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COMPARATIVE CHEMICAL ANALYSIS OF NON-DRUG VARIETIES OF CANNABIS SATIVA L. GROWN IN SALINE SOILS OF THE REGIONS

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СРАВНИТЕЛЬНЫЙ ХИМИЧЕСКИЙ АНАЛИЗ НЕЛЕКАРСТВЕННЫХ СОРТОВ CANNABIS SATIVA L., ВЫРАЩИВАЕМЫХ НА ЗАСОЛЕННЫХ ПОЧВАХ РЕГИОНОВ

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ABSTRACT

Comparative chemical analysis of drug-free varieties of cannabis Sativa L. grown in saline soils of the region is described. It also covers saline soils in our country and ways to combat them. In addition, information on drug-free varieties of Sativa L. is provided. In addition, the comparative chemical analysis of the drug-free varieties of cannabis Sativa L. grown in saline soils is highlighted.

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АННОТАЦИЯ

Приведен сравнительный химический анализ безлекарственных сортов каннабиса Sativa L., выращиваемых на засоленных почвах региона. В нем также рассматриваются засоленные почвы в нашей стране и способы борьбы с ними. Кроме того, представлена информация о разновидностях Sativa L., не содержащих лекарственные препараты. Кроме того, представлен сравнительный химический анализ сортов каннабиса Sativa L., выращенных на засоленных почвах, без применения наркотиков.

Keywords: terpenes in plant varieties, heavy metals, saline soil, Sativa L. grown, covers saline soils.

Ключевые слова: терпены в сортах растений, тяжелые металлы, засоленная почва, выращенная Sativa L., покрывает засоленные почвы.

Introduction

The task of land reclamation is to create a favorable water regime for plants and the associated air, salt and nutrient regimes in order to increase soil fertility. The removal of excess moisture from the soil not only improves thermal and microbiological regimes, but also changes the humidity and temperature conditions of the surface air layer in the area where the waste is removed. Quantitative characteristics of water, salt and air regimes in the soil are determined by the type of crop grown in the area. Zach removal, removal of water from excessively moist soil, increases the amount of air in the soil. This allows it to decompose organic matter and increase soil fertility [1].

Zach removal also changes the physical and chemical properties of the soil, as well as the composition of microorganisms. Dry land reclamation is an anthropogenic factor that leads to the formation of new soils. Dry reclamation is necessary to improve forest growth and tree species composition. Drying is an integral part of peat extraction, which is also used in the open pit mining of other minerals (coal, iron ore, etc.). Drying and drainage works are also necessary for the construction of production facilities, settlements, agricultural and livestock complexes, roads, airfields and others. Zach reclamation works well when used in conjunction with a system of agro-technical, cultural, technical, organizational and operational measures. Zach drainage reclamation changes the process of soil formation and also regulates the microclimate conditions of reclaimed lands in the desired direction. The removal of excess moisture improves the aerobic breakdown of organic matter and the mineral condition of the soil. It also changes the heat, microbiological order and soil temperature of the soil. But along with water, the necessary nutrients can also escape from the soil [2]. Therefore, the humidity should be adjusted. The combination of agro-technical measures will improve the physical condition of the soil and the physical properties of water. In addition, the hydrogeological regime and groundwater level (GS) should be normalized. If the salinity of the GS is higher than normal and it is close to the active layer of the soil, the soil may become saline. Soil moisture and aeration are highly dependent on the depth of the GS near the surface. As the depth of the GS increases, the aeration capacity of the soil also increases. Therefore, the relationship between soil water, air regime, and GS depth is expressed in terms of soil drying rate.

The salinity leaching rate is the amount of water used to make the salt in the soil layer harmless to plants. The washing rate must be precise. If it is understated, the soil will be partially leached of salts. Too much fresh water is used, and the loss of nutrients along with harmful salts reduces soil fertility. The saline leaching process consists of squeezing out the soil solution and draining it downstream. The washing rate is determined by the degree of salinity of the soil, the depth of the washed layer. The initial level of soil salinity depends on its type, mechanical composition, structure, water permeability, depth of groundwater and other parameters. The rate of salt washing is calculated using the formula of VR Volobuyev. The salinity of two types of soil can be calculated using this formula and the table data[3].

$$M=10000\cdot h\cdot a\cdot lg\frac{S_b}{S_{kmb}} \qquad (1)$$

Here, M – salt washing rate, m^3 /;

h– thickness of the washed layer of soil,m;

α – salinity, depending on the chemical and mechanical composition of the washed soil (from 0.62 to 3.30);

Sb – the initial amount of salt in the washed layer of soil (as a percentage by weight);

Skmb – the amount of salt in the soil after washing with saline (as a percentage by weight).

