Studies on the Evaluation of Moisture and Ash Content in Kamori, Pateri and Tapri Goat Meat

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Abstract

The aim of this work was to evaluate the moisture and ash content in meat of three different local breeds of goat (Kamori, Pateri and Tapri). A total of 30 samples were randomly collected from the local market of Tandojam-Pakistan. The results revealed that the average moisture content in meat of Kamori breed was 76.56 ± 0.72% which is comparatively higher than the mean moisture content in meat of Pateri and Tapri i.e. 72.63 ± 1.13% and 69.88 ± 0.93% respectively. The overall moisture content in goat meat varied in a range of 65.92 and 80.02% (mean 73.02 ± 0.732%). There were statistically highly significant differences (P< 0.001) observed in meat of different breeds of goat. Further results of LSD (0.05) comparison of means revealed that the moisture content in meat of different of goat are significant (P< 0.001) from each other. The ash content in meat of all three breeds of goat meat was in a range of 0.87 and 1.97% (mean 1.40 ± 0.049%). Statistically there were highly significant differences (P< 0.001) in average ash content in meat of these three different breeds of goat. LSD comparison of means also showed significant differences (P >0.05) in average ash content in meat of different breeds of goat.

Key words: Goat, Meat, Ash, Moisture, Chemical composition

Introduction

Goat meat is preferred and comparable with other meats in respect to its moisture, protein and ash contents. It contains more arginine, isoleucine and adequate amount of essential amino acids. Goat has less subcutaneous fat but more internal fat than sheep. Goat meat has been established as lean meat with favorable nutritional quality. Its attributes are concordant with present day
consumer demands for leaner and nutritious meat. It is darker and more red in color than mutton from sheep mainly due to the lower intramuscular fat content of goat carcass with less saturated fat and more mineral. In addition the overall composition of the carcass is greatly influenced by age, sex, feed, body weight, growth, physiological condition, physical activity of animal and initial microbiological load on carcass in slaughter house and meat shops. From nutritional point of view, goat meat is a suitable source of nutrients especially for cardiac patients as it is low in cholesterol level than beef and mutton.

The goat meat is widely consumed and is important source of animal protein in most developing countries. Three types of goat meat are consumed: meat from kids, meat from young goats and meat from old goats. The supplies of goat meat over the last 20 years are decreasing consistently in all regions of the world. A widening gap between production and consumption has resulted in increased prices. Goat meat appears to contain more arginine, leucine, and isoleucine than mutton and is adequate in all the essential amino acids. Goat meat also has a relatively lower fat content because the tissue is more concentrated in the viscera. The implication of this feature is an increased value of the purchased product (lean meat). The Ca content of goat meat is inferior to that of beef. Goat meat has higher thiamine and riboflavin contents in the liver, but niacin was lower than that in beef. Management factors affect the proximate composition of the meat and the eating quality, especially tenderness, flavour and juiciness.

Goat is the animal of developing countries where more than 95% of goats are reared indicating their economics importance and adaptation in the different agro-ecological zones of Asia and Africa. The goat meat is popular in the Middle East, Africa and South Asia including Pakistan. The perception of consumers in the Western world is not in favor of goat meat; however, in Pakistan the meat consumption pattern is entirely different to those in developed countries, where majority of Pakistani consumers prefer goat meat. There is also a worldwide tendency for rapid increase in demand for goat meat. Goat meat has an immense market potential, as it can become an ideal choice for health conscious consumers. In recent time market of meat have been adapting to different requirements of contemporary consumers, insisting of lean and easily digestible meat of high quality and good test. Goat meat market and geographical pattern of consumption in sub-tropical and tropical developing countries are different. Goat meat for longer occupied a special place in the diet for variety of reason including test preference, prestige, religion, tradition and availability, in almost all the communities of the country with the nutritional aspect.

Pakistan is the second largest goat producing country in South Asia region having 56.7 million goats contributing about 578 000 tons of mutton. Goat production in Pakistan has expanded considerably over recent decades as a result population densities have also increased.

Limited studies on carcass composition and quality of goat meat has appeared in literature and no studies have been reported so far on the same aspects of goat meat particularly in Sindh. Therefore keeping in view the importance of the subject, this study was conducted to evaluate the moisture and ash contents of goat meat available in local market of Tandojam- Pakistan.
Materials and Methods

Collection of meat samples

A total of 30 goat meat samples were randomly collected from local meat market of Tandojam-Pakistan. All the samples were divided into three groups according to the breed (Kamori, Tapri and Pateri) and each group is further divided into adults and kids according to the age at slaughter as per butcher’s information respectively. All the samples were brought to Laboratory of Animal Products Technology, Faculty of Animal Husbandry and Veterinary Sciences, Sindh Agriculture University, Tandojam, for further analysis.

Chemical analysis

Moisture Content (%)

Moisture content was observed according to the method of Association of Official Analytical Chemistry. The fresh minced meat sample (5g) was transferred in pre-weighed flat bottom aluminum dish, which was transferred to hot air oven at 101 ± 1°C for 3 - 4 h. Dried sample was then placed in desiccator having silica gel as desiccant. After 1h, the dish was weighed. Moisture content was calculated by applying the following formula.

\[
\text{Moisture} \% = \frac{W_2-W_3}{W_2-W_1} \times 100
\]

W1 = weight of empty dish.
W2 = weight of dish + sample.
W3 = weight of dish + dried sample.

