Quantitative descriptive sensory analysis of buffalo meat from animals fed with a diet containing different amounts of vitamin E

M.P. Pellicano, G. Cammarota, C. Laurino, M.P. Graziani

Istituto di Scienze dell’Alimentazione, CNR, Avellino, Italy

Corresponding author: M.P. Pellicano. Lab. di Analisi Sensoriale & Consumer Science, Istituto di Scienze dell’Alimentazione, CNR, Via Roma 52 a-c, 83100 Avellino, Italy - Tel. 0825-299371 - Fax: 0825-781585 - Email: mpellicano@isa.cnr.it

ABSTRACT: The objective of our study is the sensory characterisation of buffalo meat from animals fed with different diets. The sensory evaluation was carried out on frozen rump meat samples from 12 animals. Control group (N=4) received a normal diet, a low vitamin E diet group (LVE) (N=4) and a high vitamin E diet group (HVE) (N=4). The sensory profiles of the different samples were obtained by Quantitative Descriptive Analysis. Sensory evaluation was initially carried out on the raw meat. The samples were cooked using an electrical oven reaching an inner temperature of 80°C. The slices were cut into squared pieces of 2x2 cm for tasting. A detailed analysis of the profiles for each attribute shows that the “tenderness”, “juiciness” and “visible fat” of the LVE group are significantly greater when compared to the Control and HVE groups. While HVE animal rump has a higher “cohesivity” and “colour uniformity” values compared to the LVE animal rump.

Key words: Animal, Diet, Meat, Sensory evaluation.

INTRODUCTION - This study is part of a project for the “Centro Regionale di Competenza Agroalimentare della Campania”, with the aim of promoting the quality and consumption of new products, in particular buffalo meat. Previous studies have shown that among the factors influencing the choice and consumption of meat, there is the preference for specific sensory qualities (Pellicano, 2006). Other authors when dealing with the subject, have discussed in detail that consumers indicate “tenderness” as being one of the most important sensorial characteristics that influences acceptability (Love, 196). The project, of which this study is part, has the aim of improving the quality of meat in relation to consumer needs, which are always orientated towards the “quality” factor.

MATERIAL AND METHODS - The samples of buffalo meat to be used in the sensory analysis were taken from 12 different animals. They were bred by the cooperative “La Baronia” in the province of Caserta (Italy) and for 100 days prior to being slaughtered, they followed the same diet. Two groups of 4 animals received a vitamin E supplement, one 600 UI/day (low dose group, LVE) while the other 1500 UI/day (high dose group, HVE). The Control group followed only the basic diet. The evaluation was carried out on samples of rump stored at –20°C for two months. In order to define the sensory profile of the different samples, quantitative descriptive analysis (QDA) (1) was used. All the samples of meat were evaluated three times in different sessions. The slices of meat were 1cm thick. Sensory evaluation
was initially carried out on whole slices of raw meat, in order to define the visual and olfactory characteristics. They were subsequently cooked on an electrical oven, reaching an inner temperature of 80°C. The slices were then cut into squared pieces of 2x2 cm for tasting. The samples were cooked in relation to the evaluation times of the judges. The 8 members of the panel evaluated the different samples in the same sequence within the same session. The sequence of the samples tasted, changed for every session in order to rotate them. The opinions expressed by each member of the panel were recorded on an evaluation sheet that had been created during previous tasting sessions, in which all the judges selected and defined the specific attributes of meat. Any statistical differences among the samples were evaluated by ANOVA, followed by Fisher’s least significant difference (LSD) procedure.

**RESULTS AND CONCLUSIONS** - Table 1 shows the definitions of the attributes reported on the evaluation sheet.

| ATTRIBUTES                        | DEFINITION                                                                 |
|----------------------------------|-----------------------------------------------------------------------------|
| Red dark-red colour intensity    | Measuring the intensity of the colour including the interval red-red brown.  |
| Colour uniformity                | Evaluating the homogeneity of colour distribution on the whole surface.     |
| Visible fat                      | Evaluating the amount of visible fat present on the extra-muscular part.   |
| Marbling                         | Evaluating the amount of intramuscular fat.                                |
| Fine-coarse grain                | Measuring the size of the muscular bundle.                                 |
| Raw meat odour int               | Measuring the whole volume of positive and negative odours.                 |
| Roast odour int                  | Measuring the whole volume of the typical odour of roasted meat.            |
| Sweet                            | Measuring the intensity of the specific sensation of sugar                  |
| Salt                             | Measuring the intensity of the specific sensation of salt                   |
| Tenderness                       | Measuring the intensity of resistance to chewing                           |
| Juiciness                        | Measuring the amount of liquid released during chewing                      |
| Cohesivity                       | Measuring the degree of deformation of the sample during chewing prior to being reduced to small bits. |
| POO                              | Measuring the intensity of positive aromas retronasally perceived          |
| NOO                              | Measuring the intensity of negative aromas retronasally perceived          |
| Aroma persistence                | Measuring the intensity of aromas perceived 30 seconds after swallowing.   |
Prior to elaborating the data obtained from the Panel, the performance of the judges was evaluated for each attribute through analysis of variance. The analysis highlighted that there were no differences between the opinions expressed, with it therefore being possible to draw out the sensory profiles of the samples. Figure 1 shows the sensory profiles of buffalo meat of the control group as well as the two other treated groups.

The data shows that the sensory qualities of buffalo meat of the Control group and the two groups treated with vitamin E are similar. Statistical analysis of the profiles, through the analysis of variance, has highlighted that the values of the attributes “tenderness”, “juiciness” and “visible fat” of the LVE group are significantly greater when compared to the Control and HVE groups (F=5.45, p<0.01; F=4.83, p<0.02; F= 11.99, p<0.001). The “colour uniformity” value of the LVE group is significantly lower than the values of the Control and HVE groups (F=5.73, P<0.01), while HVE group has a higher “cohesivity” and “colour uniformity” values compared to the LVE group (F=5.28, P<0.02). The results show that the diet integrated with vitamin E influence differently several of the sensory characteristics of buffalo meat. A low dose of vitamin E positively influences the tenderness and juiciness of the meat but it has a negative effect on colour uniformity. These results suggest the usefulness of further studies.

ACKNOWLEDGMENTS - The Authors would like to thank the Centro Regionale di Competenza delle Produzioni Agroalimentari della Campania for funding the study as well as Prof. Luigi Zicarelli for supplying the buffalo meat samples. They would also like to thank all the members of the Panel for having carried out the sensory evaluation without receiving any form of economic compensation.

REFERENCES - Pellicano, M.P., Cammarota, G., Picocci, N., Cipriano, L., Tarantino, K., Graziani, M.P., 2006. Caratterizzazione sensoriale della carne bufalina e individuazione dei fattori che incidono sui consumi. Atti 7° CISETA. In: Porretta S., Ricerche e innovazioni nell’industria alimentare. Chiriotti Editori, Pinerolo - Italia, pp. 37-42. Love, J., 1994. Product acceptability evaluation. In: Pearson A.M., Dutson T.R., Quality attributes and their measurement in meat, poultry and fish products. Blackie Academic & Professional, Glasgow, pp.337-358. Stone, H., Sidel, J., Oliver, S., Woolsey, A., Singleton, R. C., 1974. Sensory Evaluation by Quantitative Descriptive Analysis. Food Technology, 8:24-34.