

Evaluation of the triple attitude of the alpine Ciuta sheep breed: quality assessment of milk, meat and wool

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Local breeds and traditional farming systems play a key role in preserving rural biodiversity, especially in mountain areas. The survival of a breed depends on its ability to meet market demands for derived products and to exploit their inner quality. The Val3Ciuta project aims to characterize and promote the products derived from the Ciuta sheep—meat, milk, and wool—recovering the potential triple purpose of this native breed from the alpine area of Lombardy, Italy. Through chemical analyses, the nutritional properties and specific chemical markers of meat and milk were identified and linked to a traditional farming system based on grazing practices, use of local forages and natural reproductive cycles. Fresh (N=60) and cured (N=26) meat samples were collected during spring and winter seasons of 2023-2024. Ciuta sheep chops were identified as lean meat (<5% fat), regardless of commercial category (light or heavy lambs, ewes, ram). Traditional dry-cured products, *violino* and *bresaola*, comprised 45% protein and 4-5% fat, of which 45-50% was unsaturated. Milk quali-quantitative parameters were measured in an 11-week trial (N=110). On average, 336g of milk were collected per ewe during a single daily milking, with top producers yielding up to 698g, with part of milk still suckled by lambs. Ewes were also assessed for their milking attitude. Discomfort behaviors at milking decreased over the trial (from 1.9 to 1.3 movements/min), with individual differences, indicating promising potential for selection in milk production among ewes. Milk comprised 4.8% lactose, 5.8% protein, and 4.6% fat, with an excellent n-6/n-3 ratio (1.4) and beneficial fatty acids content (2.9% BCFAs, 1.3% CLAs). Somatic cell counts were below the threshold suggested for healthy sheep mammary glands and high milk quality (<250,000cells/mL). Wool quality was assessed, contributing to its valorization and to the development of a local supply chain for the future, considering that wool is still considered a by-product to discard. Each sheep yielded about 1.5kg of wool per shearing, with a yield on greasy wool of 75% in line with non-Merino small breeds. The average fiber diameter of 30.0µm (61.8% comfort factor) highlighted a rather coarse wool but usable for textile purposes. These outcomes promote an added value for the Ciuta sheep, providing farmers with original knowledge, stimulating interest from agricultural entrepreneurs, and supporting biodiversity conservation in the alpine area. Research supported by PSR 2014-2020 Programme of Regione Lombardia, Operation n° 16.2.01, FEASR funds.