Possible salt content after washing: chloride salinity - 0.2%; sulfate-chloride - 0.3%; sulfate-sodium - 0.4%; sulfate, sodium, calcium - 1.0%.

The rate of salt washing is determined by the following formula[4]:

$$\text{Here, lg}\cdot\left(\frac{dry\ residue-3\%S_b}{k.m.b.salt\ amount\ 0{,}3\ \%S_{kmb}}\right)=\text{lg}10=1 \qquad (2)$$

$$M=10000\cdot 0{,}72\lg\left(\frac{3\%}{0{,}3\%}\right)=7200m^3/ga \qquad (3)$$

This means that if the soil is saline with sulfur chloride, 7200 m^3 of water should be added to the soil to wash it. Irrigation rate is the amount of water needed for one irrigation. Seasonal irrigation is the sum of the amount of water used to irrigate a particular crop during its growth and development. To calculate the irrigation rate, you need to know 3 indicators. These include field moisture capacity (DNS), the lower limit of moisture that a plant can absorb in a soil for a particular crop, and the thickness of the water-saturated layer. Let's look at the calculation for irrigating cotton. For good growth and development of cotton, irrigation should be started at a moisture content of not less than 70% of the field moisture capacity (DNS) of the soil. The difference between the amount of DNS in the soil (100%) and the initial moisture content (70%) is the irrigation rate. Irrigation rates also vary because the DNS in the soil varies depending on their mechanical composition. Irrigation rate is determined by the following formula[5]:

$$m = (A – B) . h + K, \quad (4)$$

here, m– irrigation rate, m^3 / ;

A – average field moisture capacity (DNS) as a percentage (%) of volume corresponding to a given layer of soil;

B – average pre-irrigation moisture in the stratum (70% of DNS);

h – the thickness of the layer of soil to be moistened, cm;

K – the amount of water used for evaporation during irrigation (it is taken at the rate of 5-10% per m), m / ha 3.

Hemp has been grown in Latvia for a long time, mainly for food purposes. Research is currently underway on the use of hemp in the production of pellets for heating purposes. Therefore, they try to reduce the content of heavy metals in hemp to a minimum, so that the metals do not get back into the environment.

Human intervention has resulted in variable variations within species, and some representatives only recognize a species with more selective pressure to reproduce more fibrous plants or THC-containing plants. There is great variability in both species, and there is debate over whether the existing paradigm used to differentiate species adequately reflects the variability that exists within a species. There are five chemotaxonomic types of cannabis: one with high levels of THC, one with fiber and high levels of CBD, one with intermediate levels, one with high levels of cannabigerol (CBG), and the last with almost no cannabinoids [6].

Cannabis oil is obtained from cannabis sativa seeds, which can be used mainly for cooking, lamps, varnishes or paints. They can also be used as bait for caged birds as they provide a source of food for most animals. Flowers and fruits (and small amounts of leaves, stems, and seeds) contain cannabinoids, known as psychoactive chemical compounds, that are consumed for recreational, therapeutic, and spiritual purposes. If used in this way, flower and fruit preparations (called marijuana) and leaves and preparations derived from resin extracts (e.g., hashish) are consumed by smoking, evaporation, and oral administration. Historically, tinctures, teas, and ointments were also common preparations. In traditional medicine, especially Indian C. sativa is a hallucinogen, hypnotic, sedative, analgesic and anti-inflammatory agent.Terpenes have informed the public through medical and recreational cannabis growth and education. Organizations and companies operating in the cannabis markets have intensified the training and marketing of terpenes in their products as a way to differentiate the taste and effects of cannabis. The environmental effect, which characterizes the synergy of cannabinoids, terpenes and other plant compounds, has also helped to further increase the need for terpenes in cannabis products. Depending on the variety and time of year, lettuce usually lives 65-130 days from planting to harvesting. Because it is a flowering lettuce (“a process known as a turmeric”) that remains bitter and unsold, plants that are grown for consumption are rarely allowed to mature[7].

