



## TEST-INDICATORS OF *LEPIDIUM SATIVUM* L. SEEDLINGS UNDER THE INFLUENCE OF MICELLAR WATER

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The use of plants to determine the toxicity of the environment (phytotesting) is widely used in ecological research. In particular, the test-plant sensitive to toxicants is garden cress (*Lepidium sativum* L.). Test-indicators of sensitive plants are the level of seed germination, the value of mass, and the size of seedlings. Today is known, that surfactants are dangerous pollutants. Thus, the synthetic surfactant is poloxamer 124, which together with other organic compounds is part of cosmetics, in particular micellar water. Therefore, this work aimed to study the biometric parameters of garden cress under the influence of cosmetic solutions of micellar water.

The seeds of the test plant (*L. sativum*) 10 pieces were placed on filter paper moistened with distilled water (control) or a suitable aqueous solution of micellar water (experiment). The experiment was repeated three times. Investigated available in the retail network of Ukraine means for removing makeup and cleansing the skin micellar water, which contained (according to the manufacturer): aqua, PEG-40 hydrogenated castor oil, glycerin, *Prunus (Amygdalus) dulcis* oil, panthenol, sorbitol, decyl glucoside, glyceryl glucoside, poloxamer 124, propylene glycol, disodium cocoyl glutamate, sodium chloride, trisodium EDTA, polyquaternium-10, 1,2-hexanediol, citric acid, sodium acetate, phenoxyethanol. The investigated concentrations of the micellar water were 6.25 %, 12.5 %, 25.0 %, 50.0 % and 100 %. Seed germination energy (3rd day), seed germination, and biometric-morphometric parameters (length of roots and aboveground part of seedlings) (5th day) were determined. The phytotoxic effect and the toxicity index of the solutions were calculated. The results were processed statistically using Excel 2010, determining: arithmetic mean and arithmetic mean error; the significance of differences according to Student's t-test.

It was found that the germination rates of garden cress seeds and biometric indicators of seedlings significantly decrease with the increasing concentration of the studied micellar water. Thus, germination energy and seed germination decreased by 14–100 %. At the same time, when watering the seeds of *L. sativum* with a solution with the maximum investigated concentration (100 %), it did not germinate. The length of the aboveground part of garden cress seedlings was determined only for the control and the variant with a concentration of micellar water of 6.25 % (it was 2 times significantly less than in the control) because at other higher concentrations the aboveground part of the seedlings was absent. There was a statistically significant decrease in the length of the roots compared to the control: 1.2 times (6.25 %), 1.6 times (12.5 %), 2.6 times (25.0 %), 3.3 times (50 %). The phytotoxic effect ranged from 49.6 to 100 %. It is established that the value of the total toxicity index of solutions is from 0.55 (6.25 %) to 0 (100 %), indicating an increase in the toxicity of the solution with increasing concentration.

Thus, garden cress *L. sativum* was a sensitive plant to the studied cosmetic. The obtained data confirm the high efficiency of this test plant for use in biotesting. As this cosmetic is used in small quantities and is significantly diluted with water when it enters the sewer system, its toxic effects are likely to be small or non-existent.

**Keywords:** *Lepidium sativum*, micellar water, phytotesting.