

## Physico-Chemical and Biotechnological Characterization of Sheep's Milk (Ovis aries) by Three Medicinal Plants Extracts

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**Abstract :** In order to combine milk and its derived products conservation and flavoring, Moroccans often used aromatic and medicinal plants. These plant extracts are endowed with several nutritive and therapeutic properties. This study constitutes a first national assessment of physico-chemical quality of sheep's milk from moroccan Sardi breed and the evaluation of the antibacterial effect of three medicinal plants extracts: Aloe barbadensis Miller, Thymus satyroides and Mentha pulegium on flora isolated from this sheep's milk. 100 milk samples were collected in four regions of Morocco. The bacteria isolated were identified by classical and molecular methods (16S rRNA sequencing) and tested, according to the disk method, for their sensitivity to several antibiotics. The physico-chemical analyzes of sheep's milk concerned the pH, titratable acidity, density, dry extract, freezing point and contents of: fat, proteins, lactose and calcium. The essential oils (EOs) of T. satyroides and M. pulegium were extracted by hydrodistillation and analyzed by GC / MS, while the Aloe vera leaf pulp was analyzed by the methods of Harborne and HPLC. A total number of 125 bacteria have been identified. Significant resistance to chemical antibiotics has been noted in LABs. The average temperature value of milk is around 57.15 °C, the pH is 6.56, the titratable acidity is around 3.4 ° D, the density is 1.035g / cm<sup>3</sup>, the total dry extract is around 169.5g / l, the ash (9.8g / l), the freezing point (- 0.556 °C) while the average fat content is 67.85g / l. The samples richest in fat belong to the region of Settat, cradle of the Sardi breed, with a maximum average value of 74.4g / l. The average protein is 56g / l, lactose (39.92g / l), and calcium (1.855g / l). Analysis of the major components of EOs revealed the dominance of borneol in the case of T. satyroides and of pulegone in M. pulegium. Aloe vera gel contains alkaloids, flavonoids, catechic tannins, saponins and 1.60 µg / ml of aloin. The plant extracts have a bactericidal effect on E. coli, Klebsiella oxytoca and Staphylococci and bacteriostatic effect on LABs of technological interest (Lactobacillus). As a result of this study, it is believed that the consumption of sardi sheep's milk would be of nutritional benefit. Its richness in fat and proteins predisposes it for biotechnological development in the manufacture of cheese and yogurt. Also, the use of aromatic and medicinal plants, as natural additives would be of great benefit to flavor and maintain its quality.

**Keywords :** sheep's milk, lactic flora, antimicrobial power, aloe barbadensis miller, thymus satyroides, mentha pulegium

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