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Mare milk: composition, main uses and health-promoting properties

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Mare milk: fluid secreted by the mammary gland of the female *Equus ferus caballus* → highly traditional in central Asia, Mongolia and the former Soviet Union mainly through kumis

OBJECTIVES

To study the chemical and structural composition of mare milk in comparison with human and cow milk. On the other hand, to present the productive origin, consumption and uses of mare milk and to justify the benefits of mare milk for human health.

PRODUCTION, CONSUMPTION AND USES

Mare milk production (%)

- World → 0,5% (other species)
- Asian countries → 40% non-bovine species

Mare milk consumption (years)

- Europe →1990 / Spain → 2009 / Catalonia → 2013
- Asian countries (Kazakhstan) → 3500 BC

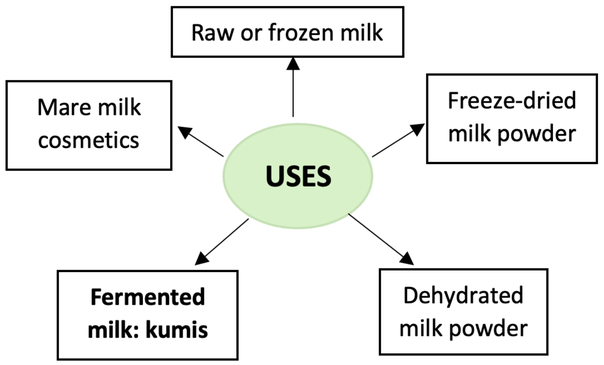

Figure 1. *Main uses of mare milk.*

BENEFITS

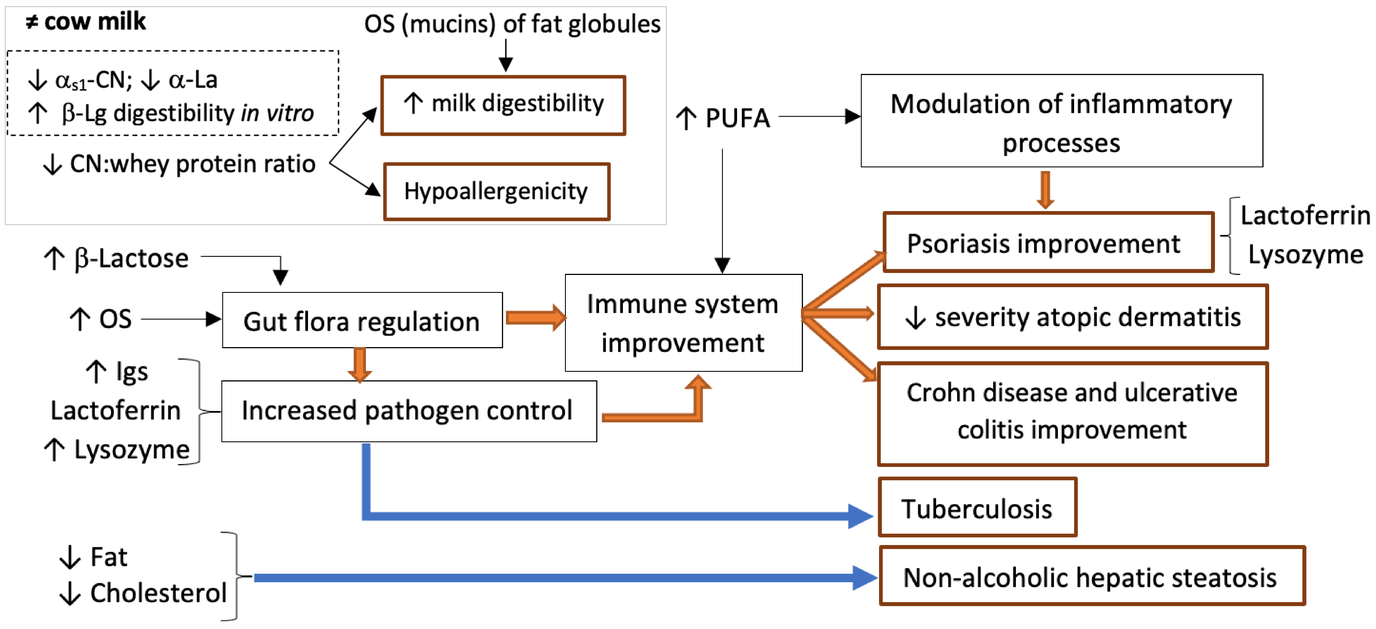

Figure 2*. Outline of the benefits of mare milk in relation to its main compositional characteristics. Own elaboration based on various referenced sources.*

Jastrzębska et al. (2017). Czech J Anim Sci. 62(12):511-518. // Pieszka et al. (2016)[a]. Ann Anim Sci. 16(1):33-51. // Salimei and Fantuz (2013)[c]. 1st ed. Wiley-Blackwell. p. 594-613. // Salimei and Park (2017). 2nd ed. Blackwell Publishing p. 369-408. // Uniacke-Lowe and Fox. (2011)[b]. 2nd ed. Elsevier Inc. p. 518-529.

MAIN CHEMICAL COMPOSITION

Table 1*. Main chemical composition characteristics of mare milk in comparison to human and cow milk.*

	Mare milk	***Human milk***	***Cow milk***
Fat (%)	1,23	3,77	3,86
Cholesterol (mg/L)	60,5	160	197,7
PUFA (% total fatty acids)	24,2	17,04	5,28
• *LA (% total fatty acids)*	3,81[a] – 16,04[b]	13,7	2,3
• *ALA (% total fatty acids)*	5,31[b] – 17,51[a]	1	1,2
CN:WP ratio	57,2:42,8→ **1,3**	33:67→ **0,5**	81,5:18,5→ **4,4**
• *α_{s1}-CN (% total CN)*	20[c]	11,75	48,46
• *α-La (% total WP)*	28,58	42,37	53,59
• *β-Lg (% total WP)*	30,75	Absent	20,1
• *Igs (% total WP)*	19,77	18,15	11,73
• *Lactoferrin (% total WP)*	9,89	30,26	1,64
• *Lysozyme (% total WP)*	5,73	1,66	trace
Lactose (%)	6,5	6,8	4,8
Sialic acid OS (mg/L)	431	322 – 612	62
Vitamin C (mg/L)	12,8 – 83	35 – 100	3 – 23

Own elaboration based on the average of various referenced sources.

Mare milk ≈ human milk Highlights on mare milk

Abbreviations: PUFA – polyunsaturated fatty acids; LA – linoleic acid; ALA – α-linolenic acid; CN – casein; WP – whey protein; α-La – α-lactalbumin; β-Lg – β-Lactoglobulin; Igs – Immunoglobulins; OS - oligosaccharide

CONCLUSIONS

- ✓ Marginal mare milk production: focused on Asian countries.
- ✓ The world's best-known presentation format is kumis. However, freeze-dried milk in powder or capsule form and cosmetics are the main contributors to globalisation.
- ✓ Chemical composition similar to human milk. Consideration as a possible substitute for human milk, especially in infant feeding, or as a source for formula milk.
- ✓ Mare milk confers prebiotic, immunomodulatory, anti-inflammatory and antimicrobial properties which, in turn, help to ameliorate diseases such as psoriasis, atopic dermatitis, Crohn disease, ulcerative colitis, non-alcoholic hepatic steatosis and tuberculosis. Also has improved properties compared to cow's milk: higher milk digestibility and hypoallergenicity.