Filler for Confectionery Based on the Probiotic Medusomyces Gisevii (Tea Fungus) (Part I)

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Abstract. The article discusses the use of Medusomyces gisevii, fungal liquid in particular, as the main ingredient for the preparation of a filler (jelly) for confectionery. The analysis of studies of domestic and foreign scientists in the field of Medusomyces gisevii research, proving the possibility of using Medusomyces Gisevi as probiotics that normalize the activity of the microbiota of the human body, provides the results of the chemical composition of kombucha. At this stage, the aim of the study is: to study the biological processes during the cultivation of the Kombucha mushroom; to determine the physicochemical parameters of liquid for kombucha culture; to study the influence of the culture liquid of kombucha on the technology of preparation of jelly as a filler and its commercial characteristics. On the basis of the fungal liquid, an inoculant was obtained (control sample no. 1 according to the classical preparation scheme and experimental sample no. 2). substances, the change in the content of antioxidants: vitamin C and rutin, depending on the time of fermentation. In order to study the possibility of using samples to obtain a filler (jelly) of confectionery products, the organoleptic characteristics of the resulting drink were determined. The most acceptable organoleptic properties are possessed by a drink with the addition of kombucha and oregano extract with honey.

1. Introduction
Medusomyces gisevii is also known as Chinese fungus, Japanese fungus, tea kvass, Indian Fungus, Manchurian fungus, Kombucha, sea fungus jellyfish of Volga, Japanese sponge [1, 11].

Scientists Velicanski A.S., Cvetkovic D.D., Markov S.L., Tumbas V.T., Savatovic S.M., Danielova L.T. have determined the composition of the microflora of the fungus Medusomyces Gisevi, they distinguish the following groups of acetic acid bacteria: Bacteriumxy linum, Bacteriuma scendens, Bacterium gluconicum, Bacteriuma ceti, Bacterium pasteurianum and the following yeast strains: Mycoderma, Torula, Saccharomy-picse codes Ludycses, Can-dida mycoderma [1].

The high reproduction rate of Medusomyces Gisevi due to the separation of a part of the film and rapid growth characterizes it as a valuable, quickly reproducible raw material. The high pH of Medusomyces Gisevi tea kvass is due to the presence of a large amount of acetic acid and other organic...
acids and other metabolic products [30]. After 15 days of cultivation on the nutrient medium of the fungus, 0.65 mg% of vitamin C was found, and after 6 months of cultivation – 4.4 mg%. Thus, tea kvass is a producer of ascorbic acid.

According to the literature, the following substances were found in the culture liquid of the tea kvass mushroom: organic acids – acetic, gluconic, oxalic, citric, malic, pyruvic, kojic, phosphoric; ethanol; vitamins – ascorbic acid, thiamine; monosaccharides, disaccharides; enzymes – catalase, linase, protease, zymase, sucrose, carbohydrazide, amylase; lipids – sterols, phosphatides, fatty acids; pigments – chlorophyll; purine bases from tea leaves [2–5].

The presence of such active substances as lactic, acetic, oxalic and other acids, as well as alcohol, in the culture liquid of the fungus, turns it into an antiseptic. G.A. Shakaryan and L.T. Danielova proved that tea kvass inhibited the growth of many types of gram-positive and gram-negative bacteria in doses from 0.05 to 0.4 ml [1, 2, 11], i.e. tea kvass has pronounced high antibacterial and antibiotic properties [2–5].

Kvass of the fungus Medusomyces Gisevi has probiotic properties due to the high content of lactic, malic, acetic and gluconic acid restores bacterial balance in the large intestine, inhibits pathogenic microflora. Kvass of the fungus Medusomyces Gisevi contains a large amount of enzymes, biologically active substances, has antibacterial activity, and therefore can be used as fillers for confectionery products of a functional orientation. Based on the conducted analytical studies, we formulated the goal and objectives of the study.

2. Main points

2.1. Research goals and objectives

The purpose of our work is to study the possibility of using the culture liquid of the fungus Medusomyces gisevii or (Kombucha) as a filler for functional confectionery products, develop a recipe, technology, conduct a commodity assessment and determine the characteristics of the resulting ingredient.

