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Chemical composition of root crops of sugar beet of different life-forms depending on regimes of provision with moisture of soil

Goal. Determine the influence of soil moisture content on the chemical composition of sugar beet roots of different biological forms during the harvesting period. **Methods.** Vegetative experiments. The content of total nitrogen, phosphorus, potassium, sodium, calcium, magnesium in sugar beet plants was calculated in one stress after wet germination by K. Ginsburg and others. followed by the determination of nitrogen - by the Kjeldahl method, phosphorus - by Denise in the modification of Chuvia, potassium and sodium by the method of flame photometry, calcium and magnesium - trilonometric, the content of protein nitrogen - by the Barshtein method, non-protein - by the difference between total and protein nitrogen. **Results** Changes in the chemical composition of sugar beet roots of various biological forms have been determined for different moisture provision of the soil during the harvesting period. **Conclusions** For increasing the level of full field moisture content of the soil, there is an increase in the content of macroelements in the root crops of beet sugar of different breeding for harvesting period, characterized by direct correlation dependencies.

Key words: hybrids, sugar beet, level of moisture, total field strength, chemical composition, root crops.

Technically mature root crops contain an average of 75% water and 25% dry matter, the main part of which (17,5%) is sucrose, and 7,5% - other non-sugars. About 5% of the total sugars contains insoluble substances (fiber - 2.5%, pectin substances - 2.4, proteins and ash - 0.1%). To soluble non-sugars belong to fructose, glucose (invert sugar) and other non-zealous substances (0,8%). The content of nitrogenous substances in the root crops sugar beet on average is 1.1%, ash - 0.6% [9].

The main indicators that characterize the productivity of beet sugar, in addition to yield, is the percentage content of sugars in root crops and collecting sugar from 1 ha [2,10]. The sugar content depends on many factors, the most important of which are the type of hybrid, the fertilizer, the degree of soil moisture and the state of the puffer apparatus as an assimilation structure [3, 4, 8]. In addition to sugar, the main indicators of the quality of sugar beet is normally purified purity juice content of invert sugar (glucose and fructose), non-protein "harmful" nitrogen and melyasoutvoryuvalnyh potassium and sodium compounds [1, 5, 6]. The presence of K + and Na + prevents extraction of crystallized sugar is in detention 70 - 80% sugar molasses [7].

Chemical composition of beet root crops sugar depends on the variety, soil-climatic and weather conditions, the level of agrotechnics and other factors. Knowledge of the laws of changes in the chemical composition of root crops under the influence of external factors is necessary for the development of technology for growing this crop, which provides the receipt of raw materials of high quality.

The purpose of the research is to determine the effect of soil moisture content on the chemical composition of sugar beet roots of various biological forms during the harvesting period.

Materials and methods of research. The research was carried out at the vegetation site of the Laboratory of Agrochemistry of the Institute of Bioenergetic Cultures and Sugar Beet NAN. Wagner vessels (d - 21 cm, h - 35 cm) were used with a capacity of 14.5 kg of air-dry soil per vessel, which was filled with typical black earth with the following agrochemical characteristics: humus - 3,8 - 4,0%, pH of salt - 6, 4 - 6,6, Ng - 1,4 - 1,7 mg · ekv / 100 soil, mobile phosphorus and exchangeable potassium by Chirikov - 184 - 197 and 81 - 89 mg / kg of soil, alkali hydrolyzed Nitrogen for Cornfield - 159 - 163 mg / kg of soil.

Varieties and hybrids of sugar beet species of different biological forms and breeding origin (factor A) were studied in the experiment: Uladovsky perennial 35, Ukrainian SS 70, Extra, Robert and KV Zbruch, as

well as variations of soil moisture (factor B): 45, 60 and 75% of the total field moisture content of the soil (APV). Seeds of beet sugar were sown at the end of April in early May, the harvest was harvested in early October. The chemical composition of sugar beet root crops was determined during the harvesting period. Repeat in the experiments - 7-time.

The content of total nitrogen, phosphorus, potassium, sodium, calcium and magnesium in sugar beet plants was determined in the same difficulty after wet germination by K. Ginzburg and others. followed by the determination of nitrogen by the Kjeldahl method, phosphorus - by Denise in the modification of Between, potassium and sodium - by the method of flame photometry, calcium and magnesium - trilonometrically, the content of protein nitrogen - by the Barshtein method, non protein - by the difference between total and protein. 1. Chemical composition of sugar beet root crops for harvesting period depending on the regime.

