

## STRESZCZENIE

### **Effect of lignite substrate and chosen agrotechnical factors on growth, yield and fruit quality of greenhouse cucumber in hydroponic cultivation**

The cucumber (*Cucumis sativus* L.) is a very popular and economically important vegetable in Poland and around the world. In intensive production of vegetables under covers, hydroponic cultivation technology in rockwool substrate is most commonly used, but alternative biodegradable substrates are constantly being investigated. In the present study, an evaluation of the effect of lignite substrate and chosen cultivation factors, such as LED (*Light Emitting Diode*) lighting, substrate reuse and high EC of nutrient solution, on morphological, physiological parameters, yield and fruit quality of greenhouse cucumber in hydroponic cultivation was undertaken. The effect of this production technology on post-harvest quality of greenhouse cucumber fruit and their storability was also evaluated. Four research hypotheses were undertaken: (I) The use of biodegradable lignite substrate in hydroponic cucumber cultivation, as an alternative to mineral wool, affects the yield and quality of cucumber fruit, (II) The re-use of lignite mats does not adversely affect plant growth, yield and fruit quality of greenhouse cucumber, while reducing undesirable environmental effects, (III) LED assimilation lighting positively affects the growth and yield and quality of cucumber fruits in hydroponic cultivation with lignite as a solid substrate, (IV) Hydroponic cultivation technology with lignite-based organic substrate and LED assimilation lighting, affects the post-harvest quality of greenhouse cucumber fruits and prolongs their storability.

The study was carried out in 2019-2023. The cucumber cultivation technology using a lignite substrate together with assimilation supplementary lighting with LED lamps influenced, among other things, an increase in cucumber fruit content of  $\beta$ -carotene, lutein, chlorophyll *a* and *b*, total soluble solids (TSS), a decrease in nitrate content, as well as higher hardness and lower water loss during simulated fruit turnover compared to cultivation in a mineral substrate with HPS (*High Pressure Sodium*) lamp irradiation.

The results obtained confirmed the research hypotheses. This represents an important addition to the development of knowledge in the field of a hydroponic cultivation technology in solid media with assimilation lighting.

*Keywords:* soilless cultivation, organic substrate, assimilative lighting, EC, gas exchange, chlorophyll fluorescence, secondary metabolites, sensory quality