To achieve the goal, the following tasks were solved:
- studying the biological processes during the cultivation of the Kombucha mushroom;
- determining the physicochemical parameters of the culture liquid of kombucha;
- studying the influence of the culture liquid of kombucha on the technology of preparation of jelly as a filler and its commercial characteristics;
- developing a technology and recipe for the production of jelly using the culture liquid of the Kombucha mushroom. The scheme of the experiment has been developed (figure 1).
2.2. Materials and methods

Kombucha is a fermented beverage made by fermenting sugar tea with symbiotic bacteria and yeast. The word “kombucha” comes from the Japanese words “seaweed” (Kombu) and “tea” (cha) (Lee K-Y., Buldum G., Mantalaris A., Bismarck A. [6]). Kombucha is also known as “red tea”, Kombucha kvass. Kombucha is believed to have originated in China over 2,000 years ago, while many other historical records indicate that it was consumed in countries such as Russia, Germany, and the Middle East. Kombucha fermentation is traditionally done at home for 7–10 days. During fermentation, the taste of kombucha changes from pleasant fruity with sourness and pleasant aroma to a mild vinegar taste. The end result is a pleasantly sour, slightly sparkling drink, similar to cider or kvass.

Green tea can also be used in production, but black tea and cane sugar, a versatile substrate for kombucha production, work best together. The drink has a preventive and therapeutic effect, improves digestion, relieves arthritis pain; acts as a laxative; prevents microbial infections, fights stress and cancer; relieves hemorrhoids, has a positive effect on cholesterol levels and promotes the elimination of toxins, as well as purification of the blood [4].
It helps balance the microflora of the human gastrointestinal tract by acting as a probiotic drink. Research Dobrynya Yu.M., Timchenko L.D., Rzhepakovsky I.V., Bondareva N.I., Piskov S.I. biologically active substance zooglea Medusomyces gisevii on nonspecific resistance and immunobiological reactivity of the body of white rats under conditions of antibiotic-associated dysbiosis [9] proved a weakening of the functional activity of microbiota as a result of exposure to antibacterial drugs and a decrease in the body's resistance and immunoharmonic defense systems [3, 4]. "...The use of a biologically active substance from the stony plant Medusomyces gisevii (Kombucha) contributed to the experiment on correcting the consequences of antibiotic-associated dysbiosis, accelerated recovery and stimulation of the general resistance of the organism of the studied animals, which indicates its immunomodulatory properties..." The results of the study are presented in Table 1 [3, 4, 5–11].

**Table 1.** The influence of Medusomyces Gisevi zoogley on resistance and immunobiological activity in experimental dysbiosis [9].

| Indicators                                         | Group 1 (n = 25) | Group 2 (n = 25) |
|----------------------------------------------------|-----------------|-----------------|
|                                                    | Before using an antibiotic | After on the 21st day of the end of antibiotic therapy |
|                                                    | Before using an antibiotic | After on the 21st day of the end of antibiotic therapy |
| bactericidal activity of serum blood, cu%          | 55.25           | 47.45           |
| lysozyme activity of blood serum, %                | 47.25           | 39.69           |
| complementary serum activity blood, cu             | 51.76           | 43.55           |
| phagocytic index, %                                | 56.3            | 46.25           |
| phagocytic number, units                           | 3.5             | 2.1             |
| neutrophils capable of absorbing nitroblue tetrazolium (NBT-test spontaneous), % | 23.3            | 25.3            |
| neutrophils capable of absorbing nitroblue tetrazolium (individual NBT-test), % | 46.4            | 40.1            |
| Individual stimulation, cu                        | 1.99            | 1.58            |
| IgA, g/l                                           | 0.57            | 0.49            |
| IgM, g/l                                           | 1.18            | 1.26            |
| IgG, g/l                                           | 1.83            | 1.85            |
| T-lymphocytes (* 10⁹/l)                           | 1.74            | 1.68            |
| B-lymphocytes (* 10⁹/l)                           | 0.49            | 0.45            |
The results of an experimental study (Dobrynya Yu. M., Timchenko LD, Rzhepakovsky IV, Bondareva NI, Piskov SI) [9] from table 1. It is proved: “.... The activation of some factors of adaptive immunity is stimulated by the immune structures of the gastrointestinal tract of laboratory animals with antigens of killed microorganisms of the symbiont Medusomyces gisevii ....”.

