Provi lacteo GDBN

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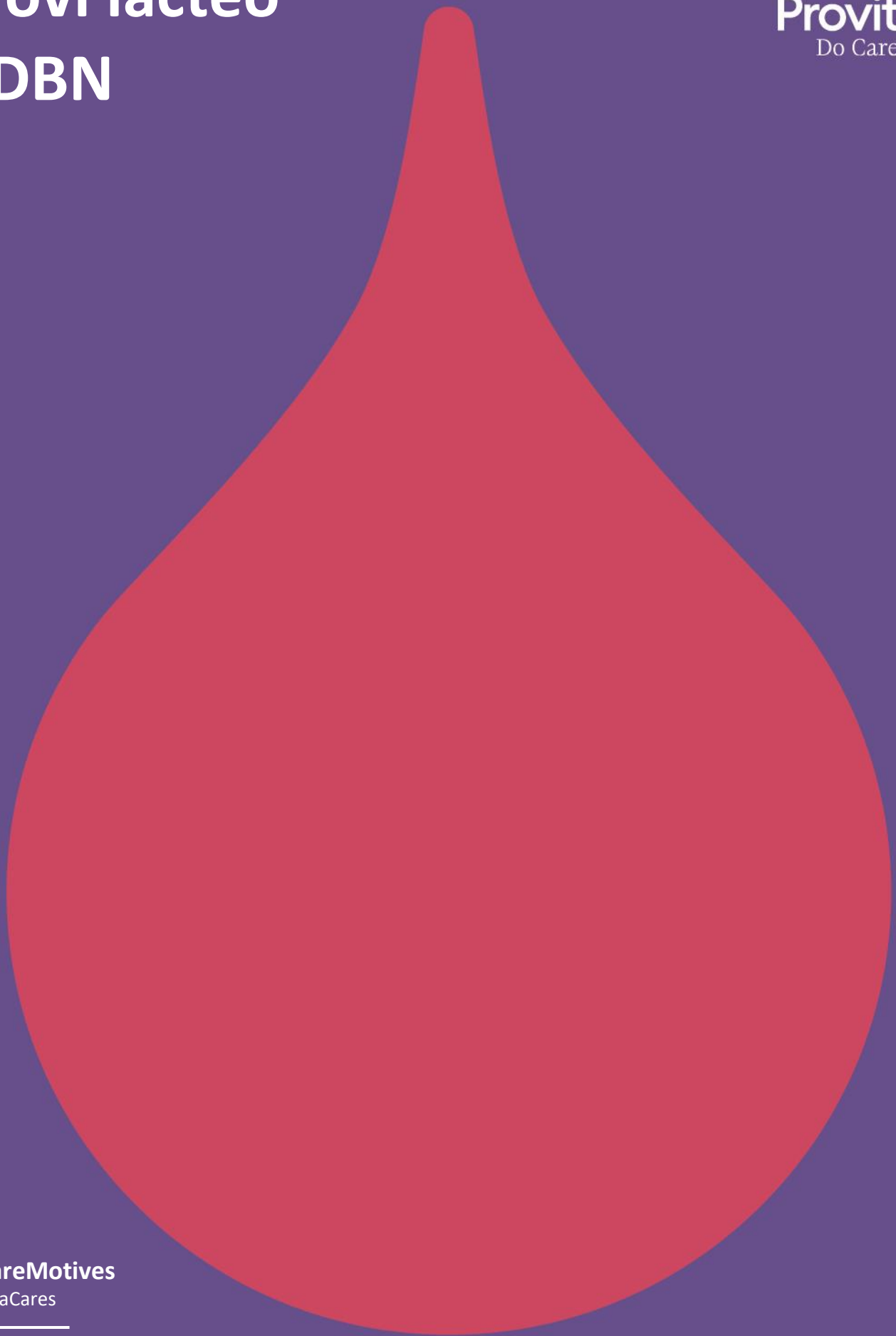

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Moisturizing

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INTRODUCTION

Yogurt is a dairy produced through milk lactic fermentation by *Lactobacillus bulgaricus* and *Streptococcus thermophilus*; the milk can be whole, semi-skimmed, skimmed, recombined or reconstituted, after preheating. The microorganisms in the final product must be adequate and abundant.

Provi Lacteo GDBN is produced from fermented skimmed milk.

CHEMISTRY

The word yogurt comes from the Turkish word for thick milk. Yogurt is a thousand-years-old food with a high biological value, vitamins, calcium, phosphorus and other minerals.

The chemical composition of yogurt is very similar to that of milk, although there are some differences.

Carbohydrates

Due to the action of lactic bacteria during the fermentation process, the amount of lactose (the typical carbohydrate in dairies) in yogurt is smaller than in milk. However addition of milk powder during yogurt making raises the amount of lactose.

