

**KEFIR: HISTORY, CHARACTERISTICS, MANUFACTURING TECHNOLOGY  
(КЕФІР: ІСТОРІЯ, ХАРАКТЕРИСТИКА,  
ТЕХНОЛОГІЯ ВИРОБНИЦТВА)**

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*В статті розкривається історія походження і виробництва кефіру, органолептичні показники кефіру, технологія виробництва кефіру.*

***Ключові слова:** кефір, кефірні грибки, органолептичні показники кефіру, технологія виробництва аутентичного кефіру.*

*The article reveals the history of origin and production of kefir, the sensory characteristics of kefir, technology of kefir production.*

***Key words:** kefir, kefir grains, the sensory characteristics of kefir, technology of authentic kefir production.*

Fermented milk has been developed as a means of preserving milk against spoilage. Their evolution through ages across the various geographical locations have progressed from home manufacture, using a small portion of a previous batch as starter, to large-scale production, in which selected starter and automatic processes are used. Most types of fermented milk are made from cow's, buffalo's, sheep's, and goat's milk using lactic fermentation. However, products like kefir and koumiss, which result from yeast-lactic fermentation, and traditionally prepared from goat's and mare's milk, respectively, are also used. Because of proclaimed health benefits of fermented milk products in general, and kefir and koumiss in particular, popularity and demand for these products have rapidly increased beyond their traditional tracts. However, constraints related to their conventional and small-scale production technology besides the location-specific and limited availability of the products are the main challenges and create a demand-supply gap. To overcome these problems, in recent years many technological advances have been achieved to meet the ever-increasing demand of the products and also to ensure the delivery of high-quality and uniform products to consumers [3].

Kefir is a traditional fermented dairy product originating from the tribes of the Northern Caucasus mountain region, located between the Black Sea and the Caspian Sea. For many decades, the longevity of the Caucasian people has been attributed to the high consumption of fermented

dairy products, especially kefir. There is no known record concerning the time of origin of the first kefir grains or first kefir product. Historically, kefir was made in sheep skin bags by continuous fermentation under uncontrolled conditions. Fresh milk was added as fermented milk was removed. Kefir can be produced from cow's milk, sheep's milk, or goat's milk and also there are studies on kefir made soymilk.

Kefir contains a diverse range of inherent microorganisms. Kefir is a self-carbonated refreshing fermented milk drink that has a unique flavor due to a mixture of lactic acid, acetaldehyde, acetoin, slight alcohol, and other fermented flavor products. It is produced by fermentative activity of "kefir grains" added to milk. Kefir grains are small, cauliflower-shaped, semihard granules that contain a specific balance of bacterial and yeast microorganisms existing in a complex symbiotic relationship. When kefir grains are added to milk, microorganisms are shed from the grains. These organisms continue to proliferate with the production of the acid and other flavor compounds causing physicochemical changes. New kefir grains grow from preexisting grains during the process of kefir fermentation [2].

The sensory characteristics of kefir can be described as follows:

- a) the color is white or yellowish;
- b) the aroma is balanced and yeasty;
- c) the taste is acidic, but pleasant and refreshing;
- d) the texture is rather thick, but not gluey, with an elastic consistency.

Lactic acid, volatile acids, diacetyl, carbon dioxide and ethanol are main compounds influencing the sensory properties of kefir. During the 1990s, kefir attracted research interest, in part because of its probiotic properties [1].

