

Pharmaceuticals and Dietary Supplements Extracted from Mare's Milk

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Abstract

Mare's milk is similar to human breast milk and has valuable therapeutic properties. For this reason, Europeans are increasingly interested in discovering its benefits and how the chemical composition of horse milk differs from that of other species. This interest is reflected in the number of new farms selling mare's milk around the world as this milk is the most similar to human milk. Mare's milk is considered to be highly digestible, rich in essential nutrients and whey protein, which makes it very suitable as a substitute for bovine milk in paediatric diets. During the period of lactation, mammal's milk composition is subject to rapid changes in macro- and micro-elements, as well as in the quantity and quality of proteins, lipids and saccharides, being ideal food for infants. The primary use of mare's milk has been the rearing of foals, but recently, due to the similarity of its chemical composition to that of human milk, it has raised particular interest and some experiments have been done to apply it as a raw material for the preparation of special food products for human consumption. Mare's milk products are very common in Russia and Central Asia throughout Mongolia. In the 19th century, some Russian scientists explored its therapeutic properties and then in 1859 they founded the first sanatorium where treatments with mare's milk could be made under medical control. Due to its potential health-promoting characteristics, in the Western countries, interest in mare's milk has lately increased.

Keywords: *chemical composition, equine milk, horse, mare's milk*

INTRODUCTION

The two domestic equine species – horse and donkey – belong to the order Perissodactyla, family Equidae, genus *Equus*. According to Herodotus, horses (*Equus caballus*) were traditionally milked in Central Asia and Eastern Europe (Salimei, 2012). D'Arval reports that in the nineteenth century, donkey milk was successfully used for feeding orphaned infants in France. In the last several years, horse colostrums and milk production developed in France (Drogoul *et al.*, 1992, Malacarne *et al.*, 2002), Chevalait (Nature Progress), the European leader in the production of horse milk.

Milk is created by nature to nourish; the protein that is found in milk is specific to the species. Milk is destined to feed the newborn, and

it contains components which are responsible for homeostasis and health (Gopal *et al.*, 2000, Kunz *et al.*, 2006).

In this review paper, we draw a parallel between the composition of mare's, human and cow's milk, considering protein fractions and fatty acid content. The quantity of fat in mare's milk is lower as compared to human milk or cow's milk; the content of protein is higher than in human milk and lower than in cows' milk.

The aim of this review is to analyse the composition of mare's milk and to compare it with human and cow's milk, and also to discuss parameters that could be of interest for the human food industry and cosmetic industry. The paper also provides a bibliographic study on the latest

European mare's products on the market: dietary supplements and cosmetological products.

1. Mare's milk composition and uses in human nutrition

Secretion of mammary gland in terms of milk composition is physiologically and structurally correlated to the nutritional requirements of the newborns of each species (Potočnik *et al.*, 2011). For this reason in nature each species drinks only its own milk. Mare's milk shows some structural and functional characteristics that make it more suitable for human nutrition than cow's milk.

In western European countries, studies have been focused mainly on the growth and health of newborn horses (Malacarne *et al.*, 2002), but due to similarity with human milk, lately interest has increased in the use of mare's milk for human nutrition particularly in France, Germany (Drogoul *et al.*, 1992), Italy and Belgium. Mare's milk has recently been studied in Italy as well, as a possible substitute for cow's milk or as formulas for allergic children (Businco *et al.*, 2000; Curadi *et al.*, 2001). In Belgium, we see the start of production of small refrigerated mare's milk bags as an alternative for allergic children formulas.

Interestingly, apart from being the most important nutritional resource for foals during the first months of life, mare's milk is also one of the most important basic foods for human populations in Central Asia, where a fermented lactic alcoholic beverage called koumiss is traditionally consumed – this is considered a beverage with health-promoting properties (Uniacke-Lowe, 2011). This drink is currently produced on an industrial scale in Eastern Europe and Asia (Orlandi *et al.*, 2003). The results of recent studies in Europe triggered the appearance of a large number of mare's milk products intended for human consumption.