Yogurt bacteria have the necessary enzymes to cleave lactose into lactic acid. Thus, lactose reaches the intestines almost completely digested, which facilitates absorption. Therefore, fermented milk products, including yogurt, are a healthy alternative for people suffering from lactose intolerance produced by lactase deficiency.

Proteins

Yogurt proteins are high-quality and easily digestible proteins, because lactic bacteria partially digest them, yielding protein fragments (peptides) and amino acids. Yogurt proteins have a noticeably high proportion of lysine. The protein content in some yogurts is even higher than that of the original milk, due to the addition of milk powder during the manufacturing process.

Fat

The fat proportion in yogurt varies depending on the fat content of the milk used to prepare it. Much like milk and other whole dairies, yogurt contains mostly saturated fat.

Vitamins

The amount of vitamins depends on the vitamin content of the milk and the heating treatments during yogurt making. Fermentation increases the levels of vitamins such as thiamin (B1), riboflavin (B2), pyridoxine (B6), niacin and especially folic acid, while reducing the concentrations of vitamins B12 and C.

Minerals

Yogurt is an excellent source of calcium. Calcium plays a major role in the organism's functions; it is the main constituent of bones and teeth; it is essential for the nervous system, muscle contraction, blood coagulation, hormone production, cardiac activity, etc. Calcium is continuously being eliminated from the body and must be replaced, especially during physiological situations that particularly demand this ion (growth, pregnancy, breastfeeding, menopause, and aging).

Furthermore, yogurt is a good source of phosphorus and magnesium, which are essential for the regulation of several processes, including calcium metabolism and calcium deposition in the bones.

Table 1 shows the nutrients in yogurt.

Nutrients content in 100 g yogurt		
	Natural yogurt	**Natural skimmed yogurt**
Macronutrients		
Fat (g)	2.6	0.32
Protein (g)	4.2	4.5
Carbohydrates (g)	5.5	6.3
Vitamins		
Vitamin A	9.8	0.8
Thiamin (B1) (mg)	0.04	0.04
Riboflavin (B2) (mg)	0.03	0.19
Pyridoxine (B6) (mg)	0.05	0.08
Vitamin B12 (µg)	Traces	0.40
Folic acid (B9) (µg)	3.70	4.70
Niacin (mg)	1.5	1.35
Vitamin C (mg)	0.70	1.60
Vitamin D (mg)	0.06	Traces
Vitamin E (mg)	0.04	Traces
Minerals		
Calcium (mg)	142	140
Phosphorus (mg)	90	116
Zinc (mg)	0.59	0.44
Iron (mg)	0.09	0.09
Iodine (mg)	3.70	5.30
Magnesium (mg)	14.3	13.70
Potassium (mg)	214	64
Sodium (mg)	63	211

Table 1. Yogurt nutrient composition.

TRADITIONAL USES

The benefits of yogurt have been known for a long time. In the Ottoman Empire, it was used to purify the blood and to relief intestinal disorders. A story tells that in the times of the crusades, Francis I of France recovered from his illnesses with a yogurt-based diet. Persian traditions tell that frequent yogurt intake was the basis of Abraham's longevity and fecundity.

The earliest scientific research about the beneficial properties of yogurt dates back to the beginnings of the XX century. The biologist Stamen Grigorov discovered the microorganisms that ferment milk to produce yogurt. The research carried out by the Russian scientist Ilya Ilyich Mechnikov in the Pasteur Institute of France, was also essential; he studied the effects of yogurt on the intestinal bacterial flora and on intestinal disorders.

Furthermore, ancient texts contain a number of mentions to the culinary uses of yogurt. In the Bible, it is mentioned as leben; in the book One Thousand and One Nights it is one of the delicacies served in the banquets; it is often mentioned in Arabian traditional recipes books.

COSMETIC PROPERTIES

Skin conditioning activity

This activity is due to the protein, carbohydrates, α-hydroxyacids (lactic acid) and vitamin content of yogurt.

- *Proteins*

The polar nature of proteins gives them the capacity to bind water molecules by establishing hydrogen bonds. This action is not influenced by the molecular weight of the protein. However, if penetration into the skin and moisturizing in deeper skin layers is the goal, then short-chain, low molecular weight peptides yield better results.

Thus, low molecular weight proteins are good moisturizing agents for deep skin layers, while high molecular weight proteins – due to their filmogenic action – are better for surface moisturizing and for giving the skin firmness and smoothness.

- *Carbohydrates*

Carbohydrates are active principles extensively used in cosmetics. These compounds are hygroscopic, namely they adsorb water thus contributing to keep a healthy moisture level in the horny layer. These active compounds build hydrogen bonds, thus preventing massive water loss and reducing dehydration. Additionally, some of these compounds make a protective coat on the skin, thus preventing and slowing down transepidermal water loss.

