Veterinary Sanitary Assessment Garden and Wild-Growing Black Currant of Yakutia

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Abstract. The provision of the population of Yakutia with vitamin products in the harsh natural conditions of the republic is especially acute. The remoteness of settlements, a complex transport scheme makes it difficult to deliver perishable fruit and vegetable products, the cost increases significantly, and the quality of plant products deteriorates during transportation. But Yakutia is rich in wild berries, among which special attention is paid to black currants. Black currant berries, leaves, buds contain a large amount of vitamins of groups A, PP, groups B, C and E, organic acids, pectin, sugars, tannins, essential oils and other biologically active substances [1,14]. The local population not only collects wild-growing black currants, but is also actively engaged in the cultivation of garden black currants in their backyards. Black currants are used both fresh and frozen; the berry is an excellent raw material for the production of preserves, jams, juices, etc. And like most berries, black currants are perishable products, therefore, the assessment of the compliance of black currants with quality and safety indicators according to the requirements of GOST 6829-2015 (UNECE STANDARD FFV-57:2010) “Fresh black currants. Technical conditions” is relevant [15].

A veterinary and sanitary assessment of the wild-growing black currant of the Okhta (Ribes. Dikusha) and the cultivar Algo (Yakutskaya), (Ribes Nigrum Yakutskaya (Algo)) from the backyard of the Batagai-Alyta village of the Eveno-Bytantaysky region of the Republic of Sakha (Yakutia) for compliance the requirements of GOST 6829-2015 (UNECE STANDARD FFV-57:2010) “Fresh black currants. Technical conditions” is relevant [15].

A veterinary and sanitary assessment of the wild-growing black currant of the Okhta species and the cultivated black currant of the Algo Eveno-Bytantaysky ulus of the Republic of Sakha (Yakutia) in a comparative analysis. To achieve this goal, the following tasks have been set: get acquainted with the requirements for the berry in accordance with GOST 6829-2015 “Fresh black currant. Technical conditions”; to study the organoleptic characteristics of black currant;

1. Introduction

The purpose of the work is to conduct a veterinary and sanitary assessment of the wild-growing black currant of the Okhta species and the cultivated black currant of the Algo Eveno-Bytantaysky ulus of the Republic of Sakha (Yakutia) in a comparative analysis. To achieve this goal, the following tasks have been set: get acquainted with the requirements for the berry in accordance with GOST 6829-2015 “Fresh black currant. Technical conditions”; to study the organoleptic characteristics of black currant;
to determine the content of nitrates, the content of the radiation background of black currant in a comparative aspect.

In Yakutia, mainly 5 types of black currant grow: fragrant currant - *Ribes fragrans* Pall., Black currant - *Ribes nigrum* L., moss currant - *Ribes procumbens* Pall., Low-flowered currant - *R. pauciflorum* Turcz. *ex Pojark.* and Siberian grouse currant, Okhta - *Ribes dikusha* Fisch. *ex Turcz* [5.11-13].

Grouse currant, synonyms: Okhta, Aldan grapes, Aldanka prefers flat places. It grows in coastal forests, willow, poplar, in floodplain larch forests, among riverine shrubs, on river islands, forms extensive thickets, sometimes enters rocky slopes [2,3]. Black and blue berries with a waxy bloom that look like black grapes with a taste reminiscent of blueberries. In the Eveno-Bytantayskiy ulus, it grows along the banks of the Bytantai rivers, on the territory of the villages of Sakkkyryr settlement, Dzhargalakh settlement, etc. But not all the local population has the opportunity to travel to hard-to-reach places where black currant grows, therefore, residents of the district are increasingly planting zoned varieties of black currant in personal plots, where it takes root well.

Sustainable development of the berry industry in the harsh climatic conditions of the North is possible only with the availability of adapted varieties. The main criteria for evaluating plants under these conditions are their winter hardiness and frost resistance, which are mainly due to the peculiarities of the genotype, its ability to adapt to a complex of unfavorable conditions of the cultivation environment. Yakutsk Scientific Research Institute of Agriculture named after V.I. M.G. Safronov (YANIIISH) research is being carried out on the selection of black currants. The created varieties meet the existing demand of the population of the republic in varietal planting material [3,4,5,10].

In culture, currants are durable, not demanding on the soil, drought-resistant and heat-resistant, slightly susceptible to diseases and pests, has a consistently high annual yield. Propagated vegetatively - by cuttings, horizontal layering and dividing bushes [7]. Seed propagation is used only in breeding. The peculiarity of black currant is that useful substances have the ability to be preserved during prolonged freezing, so they can be used all year round.