In addition, it is believed that it can improve the health of hair, skin and nails, reduce the effects of stress and reduce the risk of nervous disorders, and help normalize insomnia; relieves spasms with headaches, reduces cravings for alcohol, reduces the risk of bladder infections, reduces kidney calcification, reduces the risk of menstrual irregularities and menopause, improves vision, cell regeneration and stimulation of the glandular system in the body, improves the general condition of bronchitis and asthma, and increases the general metabolism [4].

During the fermentation of the kombucha, the polyphenolic compounds in the tea go into solution. Polyphenols have the ability to neutralize free radicals, in particular reactive oxygen species (ROS), which are highly antioxidant.

Researchers studying kombucha have found that tea prepared on substrates of green and black tea has high antiradical activity (Jayabalan, Subathradevi, Marimuthu, 2008) [12].

It has been shown that the total antioxidant activity depends on the time of fermentation, the type of tea substrate and the microbiota present in the tea plant [4].

The cultured liquid of kombucha is the product of combined fermentation processes of a complex composition (acetic acid and alcohol), during the fermentation process intermediate compounds are formed that play an important role in the biochemical processes of the human body, for example, phosphoric acid, which forms phosphoric acid esters, which are converted into pyruvic acid.

The symbiotic union is able to synthesize some vitamins, research by Bondareva N.I., Mitina S.S., Avanesyan S.S. and Timchenko L.D. showed that “... the amount of synthesized vitamin B on a medium with sucrose during the cultivation of some strains of kombucha ranges from 0.019–0.0534 mg in 100 ml of culture liquid, which also confirms the fact that the microbial composition of symbionts studied by samples of kombucha is different ....” [13].

The chemical composition of the culture liquid is diverse and depends on the microbial composition of the kombucha strains, contains: citric, oxalic, tartaric acids, aldehydes L.T. Danielyan. “Kombucha and its biological characteristics”, “.... Residual sugar – from 0.78 to 2.5% with an initial content in the medium of 5% ...”.

The difference in antibacterial activity is observed at a titer of 0.2 ml (1:25) with an initial sugar content of 5% 0.78% and at 0.6 ml (1: 8) – 2.5%. With the initial sugar content in the medium of 10% and the antibacterial activity of the Kombucha culture liquid 0.3 ml, the sugar residue was 7.28%.

The content of proteins and nucleoproteins in the culture liquid of kombucha is about 5.24%, pigments (chlorophyll, xanthophyll) and purine bases of tea leaves in the amount of 0.08%, amylase and catalase enzymes, bactericidin L.T. Danielyan. “Kombucha and its biological characteristics” [2, 3].

2.3. Nutritional and energy value of kombucha (tea extract)
Table 2 shows the nutrient content (calories, protein, fat, carbohydrates, vitamins and minerals) per 100 grams of edible portion.

| Nutrient       | number | Norm** | % of the norm in 100 g | % of the norm in 100 kcal | norm in 100% normal |
|----------------|--------|--------|------------------------|--------------------------|---------------------|
| Calorie content| 7 kcal | 1684 kcal | 0.4%                  | 5.7%                     | 24057 g             |
| Protein        | 0.3 g  | 76 g   | 0.4%                  | 5.7%                     | 25333 g             |
| Carbohydrates  | 4 g    | 219 g  | 1.8%                  | 25.7%                    | 5475 g              |
| Vitamins       |        |        |                        |                          |                     |
| Vitamin A, RE  | 0.12 μg| 900 mcg |                        |                          | 750,000 g           |
| beta carotene  | 0.06 mg| 5 mg   | 1.2%                  | 17.1%                    | 8333 g              |
2.4. Preparation of the culture medium for Medusomyces Gisevii (or Kombucha)

The water, on the basis of which the culture medium is prepared, should not contain hardness salts (Ca, since they interact with gluconic acid, formed during the life of the kombucha, and form calcium gluconate, which precipitates).