Milk of all mammals has the same chemical composition, being composed of the same organic substances: protein, fat, lactose vitamins and minerals. The differences between the species are given by the fact that all these substances vary in quantitative terms.

Milk protein fractions

As concerns protein, mare's and human's milk is poorer when compared to cow's milk. The whole protein system of mare's milk is quite similar to that of human milk (Malacarene *et al.*,

2002). Cow's milk has a higher casein content, and is thus defined as a caseineux milk (Alais, 1974; Mariani *et al.*, 1993).

The whey protein fraction, indeed, represents approximately 40% in mare's milk, slightly more than 50% in human milk and less than 20% in cow's milk. Cow's milk protein features, like other ruminant milk (e.g. goat and sheep), are quite different, as characterised by an acid-enzymatic, mixed coagulation. From this point of view, mare's milk is more similar to human milk, which could be defined typically as albumineux. The richness in whey protein content of mare's milk makes it more favourable to human nutrition than cow's milk, because of the relatively higher supply of essential amino acids (Hambræus, 1994).

As stated above, casein is the predominant class of proteins in bovine milk, but in equine milk there are less caseins and more whey proteins: β -Lg (beta lactoglobulin), α -La (alpha lactalbumin), Igs (immunoglobulins), BSA (blood serum albumin), Lf (lactoferrin) and Lyz (lysozyme). Antimicrobial defence in mare's milk seems to be due mainly to the presence of lysozyme (as in human milk) and, to a lesser degree, to lactoferrin, which is preponderant in human milk (Solaroli *et al.*, 1993). These antimicrobial factors are scarce in cow's milk, where immunoglobulins represent the principal defense against microbes and are particularly abundant in colostrum (Boland *et al.*, 1992; Solaroli *et al.*, 1993).

All these proteins are present in human milk as well, except β -Lg, which is not. The richness in whey protein content of mare's milk makes it more favourable to human nutrition than cow's milk, because of the relatively higher amount of essential amino-acids (Hambræus, 1994). Whole protein and salt content are comparable between mare and human milk, while cow's milk is clearly richer in salts, and thus less suitable as a replacement for human milk (Malacarene *et al.*, 2002). From these several considerations on the gross composition, mare's milk would appear to be, on the whole, a more suitable nourishment for infants than cow's milk (Marconi and Panfili, 1998).

Milk fat

Mare's milk has noticeably less fat content. The fat content of horse milk is remarkably lower than the fat content of human and ruminant milk, which is also reflected by their calorific value.

Lipids in milk are dispersed as emulsified globules; in mare's milk, fat is organised in globules of about 2-3 μm in size (Kharitonova, 1978; Welsch *et al.*, 1988). Fat globules are coated with three layers: an internal protein layer, an intermediate layer consisting of a phospholipid membrane and the external layer consisting of high-molecular-weight glycoproteins. On the surface of these glycoproteins there is a branched oligosaccharide structure, which is similar to that of the fat globules in human milk and which is not found in cow's milk (Solaroli *et al.*, 1993).