Lettuce flowers bloom faster at hot temperatures, while freezing slows growth and sometimes damages the outer leaves. Once the plants have gone through an edible stage, they form flowers with small yellow flowers up to 1 meter (3 feet 3 inches) in height. Like other members of the tribe, Cichorieae, milkweed inflorescences (as well as , known as flower heads or capitula) are long-stemmed flowers, each with a modified calyx called a pappus (which turns into a hairy “parachute” of the fruit), a five-leafed wreath ligula or ribbon, and reproductive parts. These include combined solutions that form a tube around the anthers a style and double-sided stain. As the anthers shed pollen, the style is elongated, allowing the pollen-covered stigmas to come out of the tube. Ovaries are compressed, dried fruits 3 to 4 mm long, which do not open at the maturity of the ovate (in the form of young drops) [9]. The fruits have 5-7 ribs on each side and are tossed with two rows of tiny white hairs. Pappus remains in the form of a top of each fruit spreading structure. Each fruit has one seed, which can be white, yellow, gray or brown depending on the type of lettuce.

Research methodology

Methods such as induction and deduction, targeted development, systematic and comparative analysis, graphical representation, expert evaluation and economic statistics were widely used in the scientific article to develop a scientifically based conclusion and recommendations based on a comprehensive analysis of the problem raised, systematization of analysis results.

Analysis and results

Field experiments in Uzbekiston were carried out on humus-podzolic gley soil (organic matter content in the soil - 4.8%, pH - 7.3, P2O5 - 83 mg kg -1, K2O - 65 mg kg - 1). Predecessor: summer rapeseed. The hemp was sown on 05/04/2009 and harvested on 09/21/2009. In the spring, before sowing, a complex fertilizer N: P: K was applied - 6:26:30 - 300 kg. 1. The area of one registration plot is 20 m2 in four replicates. Field experiments in Uzbekistan were carried out at the Upitskaya Experimental Station. The predecessor of hemp is winter rye, the soil is soddy podzolic sandy loam (acidity pH - 7.5, organic matter content in the soil - 3.62%, P2O5 - 228 mg kg -1, K2O - 171 mg kg -1) [10].

When the soil reached physical ripeness, cultivation was carried out to a depth of 8 - 10 cm, and then - pre-sowing cultivation by 4 - 5 cm. Sowing method - row-spacing with row spacing of 10 cm. Seeding depth - 3 - 4 cm. Seeding rate - 70 kg ha - 1 seed. The hemp was sown with the SLN-1.6 seeder on 05/05/2014 and harvested on 06/10/2014. The area of one registration plot is 10 m2 in triplicate. The Polish variety 'Bialobrzeskie' (registered in 1968) has been investigated. The content of the fire was determined for the average sample from each variant. Each sample was divided into two parts and dried to 8 - 10% moisture content. Then, from each sample on a balance (accuracy ± 0.001 g), 100 grams of hemp was weighed, from which they separated the fire using a crush on LM-3 and combing. If necessary, grinding was repeated until the amount of fire in the bast did not exceed 10%. The rest of the fire was selected by hand (on a table covered with dark paper). Then the bast was weighed (accuracy ± 0.001 g). The content of bast and fire was calculated using the formulas (Freimanis et al., 1980):

$$C = 100\frac{S}{L} \quad (5)$$

where C - bast content%; S is the mass of hemp stems, g; L is the mass of the bast, g. K = 95 - C, (2) where K is the content of the fire%; C - bast content%. Bast and bonfire content is calculated as the arithmetic mean of four repetitions. The content of chemical elements in the analyzed hemp samples was determined by an optical emission spectrometer of inductively coupled plasma Pernin Elmese Optima 2100 DV. The difference between two repetitions is no more than 5%. The experimental data were mathematically processed by methods of variance and regression analysis.

Conclusion

The hemp fire contained more arsenic and calcium than the entire stem, and less potassium. The content of the heavy metal cadmium has not been determined in hemp. The different concentrations of metals can be explained by the well-developed root system and the rapid growth of cannabis. In the fire of hemp grown in Latvia, there was more As, and Na and Mg - less, in comparison with the fire of hemp grown in Lithuania.

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