Tea leaves are poured into the prepared water at t = 100 °C. The concentration of tea should be from 0.5 to 1.5%, and its excess inhibits the growth of kombucha.

During the preparation of the nutrient medium, sugar should not be poured onto the mycelial film of the fungus, as this causes burns on its body in the form of brown spots. Sugar is added in the form of a 10% solution. To obtain the culture fluid of the fungus, a nutrient medium was prepared, the mycelial film of the fungus was placed in it and cultured under certain conditions until the culture fluid of the required acidity was reached.

The fungus must be kept in a warm, dark place, as low temperatures and sunlight inhibit its development. The jar with kombucha is not hermetically closed, it is covered with clean gauze to prevent dust from getting in. The optimum temperature for the fungus is 25 °C. At temperatures below 17 °C, the activity of the fungus decreases and blue-green algae can develop in it. As a control solution, a solution of disaccharide and large-leaved Ceylon black tea “Ricyard” was used in which a certified Kombucha Medusomyces gisevii or (Kombucha) company “Zdorovevo” St. Petersburg sample no. 1 was used. Volume of 3 liters. The cultivation of the control sample was carried out according to the scheme (figure 2).

**Figure 2.** Flow chart for the production of the culture broth of the tea inoculum from Medusomyces gisevii (obtaining a control sample).
In order to obtain an enriched composition of kombucha, a consortium of symbiotic microorganisms of the company was used using two substrates – traditional black tea and an untested combined substrate-extract of oregano, fructose and flower honey, sample 2, production flow chart in figure 3.

Microbial diversity was analyzed during fermentation in both cellulolytic pellicles and corresponding kombucha using culture-dependent methods.

Additionally, polyphenols, flavonoids, and antioxidant properties of the culture fluid, in particular its metabolites, have been determined.

![Figure 3](image-url)

**Figure 3.** Biotechnological scheme for the production of «Kombucha» – experimental sample no. 2.

2.5. Results and discussion

The results of determining the component composition and physicochemical parameters of the culture liquid of kombucha.

To obtain the most useful ingredient - as a filler for functional confectionery products, using a portable PH ATC (Tester), the device was pre-calibrated against a standard buffer solution at a temperature of 25 °C, pH = 4.8, error 0.1.

The determination was carried out on days 1, 7, 14 for 20 days in order to obtain optimal useful values that affect the organs and systems of the human body (in control and experimental samples). The results are shown in figure 4.
Figure 4. Changing the pH of kombucha extracts depending on time.

We have determined the level of mineralization of kombucha extracts. The results of determining the level of mineralization of kombucha extract are shown in figure 5.

The level of mineralization of the extract of kombucha (Medusomycesgisevii) was also determined using a TDS – meter – S (with factory calibration of the device), the error was 0.1. The determination was carried out on days 1, 7, 14 for 20 days in order to obtain optimal useful values that affect the organs and systems of the human body (in the control and test samples).

Figure 5. Change in the level of mineralization depending on the cultivation time in days (level of mineralization mg-eq / l).

Experimental studies have shown an increase in the amount of mineral substances on the seventh day of kombucha cultivation. The results of the determination of the total titratable acidity of kombucha. Titrimetric method based on the neutralization reaction of 0.1 N NaOH solution (indicator – alcoholic solution of phenolphthalein), the total acidity, expressed in degrees during the entire cultivation period, was determined by the volume consumed for titration. The results are presented in table 3.
Table 3. The results of the titrimetric method of analysis of the control and experimental samples.