Horse and donkey milk fat consists of 80-85% triglycerides, 9.5% free fatty acids and 5-10% phospholipids. Bovine, sheep, goat and human milk fat consists of 97-98% triglycerides, but has only low levels of phospholipids (0.5-1.5%) and free fatty acids (0.7-1.5%) (Doreau *et al.*, 2002; Malacarne *et al.*, 2002; Park *et al.*, 2007; Uniacke-Lowe, 2011). Compared to ruminants, horse and donkey milk fat contains a higher percentage of polyunsaturated fatty acids (PUFA) and a lower percentage of saturated fatty acids (SFA) and monounsaturated fatty acids (MUFA). The fatty acids of horse and donkey milk are mainly unsaturated or short-chained, which is interesting from a nutritional point of view. For instance, polyunsaturated fatty acids (linoleic and linolenic) in mare and human milk are remarkably higher than in cow's milk. (Akai *et al.*, 2014, Macharadze, 2007). Horse milk contains about 10 times more caprylic acid (C8:0), 3 times more capric acid (C10:0) and twice more lauric acid (C12:0) than bovine milk. Horse and donkey milk has additionally higher levels of linoleic acid and α -linolenic acid than bovine milk (5 and 224 times more, respectively) (Salamon *et al.*, 2009). Some positive health effects are attributed to CLA (conjugated linoleic acids) isomers such as lowering the risk of cardiovascular diseases, carcinogenesis, diabetes and osteoporosis, and modulation of the immune system (Barlowska *et al.*, 2011; Uniacke-Lowe, 2011). The presence of trans fatty acids in horse milk suggests some fatty acid hydrogenation by intestinal microorganisms before absorption (Hoffman *et al.*, 1998). Besides the composition of milk fat, the distribution of fatty acids on the glycerol backbone also needs to be considered, as it determines the lipolysis and thus bioavailability of fatty acids and, therefore, their possible beneficial or detrimental effects

on health (German and Dillard, 2006). The milk of most of the considered ruminants contains a similar cholesterol level as human milk, whereas the cholesterol level of horse and donkey milk appears to be much lower. Cholesterol is mostly associated with cardiovascular diseases, but is also an important component of body cell membranes and of the central nervous system (Dietschy and Turley, 2004; Gidding *et al.*, 2006). It has been suggested that human milk cholesterol may be responsible for long-term regulation of cholesterol metabolism and myelin synthesis, although results are not univocal (Gidding *et al.*, 2006; Schanler, 2011).

Milk sugars

Lactose is quantitatively the main milk sugar. Its concentration is similar in horse, donkey and human milk, but lower in bovine or other ruminant milk. Other milk carbohydrates, which are free or bounded to lipids, proteins or phosphate, include a small fraction of oligosaccharides. They are composed of galactose, fucose, N-actylglucosamine and/or N-acetyl neuramic acid (sialic acid) and contain mostly a lactose unit at their reducing end. They have the potential to modulate the growth of intestinal flora, to influence different gastro-intestinal and inflammatory processes and to provide protection against bacterial and viral infections (Kunz and Rudloff, 2006). In general, the oligosaccharide level is much lower in animal milk compared to human milk (Abd El-Salam and El-Shibiny, 2011; Martinez-Ferez *et al.*, 2006; Mehra and Kelly, 2006). No data were found in literature on the oligosaccharide level of horse milk, but it is probably much lower than the level of horse colostrum. The latter is reported to contain 18.6 g/l oligosaccharides compared to 20 g/l in human colostrum (Nakamura *et al.*, 2001; Uniacke-Lowe, 2011). Oligosaccharide-bound sialic acid (but also glycoprotein-bound and free sialic acid) is reported to affect the intestinal flora development and, most probably, the level of glycosylation of gangliosides of the brain and the central nervous system (Malacarne *et al.*, 2002; Potocnik *et al.*, 2011). Sialic acid levels measured in human milk (1 g/l) are significantly higher than the levels measured in bovine or horse milk (around 0.05-0.2 g/l) (Malacarne *et al.*, 2002; Potocnik *et al.*, 2011). During heating, only a small fraction of lactose is converted into lactulose (around 0.5%

during UHT treatment and 1-2% by sterilization). Lactulose has, similarly to lactose, prebiotic properties (Schaafsma, 2002).

