)and Kronman,et.al.(1960).

CONCLUSION

The results of the present experiment showed that prolonged freezing of meat up to 150 day would probably results in an increase in the meat losses of protein and minerals.However, any attempt results in a reduction in the drip volume would be considered as a positive step towards conserving meat nutritive value during freezing.

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