Fermented dairy products have been classified into three groups based on the metabolites produced:

1. Lactic fermentation
2. Yeast-lactic fermentation
3. Mold-lactic fermentation

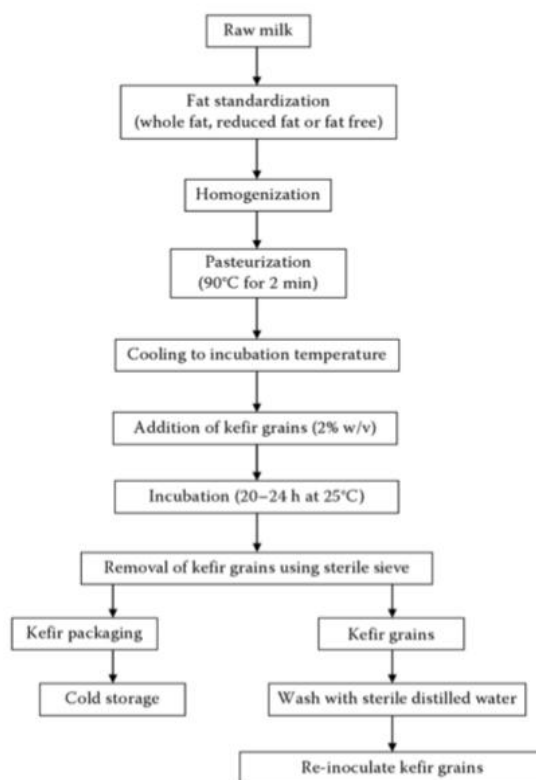
Yogurt and buttermilk are grouped in the first category as solely lactic acid fermentations, whereas kefir and koumiss are listed in the second category as a combination of eukaryotic and prokaryotic fermentation.

To make authentic kefir, kefir grains are added to previously pasteurized and cooled milk and incubated with stirring for approximately 24 h and 25°C. Upon completion of fermentation, agitation of the kefir curd will cause the kefir grains to float due to the effect of carbon dioxide. A unique feature of authentic kefir that differs from other fermented milk products is that kefir grains are recovered after fermentation for future use in subsequent kefir fermentation. Some authors have

claimed that it is necessary to use kefir grains in order to manufacture authentic kefir. However, industrial production of kefir using kefir grains is difficult due to postfermentation separation requirements. As a result, much of the kefir produced in industrial practice is not considered authentic kefir because it is not incubated with the grains. These same researchers indicate that the kefir generated by incubation of milk kefir grains cannot be used as the starter culture for a subsequent batch of kefir. Using this method, the microbial population, especially the number of yeast cells, is slightly decreased but the product manufactured from this technique is acceptable. An advantage of this method is that reduced yeast populations may limit the amount of swelling in the final packages.

Much of the commercial production of kefir involves use of lyophilized starter cultures containing lactic acid and bacteria (LAB) and yeast. Using this method, activated starter culture is added to homogenized and pasteurized milk containing 2-5% milk fat.

*Production scheme for making authentic kefir:*



After fermentation at 25°C for 20-24 h, the product is stored at refrigeration temperatures. The pH gradually drops to 4.6 and fermentation is completed in approximately 20-24 h, which gives sufficient time for the formation of taste and aroma substances when an inoculation rate 2-5% kefir culture is used.

Due to the different production techniques utilized, resultant kefir products are varied. There are no universal standards for the product exist. In order to guarantee a consistent and authentic product, it is important to define standards for the microbially complex kefir product [2].

## Література:

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### THE FERTILIZER'S QUALITY (ЯКІСТЬ ДОБРИВА)

*Сибір Т.А.* – здобувач вищої освіти групи А2/3

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*В статті представлені види та якість добрив, які забезпечують посіви необхідними поживними речовинами, завдяки чому посіви ростуть більше, швидше і виробляють більше їжі.*

**Ключові слова:** *мінеральні добрива, органічні добрива, промислові добрива.*

*The article presents the types and quality of fertilizers that provide crops with the necessary nutrients, so that crops grow bigger, faster and produce more food.*

**Key words:** *mineral fertilizers, organic fertilizers, industrial fertilizers.*

Fertilizers are added to crops in order to produce enough food to feed the human population. Fertilizers provide crops with nutrients like potassium, phosphorus, and nitrogen, which allow crops to grow bigger, faster, and to produce more food. Nitrogen in particular is an essential nutrient for the growth of every organism on Earth. Nitrogen is all around us and makes up about 78% of the air