| Days | Sample no. 1 (control sample) | Sample no. 2 («Kombucha») |
|------|-------------------------------|---------------------------|
|      | V₁, ml Sk.,%                  | V₁, ml Sk.,%              |
| 1    | 0.78 0.05                     | 0.8 0.05                  |
| 2    | 1.16 0.07                     | 1.25 0.75                 |
| 3    | 1.45 0.09                     | 1.65 0.1                  |
| 4    | 1.86 0.11                     | 2.05 0.12                 |
| 5    | 2.95 0.18                     | 3.1 0.19                  |
| 6    | 3.66 0.21                     | 3.72 0.22                 |
| 7    | 4.65 0.27                     | 5.0 0.29                  |
| 8    | 5.3 0.32                      | 5.6 0.34                  |
| 8    | 5.8 0.35                      | 5.95 0.36                 |
| 10   | 6.7 0.4                       | 6.8 0.4                   |
| 11   | 7.0 0.42                      | 7.2 0.48                  |
| 12   | 7.2 0.48                      | 7.2 0.48                  |
| 13   | 9.0 0.54                      | 9.5 0.57                  |
| 14   | 10.0 0.62                     | 10.3 0.65                 |

This indicator shows the presence of all organic acids in the culture liquid. The total acidity is expressed through acetic acid until the 7th day, the accumulation of acids occurs, starting from the 7th day it decreases. This tendency is observed in both control and experimental samples.

The dry matter content was determined in the samples. The content of the mass fraction of dry substances of kombucha was determined by the refractometric method (refractometer RPL-3). The results are shown in table 4.

Table 4. The content of dry matter in the kombucha culture liquid, in the process of cultivation.

| Name | Components of the Medusomycesgysevii culture liquid (kombucha) | Cultivation time, per day | Solids content, % |
|------|---------------------------------------------------------------|---------------------------|-------------------|
|      |                                                               | 7                         | 14                |
| Sample no. 1 (control) | Black tea sucrose                                      | 7                         | 10                |
| Sample no. 2 | Black tea Oregano leaf extract Floral honey Long chain inulin from Scorsonera his. | 10                        | 14                |

In the process of cultivation, the dry matter content increases.

Results of determination of the content of ascorbic acid and rutin in samples no. 1 and samples no. 2, substances with antioxidant activity and preventing the negative effects of singlet oxygen on the human body. Kombucha has a high adaptive potential and the synbiotic composition is able to synthesize vitamins C, group B and antioxidants, which has been experimentally determined.

The content of ascorbic acid was determined by the method based on the reducing ability of vitamin C when interacting with Tillmans paint (2,6–dichlorophenolindophenol) in an acidic medium.

The results are shown in table 5.

From the results of the experiment it can be seen that the largest amount has an experimental sample no. 2 on the basis of honey and oregano.
Table 5. Changing the content of vitamin C in an ingredient in the “Kombucha” filler.

| Name            | Components of the Medusomyces gysevii culture liquid (kombucha) | Cultivation time, per day | Ascorbic acid content, mg% |
|-----------------|---------------------------------------------------------------|---------------------------|---------------------------|
| Sample no. 1    | Black tea sucrose                                             | 0.75 ± 0.13               | 0.79 ± 0.15               |
| (control)       |                                                               |                           |                           |
| Sample no. 2    | Black tea                                                     | 1.09 ± 0.11               | 1.15 ± 0.17               |
|                 | Oregano leaf extract                                          |                           |                           |
|                 | Floral honey                                                  |                           |                           |
|                 | Long chain inulin from Scorsonera his.                        |                           |                           |

By the method of I.K. Murray was determined in rutin samples by color reaction of rutin with aluminum salts in the presence of acetic acid. The results are shown in table 6.

Table 6. Changing the content of rutin in an ingredient in the “Kombucha” filler.

| Name            | Components of the Medusomycesgysevii culture liquid (kombucha) | Cultivation time, per day | Rutin content, mg% |
|-----------------|----------------------------------------------------------------|---------------------------|--------------------|
| Sample no. 1    | Black tea sucrose                                             | 0.28 ± 0.05               | 0.30 ± 0.15        |
| (control)       |                                                               | 0.05                      | 0.15               |
| Sample no. 2    | Black tea                                                     | 0.35 ± 0.09               | 0.30 ± 0.12        |
|                 | Oregano leaf extract                                          | 0.09                      | 0.12               |
|                 | Floral honey                                                  |                           |                    |
|                 | Long chain inulin from Scorsonera his.                        |                           |                    |

The largest amount of rutin is contained in experimental sample no. 2.

