

## SUMMARY

### **Evaluation of Secondary Cell Wall Constituents and *in-vitro* analysis of mutant *Capsicum annuum* plants.**

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*Capsicum annuum* is a world-wide known and consumed plant. In Hungary bell pepper is important vegetable in traditional cuisine and feeding as well. It is efficient to provide more fruits. Horticulture is a dynamic and a quickly changing sector which needs new ideas, plant materials, and cultivating methods to produce more. The application of mutant traits to breeding lines has become a common method since mutant plants may present some unique properties. that can be useful to create new cultivating methods and breeding lines.

The *pcx* (procumbent) and *tti* (tuortous)pepper is a mutant breeding line from the huge mutant collection of Hungarian pepper breeder Csilléry Gábor. It presents a laying, vine-like growth habit. The laying, procumbent growth-habit might occur because lignin deficiency or any error that might occur the light- or the gravity sensing-reacting process. Understanding the background of this mutant phenotype might help us preparing our own laying plants to use them in different cultivation methods. In this experiment, the mutant plants' reaction to light and gravity were evaluated in *in vitro* culture in comparison to the control line 'Fehérözön'. The results proved that all the plants sensed and reacted to light growing into its direction. In completely dark environment the control plants still reacted to gravitational pull and started to grow upwards while the *pcx* plants show a random hypocotyl growth, the *tti* plants sensed the gravity but the stem structure was too weak to keep the stems upwards. In all experiments, the roots started to grow in the direction of the gravity. The *pcx* plants were categorized into three groups. *pcx* 1, 3, 4, 5, 6, 10 belonged to the first group, *pcx* 2 belonged to the second group and *pcx* 7, 8, 9 belonged to the third group. The first group contains the *pcx* plants which did not present any abnormal stem growth. The second group contains those plants, which has a slight bending at the beginning, but they start to grow upwards after a while. In the third group we added the plants which were not

affected by the gravity at all. This result was further backed by a graph which was obtained by analyzing the images using ImageJ image analyzing software and the graph plotted using Ms Excel.

The lignin content of the hypocotyls was checked using Phloroglucinol-Hydrochloric Acid solution which immediately stains the lignified tissues of the plants. The *pcx* hypocotyl contains less lignin in this early phase as compared to the *titi* and the control. The *titi* plants also have lower lignin content compared to the control. It was therefore recommended that the experiments be further studied by making an analytical measurement of the lignin content of the hypocotyls and fully grown stems as well. To also come to a concrete conclusion on the cause of the growth habit of the plants, the genome of the mutants could be sequenced and analyzed. This will help to identify the probable genes responsible for this trait.