Summary

Meat considered the most important source of animal protein of high biological value for human so its price is expensive. This study was planned to evaluate the chemical changes, which occurred in beef as a result of frozen storage at –18°C for (6, 15, 30, 45, 60, 75, and 90 days) and also heat treatment by boiling, roasting and boiling under pressure. The study included both chemical analysis of meat constituents and the keeping quality parameters.

The results were summarized as following:

I-Chemical constitutes:

1-Total proteins (g%):

Frozen storage of beef at –18°C for 90 days decreased the total proteins content of raw beef samples. That was observed also in samples which subjected to heat treatment as boiling and roasting causing a significant decrease in total protein content of beef.

2- Electrophoretic pattern of beef meat proteins:

The electrophoretic pattern of beef meat proteins changed due to thermal effect including frozen storage at –18°C for 90 days and heat treatment by different methods. The molecular weights of separated polypeptide bands were changed and the number of separated bands increased as a result of separation electrophoretically more mobile contents.

3- Total lipids (g%):

Total lipids content of beef not significantly changed during the frozen storage at –18°C for 90 days, while it were increased as a result of

heat treatment. Roasted and boiled under pressure samples had higher total lipids than raw control samples.

4-Total cholesterol (mg%):

Total cholesterol content of beef not significantly changed during the frozen storage at –18°C for 90 days, while heat treatment by different methods including boiling, roasting and boiling under pressure leading to an increase in its percentage.

5-Total pigments (ppm):

Total pigments of beef decreased during frozen storage at –18°C for 90 days. Heat treatment of beef by boiling and boiling under pressure decreased the total pigments of beef, while it increased as a result of roasting.

II-Keeping quality parameters

1-Moisture (%):

Moisture content of beef decreased during frozen storage at –18°C for 90 days. Heat treatment by boiling, roasting and boiling under pressure had the same effect on the moisture content of beef.

2-Water holding capacity:

Both of frozen storage at –18°C for 90 days and heat treatment by different methods including boiling, roasting and boiling under pressure decreased the water holding capacity of beef.

3-Thiobarbituric reactive substances (mg malonaldehyde/kg tissue):

Frozen storage at –18°C for 90 days increased the T.B.A.R.S of beef. Roasting increased the T.B.A.R.S of beef, while boiling and boiling under pressure causing no significant changes that observed during 0,15,30 and 60 days of storage. At 75 days of storage the T.B.A.R.S of beef increased as a

result of boiling, roasting and boiling under pressure, while at 90 days of storage only roasting and boiling under pressure increasing the T.B.A.R.S of beef.

Conclusion

From the present study it could be concluded that the chemical composition and the keeping quality parameters of beef were influenced by the thermal effect as total proteins, total pigments, moisture content and the water holding capacity of beef decreased as a result of frozen storage at –18°C and heat treatments by different methods. Total lipids, total cholesterol content increased as a result of heat treatments by different methods. Thiobarbituric acid increased as a result of frozen storage at –18°C and heat treatments by different methods.

Recommendation

To avoid changes in the chemical composition of beef which affect its nutritional value and its quality, preservation of beef by freezing should be for a short time. Cooking by boiling and boiling under pressure were the more favorable methods of cooking as compared with roasting.