Research results. It has been established that during the period of harvesting of beet sugar content of total nitrogen in root crops, in the variant with a moisture content of soil, 45% of the SPV did not differ significantly between hybrids and was within the range of 0.58-0.61% on dry matter. At the same time, for increasing the moisture content up to 60%, the content of this element increased to 0,70 - 0,75%, and up to 75% of PPV - up to 0,84 - 0,97% on dry matter. It should be noted that the highest content of total nitrogen in the root crops was observed in plants of the hybrid KV Zbruch in the version with 75% of the SRV, which is 23.7% higher than the values of the variant with a moisture content of 60% soil moisture (Table 1).

1. Chemical composition of sugar beet root crops for the harvesting period depending on the humidity regime

An analysis of the research on the contents of the root crops of protein and non-protein "harmful" nitrogen suggests that in vessels with a minimal moisture content in the soil no significant difference in the content of protein and non-protein nitrogen between varieties and hybrids was detected - respectively 0.27 - 0.31 and 0,28 - 0,33% on a dry substance (Table 2). For the increase of the level of HPAs up to 60% in sugar beet species of investigated varieties and hybrids, the content of protein and non-protein nitrogen in the root crops compared to those with a moisture content of soil, 45% of the PPV increased by 26.2 - 35.6% and 3.2 - 9.3% respectively. With an increase in the level of moisture supply up to 75% of PPV in plants of all sorts and hybrids of sugar beetroot, there was an increase in the content of protein nitrogen in the root crops by 12.5 - 15.9%, non protein - by 22.5 - 34.1% compared with variants from 60% HW. Much less this difference was found in plants of the Uladivskyi monocotyledon - 35 - 12,5%.

2. Content of forms of nitrogen in root crops of sugar beet hybrids of various origins depending on moisture content,% on dry matter

According to the results of research, the content of phosphorus in sugar beet root crops domestic and foreign selections for harvesting period in variants with 45% of PPV was 0.15-0.16% on dry matter, a total selection of 0.13% on dry matter. With an increase in the level of HPAs up to 60%, phosphorus content increased by 11.1% in Robert G. Sugar beet, 15.8% - Uladovsky perennial 35 and 25% - 28% - in the remaining hybrids. Against the background of 75% of the PPV, the increase in the content of this element was 1.4 - 1.7 times compared to 60% of the alternatives (see Table 1).

Potassium content in the root crops during the harvesting period of sugar beet in varieties with a moisture content of 45% soil moisture in different varieties and hybrids did not differ significantly - 0.73 - 0.81% on dry matter (see Table 1).

Only in the plant root plants of the hybrid KV Zbruch the content of this element inferior to other varieties and hybrids - 0.63% on dry matter. In variants with 60% of PPV content potassium in root crops exceeded the similar indicators in variants with 45% of PPV by 10,5 - 18,2%, and in plants of the hybrid Robert - by 27,7%. At the same time, the potassium content in the root crops of hybrids, the Ukrainian SS-70, Extra and Robert was 0.92 - 1.01% on dry matter, in the hybrid KV Zbruch and the variety Uladovsky perennial 35 it was significantly lower - 0.77 and 0.86% on dry substance. In the variant of 75% of the HPV of the plant of all the studied varieties and hybrids accumulated potassium in the root crops of 1.27 - 1.33% on dry matter, which exceeds the parameters of variants from 60% of PPV by 20.5 - 42.1%.

The results of the studies indicate a linear relationship between the soil moisture regime and the content of the chemical elements of nitrogen, phosphorus and potassium in the root crops of all the studied varieties

and hybrids, as shown in the figure on the example of the joint selection hybrid KV Zbruch ($R^2 = 0.9894$; 09908; 0.8929).

The results of the research determined that the content of sodium and magnesium in the root of beet sugar, depending on the background of moisture during the harvest period was within 0.06 - 0.09 and 0.08 - 0.14% on dry matter, respectively. At the same time, there was a tendency to increase the sodium content for increasing the level of soil moisture (see Table 1).

Conclusions

For increasing the level of total field moisture content of the soil, there is an increase in the content of nitrogen, phosphorus and potassium in the root crops of sugar beets of different selections for the harvesting period, which is characterized by direct correlation dependencies. The largest content of non-protein "harmful" nitrogen accumulated corn grains of varieties and hybrids of sugar beetroot on the background of 75% PPV - 0,40-0,44% on a dry matter that exceeds the parameters of the variant with 45% SPV by 17,5 - 41.0%.

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