Mare's milk is rich in lactose (64g/kg) (Di Cagno *et al.*, 2004). The average content is 6.26%, which means it is much higher than in cow's, goat's, or sheep's milk. Because of the high content in lactose, mare's milk has a sweeter taste than the other types of milk considered for human consumption. Because most of the populations in Asia are affected by lactose malabsorption, mare's milk is rather used as fermented milk - koumiss (Eastern Europe), airag (Mongolia) or chigee (Mongolia, China) (Čagalj *et al.*, 2014). The lactic-alcoholic beverage derived from horse milk is the combination of raw milk and indigenous microbial populations: lactic acid bacteria and yeast whose diversity is of increasing interest (Batdorji *et al.*, 2006; Di Cagno *et al.*, 2004; Watanabe *et al.*, 2008). The microflora found in mare's milk consists mostly of *Lactobacillus* sp. and *Lactococcus* sp., and yeasts such as *Saccharomyces unisporus* (Di Cagno *et al.*, 2004). Bacteria called *Bifidobacterium mongoliense* sp. nov. and *Lactobacillus casei* Zhang have been lately isolated from airag.

Milk vitamins

The total vitamin content of milk is highly variable and depends on the vitamin status and the feeding regime of the mother (with the level of water-soluble vitamins being more influenced by the feed than the level of the fat-soluble vitamins). The vitamin content of horse milk is on average lower than the vitamin content of ruminant milk. An exception is the vitamin C level, which is relatively high in horse milk (Doreau *et al.*, 2002;). Additionally, it is noted that sheep, goat and buffalo milk have a higher vitamin A content than bovine milk. Their milk is whiter than other milk due to the ability to convert the yellow b-carotene to vitamin A (Abd El-Salam *et al.*, 2011; Jainudeen, 2002; Park *et al.*, 2007).

Milk minerals

As for the content of essential macro minerals in mare's milk: Ca and P concentrations are 3 times higher than in human milk and twice lower than in cow milk (Gaucheron, 2005). K, Na, and Mg concentrations in equine milk are similar to those in human milk, and they vary significantly during lactation (Fantuz *et al.*, 2011, Summer *et al.*, 2004).

Milk is mainly a good source of calcium (Ca) and phosphorus (P), which are necessary for bone growth, development, metabolism and maintenance (Adolphi *et al.*, 2009; Cashman, 2006), but is less important with respect to the other minerals. Bovine milk contains about 50% more Ca and twice as much P and potassium (K) than horse and donkey milk, but horse and donkey milk contains about 2-3 times more Ca and P than human milk (Anderson, 1991; Csapó *et al.*, 2009; Salimei and Fantuz, 2012).

2. Mare's milk products with therapeutic effect

This paper shows a comparison between human milk, cow's milk and equine milk and highlights the importance of equine milk in terms of human nutrition and treatment. The assessment of these three sources of milk nutrients indicating that the mare's milk could be used as a substitute for *allergic children* instead of cow's milk or in special anti-allergic formulas. In countries such as Belgium, Germany, France or Italy, mare's milk is sold instead of breast milk or instead of powdered milk formulas for newborns, or simply for winter immunization cures - packages for 3 to 6 month cures, are sold on farms or bio-shops. Horse milk has been used successfully as an alternative food for infants with allergies, e.g. cow's milk protein allergy (CMPA), a common food allergy in childhood with a prevalence of approximately 3% during the first 3 years of life (Salimei, 2012). Milk allergy is the most common childhood allergy. Although cow's milk is the one that causes most cases of allergy, other milks such as sheep, goat or buffalo milk can also cause an allergic reaction. About horse milk, it is known that its composition differs from the milk of other species (Park *et al.*, 2007; Pulina and Nudda, 2002).

Raw horse milk and fermented derivative products seem to be very useful in the prevention of cardiovascular disorders. Koumiss, which is rich in angiotensin converting enzyme (ACE)-inhibitory peptides, supports the assertion that its effects are beneficial on cardiovascular health (Chen *et al.*, 2010). Mare milk is also able to regulate the immune response and anti-tumoral activity (Mao *et al.* 2009).