Ash Percentage

Ash percentage was determined by Gravimetric method as described by AOAC using muffle furnace. The fresh minced meat sample (5g) was transferred in pre-weighed crucible, and transferred to muffle furnace at (550°C) for 4 – 5 h. Ashed sample was transferred to desiccator having silica gel as desiccant. After 1h, the dish was weighed. The ash content was calculated by the following formula.

\[
\text{Ash} \% = \frac{\text{Wt of ashed sample}}{\text{Wt of sample taken}} \times 100
\]
ASH CONTENT IN KAMORI, PATERI AND TAPRI GOAT MEAT

Statistical analysis: Statistical analysis was performed using the Computer based statistical software package i.e. MSTAT-C. Department of Crop and Soil Sciences, Michigan State University, USA.

Results and Discussion

Moisture content

Moisture content of goat meat was determined, average moisture content in meat of Kamori goats was observed as 76.56 ± 0.72%, which is comparatively higher than the mean moisture contents in meat of Pateri and Tapri goats, i.e. 72.63 ± 1.13% and 69.88 ± 0.93% respectively. The overall moisture content in goat meat varied in a range of 65.92 and 80.02. There were statistically highly significant differences (P<0.001) observed in moisture content in meat of different breeds of goat (Kamori, Pateri and Tapri). Further results of comparison of means reveals that the moisture content in meat of different breeds of goat are significantly different (P<0.001) from each other (Table-1).

Table-1. Average Moisture Percentage and Range in meat of different breeds of goat.

<table>
<thead>
<tr>
<th>Goat Breed</th>
<th>Moisture content (%)</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>SE ±</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kamori</td>
<td></td>
<td>73.36</td>
<td>80.02</td>
<td>76.56</td>
<td>0.72</td>
</tr>
<tr>
<td>Pateri</td>
<td></td>
<td>67.96</td>
<td>77.92</td>
<td>72.63</td>
<td>1.13</td>
</tr>
<tr>
<td>Tapri</td>
<td></td>
<td>65.92</td>
<td>74.06</td>
<td>69.88</td>
<td>0.93</td>
</tr>
<tr>
<td>Over all mean</td>
<td></td>
<td>65.92</td>
<td>80.02</td>
<td>73.02</td>
<td>0.732</td>
</tr>
</tbody>
</table>

MSE = 8.914, DFE = 27, LSD (0.05) = 2.74
No. of observations to calculate a mean = 10

Table-2. Average Ash Percentage and Range in meat of different breeds of goat.

<table>
<thead>
<tr>
<th>Goat Breed</th>
<th>Ash content (%)</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>SE ±</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kamori</td>
<td></td>
<td>1.39</td>
<td>1.97</td>
<td>1.63</td>
<td>0.07</td>
</tr>
<tr>
<td>Pateri</td>
<td></td>
<td>1.12</td>
<td>1.64</td>
<td>1.39</td>
<td>0.06</td>
</tr>
<tr>
<td>Tapri</td>
<td></td>
<td>0.87</td>
<td>1.51</td>
<td>1.19</td>
<td>0.07</td>
</tr>
<tr>
<td>Over all mean</td>
<td></td>
<td>0.87</td>
<td>1.97</td>
<td>1.405</td>
<td>0.049</td>
</tr>
</tbody>
</table>

MSE = 0.04000, DFE = 27, LSD (0.05) = 0.1835
No. of observations to calculate a mean = 10

Ash content

The meat of different breeds of goat was analyzed for ash content. Ash content in meat of Tapri goat averaged 1.19 ± 0.06%, while in Pateri meat it was slightly higher than Tapri i.e. 1.39 ± 0.056% and remarkably higher i.e. 1.63 ± 0.07% in Kamori goat meat. The ash content in meat of all three breeds of goat varied in a range of 0.87 and 1.97% (mean 1.40 ± 0.049). Statistically
analysis revealed highly significant differences (P<0.001) in ash content in meat of different breeds of goat i.e. Kamori, Pateri and Tapri. LSD (T) comparison of means at rejection level of 0.05 revealed that the average ash content in meat of Kamori, Pateri and Tapri was significantly different at the level of P>0.05 (Table-2).

Moisture content (76.56 ± 0.72) in meat of Kamori goat breed was remarkably higher than the meat of Pateri and Tapri goat breeds i.e. 72.63 ± 1.13 and 69.88 ± 0.93, respectively. The decrease in moisture content of goat observed in the present study is directly correlates with breeding group (Genotype) and age. The result of the present study is in concordance with the previous studies and results of these research highlighted that breed types (genotype) had significant effect on the chemical composition including moisture, protein, ash and cholesterol.

A study also was conducted and analyzed the moisture and ash content in different breeds and sexes and claimed that there were significant differences present in mineral (ash) and moisture content among different breeds but not between sexes. It is also reported that the crossbred kids have higher content of protein, moisture and ash content and lower level of cholesterol than Anglo Nubiana and Boer goats. However, other studies observed that observed that the increase in moisture content had been attributed with breeding group and age. For the first time, correlation has been identified b/w moisture, ash and breed group and correlation b/w moisture, fat and age. It has been observed that slaughter age had significant effect on decrease in moisture content with advancing slaughter age. While the workers also reported that the decrease in moisture content in meat has been due to increase in fat content in meat.

Ash content (1.19 ± 0.07) analyzed in meat of Tapri breed was significantly lower followed by Pateri goat meat 1.39 ± 0.06 and Kamori goat meat 1.63 ± 0.07 respectively. Considerable research has been conducted in different parts of world on examining the physicochemical changes in goat meat with breeding group and advancing age. The result of present study is in line with study conducted by different researcher who reported that slaughter age had significant effect on physico-chemical characteristics of meat. Particularly the ash content increased with breeding group (genotype) and advancing slaughter age.

This has been also claimed by different worker that goat meat is more advantageous in nutritional point of view than mutton because of high mineral elements (ash) and lower fat content.

References


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