In FSBSI "Yakutsk Scientific Research Institute of Agriculture named after M.G. Safronov "by agronomist-breeders MA Chertkova and L.P. Gotovtseva bred the black currant variety Algo (Yakutskaya), (Ribes Nigrum Yakutskava (Algo)) by crossing the Siberian grouse currant (Okhta), (Ribes dikusha Fisch.ex Turcz) and moss currant (Ribes procumbens Pall.). The variety has a medium-sized, medium-spreading bush, berries weighing 0.7–0.9 g, rounded, dark blue in color with a thin skin and waxy bloom, with an ascorbic acid content of up to 230 mg%. The variety is characterized by early ripening and high yield, 5-9 kg per bush. This variety of black currant is resistant to fungal diseases and kidney mites [3-5,9].

Fruits and leaves have anti-inflammatory, diaphoretic, diuretic, multivitamin properties, increase the body's resistance to infectious diseases, and reduce the effects of radioactive radiation. Healing properties are possessed not only by fruits and leaves, but also by buds, the aqueous infusion of which promotes the excretion of excess uric and oxalic acids from the body, helps with rheumatism, kidney and bladder diseases [1,6,14].

Currently, in a number of Central regions of the republic, with the participation of the Ministry of Agriculture of the Republic of Sakha (Yakutia), administrations of municipalities and private enterprises, planting of berry crops and a system of harvesting and processing of berry products that meet the quality and safety indicators of regulatory documents are being organized [2,8, 10.11].

2. Materials and research methods

The work was carried out at the Department of Veterinary and Sanitary Expertise and Animal Hygiene, Faculty of Veterinary Medicine, Arctic State Agrotechnological University. Three samples of black currant were investigated: the wild-growing species Okhta (Ribes. Dikusha) and the cultivar Algo, (Ribes Nigrum Yakutskava (Algo)), collected on the backyard of the Batagai-Alyta village of the Eveno-Bytantai region.
The organoleptic assessment of the quality of black currant was carried out by external examination, tasting and revealing the degree of compliance of quality indicators with the requirements of GOST 6829-2015 [15]. Black currants were evaluated according to the following indicators: appearance, degree of maturity, the presence of berries with damage and diseases, with excessive external moisture, mineral impurities (sand, dust, etc.), agricultural pests, smell and taste. External examination also determines the mass fraction of black currant berries with mechanical damage, with lesions with powdery mildew, mold, fruit rotting that does not correspond to the commercial grade as a percentage of the total weight of black currant [15,16]

The results of organoleptic studies of the garden black currant variety Algo and the wild species Okhta of the Eveno-Bytantai region are presented in Table 1.

**Table 1.** The results of organoleptic studies of the garden black currant variety Algo and the wild species Okhta Eveno-Bytantaysky district.

| Indicator name | According to GOST 6829-2015, premium grade | Ribes Nigrum Yakutskava (Algo) | Okhta (Ribes. Dikusha) |
|----------------|---------------------------------------------|--------------------------------|-----------------------|
| Appearance     | Berries are fresh, fully developed, healthy, ripe, clean, whole, without mechanical damage, without damage caused by pests and diseases, without excessive external moisture, in brushes or without brushes, typical for the pomological variety of color. The berries are typical in shape and other characteristics for the given pomological variety. The berries are uniform in size and color, almost identical in ripeness. Berry size - medium, rounded in shape | The berries are fresh, fully developed, healthy, ripe, clean, whole, without mechanical damage, without damage caused by pests and diseases, without excessive external moisture, without brushes, typical for the pomological variety of color. | The berries are fresh, fully developed, healthy, ripe, clean, whole, without mechanical damage, without damage caused by pests and diseases, without excessive external moisture, without brushes, typical for the pomological variety of color. |
|                | Not detected                               | Not detected                  |                       |
| Smell and taste | Characteristic of this pomological variety, without foreign smell (or) taste | Characteristic of this pomological variety, without foreign smell, tart-sour taste | Characteristic of this pomological variety, without foreign smell, sweet and sour taste |
|----------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| Mass fraction of berries that do not correspond to this commercial grade, but correspond to a lower grade, %, not more including: | 5,0 | 0,3 | 0,43 |
| - overripe and with mechanical damage | Not allowed | Not identified | Not identified |
| - not attained removable maturity | 0,5 | 0,3 | 0,5 |
| - including immature (green) | Not allowed | 0,2 | 0,4 |
| - not corresponding to the second grade | Not allowed | Not identified | Not identified |
| Mass fraction of impurities of plant origin, %, no more | Not allowed | 0,2 | 0,3 |
| The presence of steamed, fermented, moldy, rotten, dried berries, with traces of chemical remedies | Not allowed | Not identified | Not identified |

