INCLUSION OF FRUIT EXTRACTS IN SOFT DRINKS

Evatov Giyosjon Hamza ugli[1]
[1]*Tashkent Institute of Chemical Technology,*
Republic of Uzbekistan, Tashkent city

Abstract

The storage stability of cherry, black raisin, black currant, and raspberry extracts was evaluated under different temperature, light, and oxygen conditions. Extracts stored at 4–5°C without light and air exposure showed the highest stability. Phenolic compounds gradually decreased during storage, but losses remained limited during the first 9 months. Black raisin extract demonstrated the greatest stability, while raspberry extract was the most sensitive. Microbiological analysis revealed no coliform bacteria throughout storage. Total microbial count and mold growth remained very low up to 12 months, increasing afterward. Therefore, 9 months is recommended for preserving biological activity and 12 months for microbiological safety.

Keywords

Fruit extracts, Cherry extract, Black raisin extract, Black currant extract, Raspberry extract, Storage stability, Phenolic compounds, Antioxidant activity, Microbiological stability, Shelf life.

In order to determine the optimal amount of fruit and berry extract to be added to the non-alcoholic beverage, the beverage samples were evaluated by the tasting commission based on organoleptic indicators. The beverage was based on 1000 g of drinking water, 30 g of sugar, and various amounts of extract. The amount of extract was studied in the range of 10, 20, 30, 40, and 50 g.

According to the table data, the fruit taste, smell, and color were insufficiently expressed in the sample with 10 g of extract. In variants with an extract of 30–50 g, the color and odor intensified, but the taste was excessively sour and saturated, characteristic of the extract. The highest organoleptic value was recorded in the sample containing 20 g of the extract.

Therefore, in the production of non-alcoholic beverages, adding 20 g of fruit and berry extract to 1000 g of drinking water and 30 g of sugar base is recommended as the optimal amount based on organoleptic indicators.

Table 1

Organoleptic assessment of the amount of extract added to the non-alcoholic beverage

Option	Drinking water, g	Sugar, g	Amount of extract, g	Appearance	Taste	Smell	Color	Overall grade, points
1	1000	30	10	Clear	The taste of the extract is weakly felt	Weak	Light	3,8
2	1000	30	20	Clear, attractive	Balanced, pleasant	Light berry	Natural, pleasant	4,8
3	1000	30	30	Clear	The taste of the extract is slightly strong.	Clear-fruited	Saturated	4,4
4	1000	30	40	Slightly saturated	Increased acidity and extract flavor	Strong	Very saturated	4,0
5	1000	30	50	Saturated	The taste of the extract is too strong	Very strong	Dark-saturated	3,6

Table 2

Physicochemical parameters of extract-containing mors and kvass beverages

Ichimlik turi	Sample	Extract type	Dry matter, %	Titratable acidity, %	pH	Total sugar, %	Phenol substances, mg GK/100 g	Antioxidant activity, EC50, mg/ml
Mors	Control	No extract	7,4	0,22	4,08	6,3	18	28,4
Mors	Experiment	Cherry extract	9,1	0,34	3,58	7,8	126	6,4
Mors	Experiment	Raspberry extract	9,0	0,32	3,63	7,7	118	7,1
Kvas	Control	No extract	6,8	0,24	4,16	5,8	21	31,6
Kvas	Experiment	Black raisins extract	8,5	0,37	3,66	7,5	168	4,8
Kvas	Experiment	Blackcurrant extract	8,4	0,39	3,52	7,3	156	5,2

According to the table data, the content of biologically active substances in the control samples is relatively low, which is explained by the absence of fruit and berry extracts in their composition. In the Mors control sample, the amount of phenolic substances was 18 mg GK/100 g, and in the kvass control sample, it was 21 mg GK/100 g. In the experimental samples with the addition of the extract, this indicator increased significantly.

In the mors with cherry extract, the amount of phenolic substances was 126 mg GK/100 g, and in the mors with raspberry extract, it was 118 mg GK/100 g. This is 7.0

and 6.6 times higher than the control morse sample, respectively. Consequently, cherry and raspberry extracts enriched the mors drink with natural phenolic compounds.

A similar positive change was observed in the kvass beverage. In kvass with the addition of black raisins extract, phenolic substances were 168 mg GK/100 g, and in kvass with the addition of blackcurrant extract, 156 mg GK/100 g. This is 8.0 and 7.4 times higher than the control kvass sample, respectively.

When assessing antioxidant activity using the EC50 value, EC50 was higher in the control samples: 28.4 mg/ml in Morse and 31.6 mg/ml in kvass. A high EC50 value indicates low antioxidant activity. In samples with the addition of the extract, the EC50 value decreased sharply. EC50 was 6.4 mg/ml in Mors with cherry extract, 7.1 mg/ml in Mors with raspberry extract, 4.8 mg/ml in kvass with blackcurrant extract, and 5.2 mg/ml in kvass with blackcurrant extract.

High results were also recorded in the experimental samples regarding dry matter and total sugar content compared to the control. This indicates that the natural sugars, organic acids, and extractive substances contained in the extracts enriched the beverage's composition. An increase in the titrated acidity and a decrease in the pH value indicate that the acid-sweet taste of the beverages has improved, and a more favorable environment for microbiological stability has been formed.

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