Considering that a search is underway for potential raw materials and ingredients from them as fillers for confectionery products, an analysis of domestic and foreign sources, a patent search showed that Medusomycesgysevii (kombucha) contains a large amount of vitamins C and P.

Of interest is the determination of the activity of dextrinogenic enzymes. The determination is based on measuring the rate of the enzymatic reaction of starch hydrolysis. This reaction was carried out at t = 30 °C, pH 4.7 for 10 minutes.

For the analysis, 2 test tubes were used, into which 10 ml of a 1% starch solution were added, were placed in a water bath at t = 30 °C for 5–10 min. Then, 5 ml of distilled water (control) was added to the first test tube, and 5 ml of culture liquid, previously filtered and heated to t = 30 °C, into the second.

The mixtures were stirred and left in a water bath for 10 min, then 0.5 ml was taken from each test tube and transferred into conical flasks, which already contained 50 ml of iodine working solution.

The contents of the flasks were shaken. The first solution (control) became blue, the second - violet-brown. Then the optical densities of the solutions are determined on a photoelectric colorimeter at λ = 656 nm. The results are shown in table 7.
Table 7. Determination of the activity of dextrinogenic enzymes.

| Name | Components of the Medusomyces gysevii culture liquid (kombucha) | Cultivation time, per day | Dextrinogenic activity, units / 100 ml |
|------|---------------------------------------------------------------|---------------------------|---------------------------------------|
| Sample no. 1 (control) | Black tea sucrose | 7 | 14 |
| Sample no. 2 | Black tea, Oregano leaf extract, Floral honey, Long chain inulin from Scorsonera his | 120 | 115 |

The oregano experimental sample is optimal. Reducing sugars were determined by K.N. Chizhova and A.N. Sonkina. This method is based on the reduction reaction of copper oxide with Fehling's reagent during boiling and subsequent accounting for the sugar content in the analyzed extract by the amount of reduced copper. The results are shown in table 8.

Table 8. Content of reducing sugars in experimental samples.

| Name | Components of the Medusomyces gysevii culture liquid (kombucha) | Cultivation time, per day | The content of reducing sugars in% on dry matter |
|------|---------------------------------------------------------------|---------------------------|-----------------------------------------------|
| Sample no. 1 (control) | Black tea sucrose | 7 | 14 |
| Sample no. 2 | Black tea, Oregano leaf extract, Floral honey, Long chain inulin from Scorsonera his | 1.7 | 2.5 |

The optimal content of reducing sugars for the production of functional products in sample no. 2. The results of determining the content of glucose, sucrose, fructose were determined by standard methods in table 9.

Table 9. Obsession monosaccharides samples.

| Sample name and composition | Glucose, mg / ml | sucrose, mg / ml | fructose, mg / ml |
|-----------------------------|------------------|-----------------|------------------|
|                             | days             | days            | days             |
| Sample No. 1 kombucha and black tea (control) | 11.2 ± 0.03 | 15.89 ± 0.64 | 37.14 ± 0.06 |
| Sample # 2 of kombucha, oregano, honey, Long chain inulin from Scorsonera his. | 11.4 ± 0.09 | 15.12 ± 0.20 | 6.23 ± 0.22 | 26.84 ± 0.001 |
The total sucrose content in all kombucha decreased with the time of incubation, and the lowest concentration was found in sample no. 2 and sample no. 1 (15.13 ± 0.02 and 26.21 ± 0.13 mg/ml). The concentration of glucose and fructose showed an increase during the fermentation process, which is only significant in sample no. 1 and sample no. 2.

