CHLOROPHYLL CONTENT TEST IN LEAVES OF *GINKGO BILOBA* L.

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Introduction

Our research is aimed at solving the problem of organic production associated with the mass cultivation of Ginkgo biloba in order to reduce the cost of manufacturing for medicines, which include relict species by extracting raw materials, and to performpharmaco-toxicological studies.

Today, a plantation of the researched species is being planted for growing organic raw materials, for pharmaceutical purposes, and further leaf collection and extraction. The harvested raw materials from leaves and fruits will be used in medicine. It will reduce the dependence of the state on similar imported medicines. The results obtained will be valuable in the forestry sector when creating environmentally friendly breeding sites including the researched species.

The study of the assimilation structure of Ginkgo biloba and, first of all, of chlorophyll pigments (the main photoreceptors of plant cells) is important for analyzing the interaction of a species with environmental conditions and in researching their adaptation to various factors. In plant organisms, chlorophyll content is a sensitive indicator of the intensity of photosynthesis and one of the most important indicators that determine the quantity and quality of a crop, which is particularly important in studying of the effects of various factors influencing plants (Singh S.K., 2002). In recent years, have been formed ideas about the dependence of photosynthesis productivity on different factors, including growing conditions, which can significantly influence the content of chlorophylls and plant functional activity (Sivchev M.V., 1973).

Methods

Therefore, the study of the dynamics of chlorophyll accumulation in leaves of *Ginkgo biloba* under the influence of external factors is of great importance, since its content affects the intensity of photosynthesis and a number of other physiological processes.

The scheme of experiment provided four options:

"I" - ten-year-old Ginkgo biloba trees growing in open ground;

"II" - three-year-old seedlings of the researched species growing in open ground;

"III" - three-year-old seedlings of *Ginkgo biloba* growing in open ground under a shading grid (60%);

"IV" - three-year-old seedlings of the researched plant, which grow in closed soil under controlled conditions.

The content of chlorophyll in the leaves of *Ginkgo biloba* was determined by preparation of a solution in an alcohol extract, followed by study on a ULAB 102 spectrophotometer (Hrytsayenko Z. M. et al., 2003).

Results

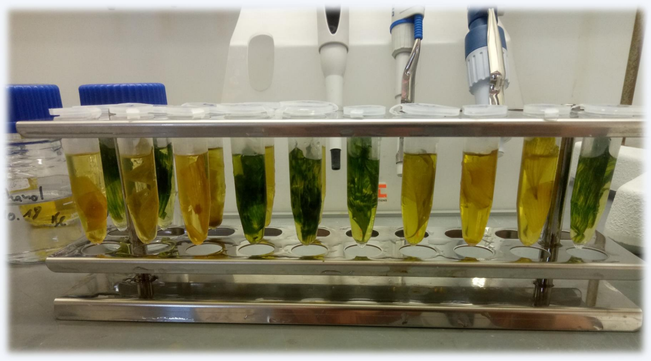
According to calculations of the concentration of chlorophyll pigments "a" it was found that the most important option is "IV" – 26,00 mg/l. Slightly smaller values characterized samples of options II (25,71 mg/l) and I (25,71 mg/l). The lowest value of the concentration of chlorophyll pigments "a" was notedin option "III" - 19.54 mg/l.

The concentration of chlorophyll pigments "b" also varied depending on the growing conditions. Thus, the maximum value was noted in option "II" – 18,22 mg/l. The smallest value was noted in option "I" - 13.36 mg / l. In options "III" and "IV" pigment concentrations ranged from 14,44 to 16,80 mg/l.

The concentration of chlorophylls "a" and "b" in the plant material Ginkgo biloba ranged from 33,56 to 43,26 mg/l. In particular, the indicator had the highest value in option "II" and the least significant value was noted in option "III". In option "IV" the concentration of chlorophylls "a" and "b" was 42,10 mg/l, and in option "I" – 37,52 mg/l.

Depending on the place of *Ginkgo biloba* growth, the content of chlorophyll "a" in the leaves varied: "IV" – 0,87 mg/g, "II" – 0,86 mg/g, "I" – 0,83 mg/g, "III" – 0,65 mg/g.

The content of chlorophyll "b" also varied, but had a slightly different tendency. Thus, the highest value of the indicator was acquired in option "II" – 0,61 mg/g. In options "IV" and "III" the content of chlorophyll "b" was 0,56 and 0,48 mg/g, respectively. The lowest content of chlorophyll "b" was noted in option "I" – 0,45 mg/g.



Picture 1: Studies on the content of chlorophyll in the leaves of *GINKGO BILOBA* L.

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Discussion

Our research has the global importance because:

1. Economic effect. As the leaves will be harvested and processed in Ukraine, the price of the medicines that include the Ginkgo biloba leaf extract will be much lower, which will be positive for people who need it. Excess of raw materials can be imported. During the first years after plantation creation (even before the beginning of its operation), it is necessary to actually produce 103-301 kg of fallen leaves per 1 ha, the cost of which in the dry form will be about 73 thousand UAH. Approximate yield of green leaf mass in the first year of operation from 1 ha (second to fourth year after creation) - 1845 kg of fresh, or 370 kg of dried leaves;

2. Ecological effect. The created plantation will help to improve the oxygen balance around the surrounding areas.

3. Forestry effect. In the future, after a series of studies, Ginkgo biloba can be used as a forest forming species.

In the spring of 2017, the Ginkgo biloba plantation for cultivation of organic raw materials for pharmaceutical purposes with an area of about 1,5 hectares was laid down by the laboratory of modern technologies for growing ornamental plants of Sumy NAU.

It is known that the organic matter of plants is formed in the process of photosynthesis. Under the influence of solar energy, this process is mainly carried out in the leaves, and it is possible only if there is chlorophyll in the leaves, which is capable of transforming light energy into thermal energy (Kayumov M.K., 1989).

Picture 2: seedlings *GINKGO BILOBA* L.

Conclusion

According to the results of the research, it has been found that the highest content of chlorophylls "a" and "b" was in the leaves of plants in option "II" – 1,44 mg/g. The plants in option "IV" were characterized by slightly smaller values– 1,40 mg/g. In option "I" the content of chlorophylls was 1,25 mg/g, and the lowest content of chlorophylls was noted in plants in option "III" – 1,12 mg/g.

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