Mare's milk comes to be rated for its medicinal properties. Products based on mare's milk are used in the food, cosmetic and pharmaceutical

industry: koumiss and cosmetic products are already well known, and then the pharmaceutical treatments for chronic gastric ulcer disease, tuberculosis, dysentery, scurvy, and other chronic diseases (Solaroli *et al.*, 1993) started to be more and more popular.

For people with skin diseases, stomach and intestinal troubles, horse milk seems to have a positive influence. Horse milk is recommended for metabolism problems, Crohn's disease and ulcerative colitis, psoriasis, multiple sclerosis, fibromyalgia, high cholesterol value, stiff joints, menopause symptoms and cancer.

Many diseases originate because of an unbalanced gut flora. A disturbed intestinal flora leads to vitamin deficiencies and general weakness. Bad bacteria produce toxic residues, which irritates the guts and will be transferred into the bloodstream. The irritation of the intestines can cause diarrhoea or constipation, which leads to flatulence, rumbling bowels, increased stomach acid production and nausea. The impact of absorbing toxic residues in the blood can lead to exhaustion, weariness, headaches, liver overload, and even forms of eczema, psoriasis, bronchitis and asthma. Horse milk stimulates the increase of good bacteria in the bowel flora, which results in the fact that bad bacteria cannot multiply. In this way, the absorption of toxic substances in the bloodstream will decrease. The microflora found in mare's milk consists mostly of species like *Lactobacillus delbrueckii* ssp. *bulgaricus*, *Lactococcus lactis* ssp. *lactis*, *Kluyveromyces fragilis* and *Saccharomyces unisporus* (Di Cagno *et al.*, 2004). Bacteria called *Bifidobacterium mongoliense* sp. nov. have been lately isolated from airag (Watanabe *et al.*, 2009) and *Lactobacillus casei* Zhang started to be investigated in 2009 (Guo *et al.*, 2009) and in early 2012, Zhang confirmed the influence of this second newly discovered bacterium isolated from airag, in reducing high-cholesterol (Zhang *et al.*, 2012). Probiotics defined as "living microorganisms, which upon ingestion in certain numbers, exert health effects beyond inherent basic nutrition" (Guarner and Schaafsma, 1998), are very much used in nutritional supplements, pharmaceuticals and functional foods (Del Piano *et al.*, 2006). Probiotics suppress the growth of bad bacteria in the colon and small intestine, thus stabilizing the digestive system, microflora, and the intestinal saprophyte

environment. Also, they have anti-tumoral activity, and improve the lactose utilization in the human gut (Kailaspathy and Rybka, 1997).

Results from recent research across Europe have indicated that therapeutic effects of mare's milk can be explained by a high content of phospholipids and vitamin A (Park *et al.*, 2008).

Skin problems: The use of mare's milk is most definitely recommended for skin problems such as atopic dermatitis, eczema and psoriasis (Bilandžić *et al.*, 2013). This knowledge even dates back to ancient Egypt, when Queen Cleopatra bathed in mare's milk every day as part of her beauty ritual.

Some babies have atopic skin, i.e. skin with a tendency to dry, with a low fat content. The frequency of atopic dermatitis in children up to 2 years increases especially in developed or developing countries (due to industry factors and allergens from the air). This problem usually begins to improve around the age of 3 months and disappears up to the age of 2 years. It may return - usually this happens around the age of 5 years.

Skin diseases, such as psoriasis and eczema are best treated from the inside out, from the place of action, removing the cause, not the symptoms. These treatments from the inside out take longer in terms of the effects, compared to treatments using cortisone creams for external use, but long-term results are much healthier for the body. Cortisone topical treatments are most commonly prescribed for atopic dermatitis, but they only reduce the external symptoms and are very dangerous to health if used on long term basis. These topic treatments thin out the epidermis and their therapeutic effect wares out forcing the increase of the dose.