In order to obtain further jelly with the desired properties, changes in the density of kombucha during fermentation in the test samples were determined, as an indicator associated with changes in ascorbic acid. The synthesis of ascorbic acid is associated with a change in the density of the solution. The measurements were carried out using a general purpose hydrometer, taking into account that ascorbic acid has a density of 1.65 g/cm³. The results of the experiment are shown in figure 6.

![Figure 6. Changes in the total density of the Kombucha culture broth.](image)

The diagram shows that an increase in density occurs up to 7 days, which proves the greatest accumulation during the synthesis of ascorbic acid, then the processes of acetic acid fermentation are intensified and the density of the solution decreases due to the accumulation of organic acids, mainly acetic acid whose density is close to the density of water and is 1.0492 g/cm³.

The organoleptic characteristics of the Kombucha inoculum were determined. The results of the sensory evaluation of the quality of the Kombucha beverage are presented in table 10.

| Name of quality indicators | Sample no. 1 - control | Sample no. 2 – an experimental sample which includes: oregano, flower honey, black tea |
|----------------------------|------------------------|-----------------------------------------------------------------------------------|
| Appearance                 | Translucent, thick liquid | Translucent, thick liquid                                                        |
| Taste                      | Sour-sweet, without foreign aftertaste | Sour-sweet, without off-taste with floral notes                                   |
| Smell                      | Typical of this type of raw material, the aroma of kombucha, acetic acid and yeast aromas are allowed, tastes and without foreign odors | Typical for this type of drink with a light aroma of oregano                     |
| Color                      | Dark brown              | Amber even over the entire surface of the drink                                   |
| Consistency                | Homogeneous evenly liquid with slight opalescence | Homogeneous, amber liquid with slight opalescence                                |
As a result of the organoleptic assessment, it was found that all the samples under study meet the requirements for quality indicators.

**Table 11.** Scoring the quality of the Kombucha drink.

| The name of indicators | Sample no. 1 - control | Sample no. 2 – an experimental sample which includes: oregano, flower honey, black tea |
|------------------------|------------------------|----------------------------------------------------------------------------------|
| Taste                  | 5                      | 5                                                                                |
| Smell                  | 4                      | 5                                                                                |
| Color                  | 5                      | 5                                                                                |
| Consistency            | 5                      | 5                                                                                |

**Table 12.** Evaluation of the Kombucha drink on a 5-point scale, taking into account the weight coefficient.

| No. | Quality indicators | Weight coefficient | Sample no. 1 - control | Sample no. 2 | Quality score taking into account the coefficient | Score taking into account the coefficient |
|-----|--------------------|---------------------|-------------------------|--------------|---------------------------------------------------|------------------------------------------|
| 1   | Taste              | 0.3                 | 5                       | 1.5          | 5                                                  | 1.5                                      |
| 2   | Smell              | 0.3                 | 5                       | 1            | 5                                                  | 1.5                                      |
| 3   | Color              | 0.2                 | 4                       | 0.8          | 5                                                  | 1                                        |
| 4   | Consistency        | 0.2                 | 5                       | 1            | 5                                                  | 1                                        |
| Total: |                      | 1                   | 19                      | 4.3          | 20                                                 | 5                                        |

The most acceptable organoleptic properties are possessed by a drink with the addition of Kombucha and oregano extract with honey.

3. **Conclusion**

According to the results of the experiment, the following parameters were determined: the optimal process of obtaining the extract of kombucha begins on the 7th day, both for the control sample and for the experimental one (sample no. 2).

As a sample for obtaining a filler for confectionery products based on physicochemical methods of analysis, we suggest using prototype no. 2.

Analysis of the use of kombucha in the production of functional drinks that normalize the intestinal microbiota (in case of dysfunctional states of the intestine).

On the basis of the fungal liquid, an inoculant was obtained (control sample no. 1 according to the classical preparation scheme and experimental sample no. 2) of the substance, the change in the content of antioxidants: vitamin C and rutin, depending on the fermentation time.

In order to study the possibility of using samples to obtain a filler (jelly) of confectionery products, the organoleptic characteristics of the resulting drink were determined. The most acceptable organoleptic properties are possessed by a drink with the addition of kombucha and oregano extract with honey.

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