

Nutritional and organoleptic quality of lamb meat of Beni-Guil breed in eastern Morocco

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Introduction : Nowadays in Morocco, 98% red meat production is ensured by cattle, sheep and goat. The eastern Morocco represents one of the main sheep farming areas, characterized by the specificity of its production system pasture-based and by the well known quality of the sheep meat. The Beni-Guil breed dominates the sheep breeding in this area, its meat have been labeled as «a protected geographical indication» and constitute an important protein source for the population. This lamb meat is highly appreciated by consumers but, currently there is no scientific data available on its organoleptic and nutritional quality. The objective of this research is to contribute to a preliminary characterization of organoleptic and nutritional quality of this meat by physico-chemical analyses carried out on the *Longissimus dorsi* muscle (LDM).

Material and methods

Animal Materiel

-10 *longissimus dorsi* muscle samples were selected and cut with the help of the agents of the National Association of Sheep and Goats

Samples Preparation

- Slaughtering and Sampling
- Cutting and Trimming of meat
- Freezing, Lyophilization and Grinding



Methods of analysis

- Dry matter : Oven Drying at 105°C.
- Fat : Blich & Dyer (1959).
- Fatty acids (FA) : GC-FID.
- Proteins : Kjeldahl method.
- Amino Acids (AA) : HPLC.

Results

Table 1 : pH, color, cooking loss and water holding capacity (WHC) of *Longissimus dorsi* muscle of Beni Guil breed

| Parameteres | Mean |
|------------------|------------|
| pH | 5.79±0.14 |
| Color | |
| L* (Lgightness) | 36.90±1.52 |
| a* (Redness) | 12.53±0.93 |
| b* (yellowness) | 13.44±0.78 |
| Chromaticity* | 23.97±7.48 |
| Hue (b/a)° | 46.47±4.59 |
| a/b | 0.96±0.16 |
| WHC (%) | 22.72±2.30 |
| Cooking loss (%) | 35.86±1.59 |
| Collagen (%) | 0.1±0.05 |

Table 2 : Fatty acids analysis by GC-FID, sums and ratios of saturated and unsaturated fatty acid contents of *Longissimus dorsi* muscle of Beni Guil breed

| Sums and ratios | Content (%) |
|-----------------|-------------|
| Σ SFAs | 49.47 |
| Σ MUFAs | 38.48 |
| Σ PUFAs | 12.40 |
| Σ TUFAs | 50.88 |
| PUFAs / SFAs | 0.25 |
| TUFAs / SFAs | 1.04 |
| DFA | 67.90 |
| OFA | 3.52 |
| Total ω - 3 | 2.58 |
| Total ω - 6 | 9.62 |
| Ratio ω6/ω3 | 3.78 |

SFAs, saturated fatty acids; MUFAs, monounsaturated fatty acids; PUFAs, poly unsaturated fatty acids; TUFAs; total unsaturated fatty acids; OFA, odd fatty acids; DFA, desirable fatty acids=C18:0+TUFA.

Table 3 : Essential amino acid,(EAA) and nutritional quality of *Longissimus dorsi* muscle of Beni Guil breed (True digestibility CUD =94%)

| AAE | % AAE Prot. LDM | % AAE Prot. Ref. |
|----------------|-----------------|------------------|
| Cys-Met | 2.31 | 1.7 |
| His | 2.47 | 1.6 |
| Ile | 3.15 | 1.3 |
| Leu | 5.11 | 1.9 |
| lys | 4.60 | 1.6 |
| Phe | 3.17 | 1.9 |
| Thr | 2.64 | 0.9 |
| Val | 3.07 | 1.3 |

Chemical Index

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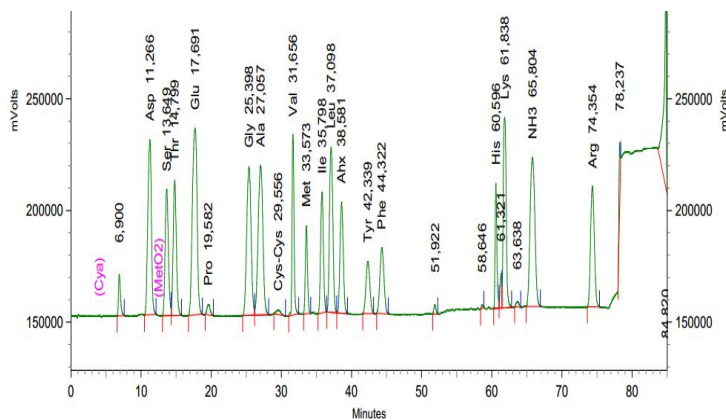


Figure 1 : HPLC chromatogram of amino acids analysis of Beni Guil lamb meat

Conclusion: The results of the organoleptic quality analysis (table1) show that Beni-Guil lamb meat has a bright red color, with a chromaticity of 23.97 which allow this meat to have an optimal color (Calnan 2016), an a/b ratio of 0.96 which reflects the predominance of the red color, and a hue angle of 46.47 which translates the bright red color (richness in oxymyoglobin). This lamb meat, sought by consumers, have a significant juiciness with a water retention capacity (WHC) and a cooking loss of 22.73% and 32.87% respectively. In addition , it have a marked tenderness with a low collagen content of 0.1%. Due to all these measurements and conducted observations, this collagen-poor meat is ranked in the first category to be grilled or roasted.

The analysis of nutritional quality (Figure1, Table2 & 3) showed that LDM of the Beni-guil has a high nutritional and dietary value, rich in polyunsaturated fatty acid (PUFA) and essential amino acid, with a PUFA/SFA and PUFA n-6/PUFA n-3 ratios of 0.25 and 3.78 respectively , and a Protein digestibility-corrected amino acid score (PDCAAS) of 127. Consequently, the consumption of this meat will satisfy the human nutritional needs in essential amino acids and fatty acids.