In atopic dermatitis concentration of EFA (essential fatty acids) decreases, even though it was recently established that there is no deficiency of linoleic acid in this eczema. In addition, the concentration of linoleic acid tends to rise, to lift into the blood, into the milk and into the fat tissues of patients with atopic eczema (Orlandi *et al.*, 2003). This indicates a low conversion of linoleic acid to alpha linoleic acid (ALA). The administration into the human diet of alpha linolenic acid is considered to make improvements in skin roughness and also in the catecholamine blood concentration (Olivry *et al.*, 2001).

All these indicate that mare's milk is more similar to human milk than cow's milk (Godovac-

Zimmermann *et al.*, 1987; Businco *et al.*, 2000; Horrobin, 2000) and more suitable for allergic children's diet as a substitute (Pagliarini *et al.*, 1993; Horrobin, 2000) in treating dermatitis.

Immune system: horse milk offers a good opportunity for regulating and strengthening the immune system (Jirillo *et al.*, 2010). The effect of horse milk can be explained by the high value of albumin and globulin (building materials for antibodies), minerals and high quality unsaturated fat acids.

Metabolism problems: mare's milk stimulates digestion, stimulates detoxification of the body and helps to create a strong internal cleansing, an internal purification.

Liver disease: in all liver diseases (from chronic hepatitis (Zhaksylykova and Sharmanov, 1979) to fat metabolism disease, a low-fat, light food diet and absolute abstention from alcohol are essential. Horse milk is highly appropriate for this type of diet.

Atherosclerosis and Cholesterol – Raw horse milk and fermented derivatives are considered useful in the prevention of atherosclerosis (Chiofalo *et al.*, 2006). They support a justified cholesterol level. Fat regime is the most important factor that influences the human condition, especially in cardiovascular diseases. Health quality would be better if we decreased fat in our diet, and if we changed the unsaturated fatty acids ratio. The high value of unsaturated and many saturated fat acids has an adjusting effect on a destroyed fat metabolism. Used regularly, it can decrease the cholesterol level of the blood. Upon comparing the cardiovascular status of ovo-lacto-vegetarians and vegans, it has been proven that while both are healthier than meat-eaters, vegans have better cardiovascular status than vegetarians who consume dairy cow products (Melby *et al.*, 1989). Mare's milk apparently contains α -linolenic (ALA) and linoleic (LA) acid amounts, which are called EFA (essential fatty acids) and traces of ω -3 and ω -6, higher than in cow's milk (Csapò *et al.*, 1995), although many polyunsaturated fatty acid (LCPUFA) contents are limited. From α -linolenic and eicosapentaenoic acid derive prostaglandins, like PGI₁, with vasodilatory effects, thromboxans, like TXA₂, with vasoconstrictive effects, and docosahexaenoic acid (DHA). From linoleic acid derive many other prostaglandins (PGI₂) and thromboxans with different influences

on the circulatory system (Gibney, 1993; Calder, 1996). Fat from cow's milk contains relatively high concentrations of saturated fats which have been implicated in heart diseases (Ney, 1991). Cow's milk fat has been identified as a cholesterol-elevating fat, because it contains cholesterol and is primarily saturated (Franklin *et al.*, 1999).

Muscles, Joints and Bones – Mare's milk is good for rigid muscles and joints, and takes care of the good structure and preservation of the bones.

Bowels and Stomach – It promotes the bowel functioning for a good metabolism; it also helps bad digestion, acid belching and inconveniences in the abdomen. Mare's milk is very useful for treating gastric ulcer and duodenal ulcers (Salhanov and Sarmanov, 1979).