- *α-hydroxyacids (AHA)*

Most AHAs are physiologic, natural, nontoxic substances. These active principles promote normal keratinization and desquamation. Those with multiple hydroxyl groups are moisturizing antioxidants, and are especially gentle for sensitive skin (Yu RJ & Van Scott EJ, 2002).

- *Vitamins*

In terms of beauty and functionality, current studies indicate that certain vitamins and their derivatives enhance the performance of cosmetics and toiletries. Furthermore, laboratory and clinical tests provide strong evidence that these vitamins, used in proper amounts, play an important role in the protection, correction, and renewal processes of skin. Laboratory and clinical studies indicate that topically applied vitamins are beneficial to treat several skin disorders and especially to prevent, delay or arrest certain age-associated degenerative changes, such as skin dryness and desquamation, as well as the formation of wrinkles. Furthermore, the naturalness of vitamins has prompted their use in creams and lotions to maintain a soft and smooth skin by “replenishing nature’s moisture”. Of particular interest to cosmetic formulations are vitamins E, A, and C. These vitamins are functional, they penetrate the skin and, when used in proper amounts, they are safe and free of side effects (Idson B, 1993).

Therefore, Provi Lacteo GDBN is highly recommendable to formulate cosmetic products with moisturizing, smoothing and general conditioning effects on the skin.

Stimulation of cell regeneration

α-hydroxyacids (AHA) act on the stratum corneum; these acids affect the cohesion between corneocytes in the deepest skin layers; consequently, the stratum corneum becomes thinner and the skin surface becomes more flexible.

Lactic acid is a natural AHA that can be found in milk (and dairy products) and in honey. Because of its acid properties, it is a very effective skin exfoliating, with strong moisturizing power.

Thus, Provi Lacteo GDBN is recommended to formulate cosmetic products with exfoliating activity.

Vitamin and mineral replenishing activity

The goal of the cosmetic use of yogurt is to restore the skin natural balance, based on the vitamin and mineral content of this product.

Yogurt vitamins and minerals strengthen the skin thus protecting it from stress, improving its defenses and reducing the earliest signs of aging.

Vitamins

- Vitamin C

This vitamin is a powerful antioxidant. It is also involved in the production of collagen, a protein that maintains the skin smooth and free of wrinkles. The nutrients found in vegetables and animal foods include vitamins, minerals and proteins, necessary to keep a healthy skin.

- Vitamins of the B group

These vitamins play a role in skin health and cell renewal. These vitamins can be found in most of the vegetable foods: vegetables, fresh fruit, nuts and seeds, cereals, legumes, as well as in leaven and animal foods: meat, fish, seafood, eggs and dairies.

  - Vitamin B9 (folic acid): involved in cell renewal
  - Vitamin B2 (riboflavin): combats seborrhea. It can be found in milk and dairies (yogurt, cheese, etc.), eggs, meat, fish, liver, legumes, nuts, almonds, seeds, etc.
  - Vitamin B6 (pyridoxine): plays a role in zinc metabolism; this mineral is part of the epidermis.

Minerals

- Calcium

Calcium is involved in a number of enzymatic processes in the organism, especially in the formation of bones and epidermal tissue.

- Magnesium

Magnesium is a relevant mineral for a number of systems related to ATP metabolism and synthesis of carbohydrates, lipids, proteins and nucleic acids. It plays a major role in the homeostasis of a number of organs, particularly during reparation processes after injury. It is probably involved in the enzyme activation leading to transfer of a phosphate to or from ATP and acts as an enzymatic substrate (Lansdown, A.B.G., 1995).

- Sodium-Potassium

Human and animal skin absorbs sodium and potassium at a rate that depends on the concentration, the applied salt, the skin morphology, the treated area and the density of skin appendages (Lansdown, A.B.G., 1995).

Sodium and potassium are closely linked to a number of physiological processes in the mammalian organism, particularly to the function of cell membranes and the mechanism of the sodium-potassium pump. One of the main effects attributed to the sodium-potassium pump is to maintain cell homeostasis and volume (Lansdown, A.B.G., 1995).

Thus, Provi Lacteo GDBN is recommendable to formulate cosmetic products with skin stimulating and revitalizing activity.

COSMETIC APPLICATIONS

Action	Active	Cosmetic Applications
Skin conditioning	Proteins Carbohydrates AHA Vitamins	Moisturizing Soothing Conditioning
Stimulates cell regeneration	AHA	Exfoliating
Vitamin and mineral replenishing	Vitamins Minerals	Stimulant Revitalizing

RECOMMENDED DOSE

The recommended dose is between 0.5% and 5.0%.

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