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Importance of Donkey milk

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INTRODUCTION

Donkey milk is increasingly being recognized not only as a traditional food but also as a milk with distinctive nutritional and functional properties.

The demand for foods that provide health benefits beyond basic nutrition has increased significantly in recent years. Such foods are commonly referred to as functional foods. Among alternative dairy products, donkey milk has emerged as a subject of growing scientific interest because of its distinctive nutritional composition and potential physiological benefits.

Scientific studies have shown that donkey milk differs considerably from cow's milk, particularly in its protein composition. It generally contains a lower proportion of casein and a higher proportion of whey proteins, which may contribute to its relatively good digestibility (Guo et al., 2007). Donkey milk also contains biologically active components, including lysozyme and lactoferrin, which have been investigated for their antimicrobial and potential gastrointestinal and immune-related properties (Vincenzetti et al., 2017).

Because of these characteristics, donkey milk has attracted attention in the fields of functional foods, pediatric nutrition and dietary management. However, its potential health benefits should be interpreted on the basis of available scientific evidence, as further research is required to establish specific clinical applications.

Although its production is still limited and relatively costly, growing scientific interest indicates that donkey milk may have potential as a specialty dairy product in the future (Martini et al., 2021).

1. Digestibility and Similarity to Human Milk

One of the notable nutritional characteristics of donkey milk is its relatively good digestibility. Compared with cow's milk, donkey milk contains a lower proportion of casein and a relatively higher proportion of whey proteins. These characteristics may contribute to the formation of softer curds during gastrointestinal digestion, potentially facilitating easier digestion (Guo et al., 2007). Its overall protein composition has also been reported to show similarities with human milk, although the two milks are not identical (Martini et al., 2018).

2. Potential Role in Cow's Milk Protein Allergy

Cow's Milk Protein Allergy (CMPA) is a food allergy that commonly occurs during early childhood and may be associated with gastrointestinal, skin and respiratory symptoms. Because the protein composition of donkey milk differs from that of cow's milk, it has been investigated as a possible alternative for some individuals with CMPA. Some studies have reported tolerance to donkey milk among children with cow's milk allergy; however, individual responses can vary.

It is important to note that donkey milk is **not completely hypoallergenic** and should not be used as a substitute for medically prescribed formulas without professional guidance. Its use in children with CMPA should therefore be considered only under appropriate medical supervision.

3. Bioactive and Antimicrobial Components

Donkey milk contains several biologically active components that may contribute to its functional properties. Among these, **lysozyme and lactoferrin** are particularly noteworthy.

- **Lysozyme:** An antimicrobial enzyme that can break down components of bacterial cell walls and may contribute to the natural protective properties of milk.
- **Lactoferrin:** An iron-binding protein involved in iron regulation and associated with antimicrobial and immune-related functions.

The presence of these bioactive components is one of the important characteristics that has contributed to growing scientific interest in donkey milk as a functional dairy product.

These bioactive compounds may contribute to the inhibition of certain harmful microorganisms and help maintain a favourable intestinal environment. However, their specific effects on human health and the extent of these benefits require further clinical investigation.

4. Low Fat Content and Nutritional Advantages

Compared with whole cow's milk, donkey milk generally contains a relatively low amount of fat. Despite its lower fat content, it provides nutritionally relevant fatty acids, including unsaturated fatty acids such as omega-3 and omega-6 fatty acids. Donkey milk also contains a comparatively high lactose concentration, which contributes to its naturally sweet taste and may influence the bioavailability of certain minerals such as calcium (Guo et al., 2007).

The combination of relatively low fat content, high lactose concentration and the presence of bioactive and unsaturated fatty acids has increased interest in donkey milk as a functional dairy product. Its possible role in metabolic and cardiovascular health is being investigated; however, further human studies are needed to establish these potential health effects.

Sr. No.	Component (per 100 g)	Human Milk	Donkey Milk	Cow's Milk
1.	Protein (g)	0.9–1.7	1.3–1.8	3.1–3.8
2.	Fat (g)	3.5–4.5	0.3–1.8	3.5–3.9
3.	Lactose (g)	6.3–7.0	5.8–7.4	4.4–4.9
4.	Vitamin C (mg)	4.0–5.0	5.5–5.7	1.0–2.0

CONCLUSION

Donkey milk has attracted considerable interest in nutrition and functional food research because of its distinctive nutritional composition, relatively good digestibility and content of bioactive compounds. Its lower casein content, relatively high lactose concentration and presence of components such as lysozyme and lactoferrin contribute to its nutritional and functional characteristics. Its compositional similarities with human milk have also encouraged research into its possible applications in pediatric and specialized nutrition.

Although existing findings are promising, the potential health benefits of donkey milk should be interpreted cautiously, as further well-designed clinical studies are required to establish its specific health effects and dietary applications. With continued research, improved production systems and greater consumer awareness, donkey milk may have potential as a specialized dairy product in the future.