Cancer – The functionality of horse milk on the immune system, the stimulation of all detoxification mechanisms of the body (liver, kidneys, intestines, sweat glands, etc.) and the effect on healthy blood texture, all of which benefit from horse milk, as does cancer therapy and cancer readjustment through its anti-tumoral activity (Mao *et al.* 2009). Besides a surgical treatment which is inevitable, with cancer disorders the application of irradiation therapy and chemotherapy are inevitable; therefore, significant attention should be paid to the physical condition of the patient. Cancer therapy attacks both the sick and the healthy cells of the patient (especially the cells of the hair roots, the guts, and the blood forming organs, the immune system and the skin). Because of that, during and after a series of irradiations and treatment with chemotherapy, the patient suffers loss of hair, intestinal problems, and a high degree of vulnerability for infectious diseases. The organism is barely able to protect itself against banal infections, let alone mobilizing its defence system in the battle against metastases (daughter cells) and the appearance of other tumours. The body affected by tumours (metastases) will also be affected by metabolism toxins released during the therapy and by the damaged detoxification mechanisms. To endure this phase better, to activate the immune system once again, to trigger the detoxification through liver, bowels, kidneys and skin anew and to give the patient new strength, horse milk (in milk, powder or capsule form) is strongly recommended (Uniacke-Lowe *et al.*, 2010).

Mare's milk is also used to treat tuberculosis (Gilmudtinova *et al.*, 2011), intestinal infections and anaemia (Uzakbaev and Mamyrbaeva, 2012). It

has also been reported to accelerate post-surgical recovery (Zaripov and Kanareikina, 2013).

Horse milk is not a magic cure by which you can cure incurable ailments, but it has been reported to have a very good influence on health and to provide support in the battle against a diversity of different disorders.

3. Cosmetics containing mare's milk

Equine milk is used in cosmetology with very good results. Horse milk fat is considered an important ingredient in Mongolian cosmetics because of its high polyunsaturated fatty acid content (Temuujin *et al.*, 2006). Milk proteins are active in skin hydration and skin ageing prevention (Cotte, 1991).

In this study, we have aimed to provide a hierarchy of cosmetics and dietary supplements containing mare's milk that exist on the market.

The first products are available on the market under the name of *Equilac*, and they are pioneers in this area, having been on the European market for merely 15 years. In 2009 they opened a unit in the USA as well.

Some of the products using horse milk as the principal active component that are currently available on the market include:

Equilac: Shampoo, Shower cream, Body cream, Soap, Hand cream, Horse milk capsules;

Paardenmelk de lage wierde: Horse milk Powder (freeze dried), Horse milk Capsules (freeze dried), Horse milk Soap, Horse milk Hand cream, Horse milk Lotion, Horse milk shampoo, Horse milk muscle balm;

Domaine de la Voie Lactée: Shampoo, Shower cream, Body cream, Soap, Hand cream;

Nature Progress: Shampoo, Shower cream, Body cream, Soap, Hand cream.

CONCLUSIONS

Compared to bovine milk, equine milk contains less fat, protein, and inorganic salts, but more lactose.

The microflora found in mare's milk consists mostly of species such as *Lactobacillus delbrueckii* ssp. *bulgaricus*, *Lactococcus lactis* ssp. *lactis*, *Kluyveromyces fragilis*, *Saccharomyces unisporus*, *Bifidobacterium mongoliense* sp. nov., *Lactobacillus casei* Zhang.

Mare's milk is very similar to human milk, so it could be a very good alternative for cow's milk.

Milk allergy is considered to be an increasing problem in infancy so mare's milk would appear to be, on the whole, a more suitable nourishment than cow's milk.

Results presented in recent research in Europe have shown that horse milk is good for: skin diseases, general physical health, metabolism problems, immune system, stomach function, liver disease, muscles, joints and bones, cardiovascular diseases and cholesterol, cancer.

Horse milk fat is considered an important ingredient in Mongolian cosmetics because of its high polyunsaturated fatty acid content. Milk proteins are active in skin hydration and skin ageing prevention.

Horse milk-based cosmetic products are available on the market under different brands names, including: *Equilac*, *Paardenmelk de lage wierde*, *Domaine de la Voie Lactée*, *Nature Progress*.

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