

MILK

Milk is one of the most nutritious drinks in the world!

Offering rich high-quality protein as well as being an excellent source of vitamins and minerals including – calcium, vitamin B12, riboflavin, vitamin A, potassium, magnesium and zinc.

There are many health benefits associated with milk consumption due to its composition.

Most milks contain components such as Lactoferrin, A-lactalbumin, B-lactoglobulin, Lactose, whey protein, caseins, lactoperoxidase and immunoglobulins.

When comparing milks the components vary in quantity, and here is where the benefits of different milks become more obvious.





HEALTH BENEFITS OF DONKEY MILK

Studies have shown that Donkey Milk provides potential health benefits through;

Hypoallegenicity

Anti-viral, Anti-tumor and Anti-inflammatory properties

Vitamins – A, B1,B2,B6, C, D & E

Essential Fatty Acids – Omega 3 & 6

Bioactive enzymes and coenzymes including abundant lysozyme



VITAMIN C

- Donkey Milk contains four times the amount of vitamin C found in Cow's milk
- Vitamin C is also known to contribute to immune homeostasis
- Vitamin C is necessary for the growth, development and repair of all body tissues
- It's involved in many body functions, including formation of **collagen**, absorption of **iron**, the **immune system**, wound healing, and the maintenance of cartilage, **bones**, and teeth

VITAMIN D

- Donkey Milk has shown a higher Vitamin D content compared to both bovine and human milk
- An essential nutrient which plays a crucial role in the calcium homeostasis and bone metabolism, it also acts as a hormone
- Vitamin D plays a significant role in the regulation of **calcium** and maintenance of **phosphorus** levels in the blood.
- Vitamin D is needed to allow the intestines to stimulate and absorb **calcium**

WHEY TO CASEIN RATIO

- A whey protein is a soluble protein containing proteins, enzymes, peptides, immune factors and has an important role in growth and mental development of a human
- Casein is a protein commonly found in mammalian milk – it is the main protein found in cow's milk and not easily soluble
- Caseins constitute the main allergenic components of milk
- In cow's and ruminants milk the whey to casein ratio is 20% to 80% respectively
- In human and donkey milk the whey to casein ratio is 60% to 40% respectively which makes these milks tolerable compared to cow's and other ruminants

MAIN WHEY PROTEINS IN DONKEY MILK LYSOZYME LACTOFERRIN

- Donkey Milk has a higher content of lysozyme than all other milks, whilst goat and cow milk only have traces - it almost absent
- Lysozymes accelerate the breakdown of certain carbohydrates found in cell walls of certain bacteria which contribute to the body's immune system
- Lactoferrin is an iron binding protein with many biological functions, including regulation of iron homeostasis, cellular growth, antimicrobial and antiviral functions and protection against cancer development and metastasis
- It controls the proper composition of intestinal microflora suppressing the growth of pathogenic and promoting the multiplication of non-pathogenic Lactobacillus (friendly bacteria which helps to break down food) and Bifidobacterium (group of bacteria called probiotics found in our stomach and intestines)
- Lactoferrin protects the intestinal epithelium – cells that line the intestinal lumen and perform the primary functions of digestion, water and nutrient absorption also forming a barrier against luminal pathogens as well as promoting T-cell maturation and inhibition of auto-immune disorders through its derivative - a proline-rich polypeptide

SYNERGISTIC ACTIVITY OF LYSOZYME AND LACTOFERRIN

- Lysozyme together with Lactoferrin host a defense for antimicrobial proteins
- The combination of Lysozyme and Lactoferrin enhances antibacterial activity hence contributing to host protection in the case of infections
- Antibacterial activity of Donkey Milk is explained by two mechanisms;
 1. Specific Structure of Lysozyme of Donkey Milk enables binding to calcium ions which improve its activity against bacteria.
 2. The synergistic activity of lysozyme and lactoferrin allows lactoferrin to bind to membrane proteins of bacteria disrupting the membrane and opening the pores to lysozyme which allows it to destroy the glycosidic linkage of peptidoglycans (bacterial cell wall).

Lysozyme being a common protein between both Donkey and Human milks and the synergistic activity between Lysozyme & Lactoferrin and Lysozyme & immunoglobulins and fatty acids, places Donkey Milk in a stand out unique position when combating bacteria and stimulating the human immune system.

OMEGA 3 & OMEGA 6

- Donkey Milk contains Omega 3 and Omega 6 in quantities 6 times higher than that in cow's milk and are absolutely necessary, for adequate growth, neurological development and cardiovascular health
- Linoleic Acid (LA) and Alpha Linoleic Acid (ALA) belong to Omega 3 and Omega 6 a series of polyunsaturated fatty acids which are defined as 'essential fatty acids' and not synthesized in the human body therefore must be obtained from diet
- Donkey Milk has a high content of both when compared with ruminant species milk in which the above polyunsaturated fats are always lower in content
- Essential Fatty Acids reduce the risk of coronary disease, high blood pressure and thrombosis

DONKEY MILK FAT CONTENT

- The fat component in Donkey Milk is much lower than both cow and human milk
- When feeding infants with Donkey Milk there would be a substitute required to compensate for the low fat content
- In the diet of the elderly however Donkey Milk could easily be used as a daily low fat drink to promote good health and combat obesity
- Naturally low in fat this milk can be used as a dietary supplement for many who are regulating their food consumption through calorie control whilst still enjoying the many benefits that milk has to offer

APPLICATIONS

FOOD

Baby Formula

Probiotic daily drink to boost human immune

Vitamin daily drink for the elderly and their immune

Dietary drink for weight loss

Daily drink for sport diets

Vitamin Supplement

COSMETIC

Soap both hand and body

Skincare face and body

Anti-ageing skincare

Bath skin rejuvenation

POTENTIAL APPLICATIONS

Eczema

Skin disorders

Cardiovascular disorders

Diabetes

Asthma

Gut Health

REFERENCES AND STUDIES

Donkey Milk Bioactive Proteins and Peptides, Health and Food Applications

– A Review

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Whey Proteins and their Antimicrobial Properties in Donkey Milk – A Brief Review

<https://link.springer.com/article/10.1007/s13594-015-0246-1>