### 3. Conclusion

According to the results of organoleptic studies, it was established in appearance that all samples of berries are fresh, fully developed, healthy, ripe, clean, whole, without mechanical damage, without excessive external moisture, without damage caused by pests and diseases, without brushes, typical for pomological color variety. The berry of the cultivar Algo black currant has an average size and a rounded shape, while the wild-growing black currant type Okhta has an average size and an elongated rounded shape. Smell and taste characteristic of this pomological variety, without foreign smell.
berry of the cultivated black currant of the Algo variety has a tart-sour taste, the berries of the wild-growing black currant of the Okhta species have a sweet and sour taste. Overripe berries with mechanical damage were not identified. The varieties of black currant Algo that have not reached the removable maturity were revealed - 0.3%, including immature - 0.2%, wild-growing black currant Okhta - 0.5%, including unripe fruits - 0.4%. Steamed, fermented, moldy, rotted, dried berries with traces of chemical berry protection have not been identified.

Research on the determination of nitrates in the cultivated black currant of the Algo variety and the wild-growing species Okhta was carried out by the method of express analysis using the Soeks nitrate tester. The method is based on determining the concentration of nitrate ions in comparison with the maximum permissible concentration for the measured product [17, 18]. Research data on the determination of nitrates in samples of black currant berries are presented in Table 2.

| Indicator name | Regulatory documents, MPC | Ribes Yakutskava (Algo) | Nigrum Okhta (Dikusha) | (Ribes. Okhta) |
|----------------|---------------------------|-------------------------|------------------------|----------------|
| Sample no.     |                           | 1                       | 2                      | 3              | 1              | 2              | 3              |
| Nitrate content, mg / kg | no more than 60.0 | 9.0                     | 8.0                    | 9.0            | 7.0            | 7.1            | 6.9            |

MPC - maximum permissible concentration

Conclusion: when determining the content of nitrates in the cultivated black currant of the Algo variety and the wild-growing species Okhta, it was established that the nitrate content in the varieties of black currant berries Algo averages 8.6 mg / kg and Okhta 7.0 mg / kg, which does not exceed the maximum permissible norms (MPC - 60 mg / kg).

Evaluation of the level of radioactive background, the number of ionizing particles (beta, gamma), X-ray radiation of samples of black currant berries was also carried out using the "SOEKS" ecotester [19, 20]. The research results are presented in table 3.

| Indicator name | Regulatory documents, MPC | Ribes Yakutskava (Algo) | Nigrum Okhta (Dikusha) | Okhta (Ribes. Dikusha) |
|----------------|---------------------------|-------------------------|------------------------|------------------------|
| Sample no.     |                           | 1                       | 2                      | 3                      | 1              | 2              | 3              |
| Radiological background, mgR / h | no more than 20 | 15.0                    | 12.0                   | 14.0                   | 18.0           | 16.0           | 17.0           |

Resume: the radiological background in the varieties of black currant berries "Algo" is - on average 13.6 mgR / hour and "Okhta" - an average of 17.0 mgR / hour, which corresponds to the maximum permissible standards at MPC - 20 mgR / hour.

4. Conclusion

The unpretentiousness and profitability of growing garden black currant of the Algo variety and the wild species Okhta in the harsh Arctic conditions of Yakutia has been established. Black currant varieties Algo, cultivated in a backyard plot, showed high winter hardness, stable productivity and resistance to diseases and pests of berry crops. The soil of the Eveno-Bytantaysky ulus of the Republic of Sakha (Yakutia) is suitable for planting garden black currants of the Algo variety, provided that the soil is fertilized annually with nutrients, regular watering during the dry summer season, and the correct formation of berry bushes.
In terms of organoleptic indicators: appearance, degree of maturity, taste, smell, the presence of non-standard, overripe, unripe, damaged berries, garden black currant of the Algo variety and the wild-growing species Okhta correspond to the highest grade according to GOST 6829-2015 “Fresh black currant. Technical conditions”. It should be noted that the berry of the cultivated variety of black currant Algo is of medium size, round in shape, while the berry of the wild-growing black currant of the Okhta species, with an average size, has an elongated-rounded shape.

Differences in taste were revealed, the berry of the cultivated black currant of the Algo variety has a tart-sour taste, and the berries of the wild-growing black currant of the Okhta type have a sweet and sour taste.

The content of nitrates in the varieties of black currant berries Algo and Okhta does not exceed the maximum permissible norms (at MPC - 60 mg / kg). The radiological background in all samples of black berries corresponds to the maximum permissible concentration (at MPC - 20 mgR / hour). The obtained results of studies of black currant berries of the Algo variety and the Okhta species indicate the quality and safety of products and the possibility of free sale of berries in the retail network, as well as their use as raw materials for processing in the production of berry products.

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