# METABOLOMIC ANALYSIS OF COLOSTRUM AND MILK IN RAGUSANA JENNIES

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The growing industry and demand for donkeys is strongly linked to the dairy donkey industry and the production of milk, which is more similar to human milk than other dairy species. This feature makes donkey milk suitable for infants who cannot be breast-fed and people suffering from cow milk protein allergies [1]. Milk metabolomics can also be used in the investigation of physiology of lactation, as the milk metabolites reflect the metabolic activity of the mammary gland [2]. In this study, colostrum (<48h) and milk samples (15$^{th}$ day of lactation) were collected from 20 healthy Ragusana jennies and analyzed by HNMR analysis. Student's T-test was performed for statistical purpose, p values <0.05 were considered statistically significant. A total of 65 metabolites were identified from NMR spectra including sugars, amino acids and derivatives, energy metabolites, fatty acids and associated metabolites, nucleotides and derivatives, and others. A total of 18 metabolites showed different concentrations ($p<0.05$) in colostrum and milk. Namely galactose, galactose-1-phosphate, fumarate, uridine, dimethyl sulphone, creatine phosphate, sn glycerol-3-phosphocholine, o-phosphocholine, o-acetylcarnitine, and ethanol decreased in milk at 15 days of lactation compared to colostrum. Conversely, myoinositol, creatine, acetone, alanine, betaine, valine, glutamate, and caprylate were found at higher concentrations in milk compared to colostrum. Some of the above-mentioned metabolites' trends resemble those seen in human and bovine milk, supporting the hypothesis that also in donkey species both the colostrum and milk metabolomes undergo significant changes over the first two weeks following parturition to support normal newborn development and vital functions.[3,4] The provision of colostrum and its composition and quality is vital to the development and growth of the newborn foal, meanwhile, a deep knowledge of donkey milk quality and composition is of special interest as it represents a main source of food for infants.

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