Effect of Overexpression of Phospholipid: Diacylglycerol Acyltransferase (PDAT) on Arabidopsis Growth

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Phospholipid: diacylglycerol acyltransferase catalyse an acyl-CoA-independent synthesis of TAG. Enzyme utilises phospholipids as acyl donors and diacylglycerols as an acyl acceptor. In Arabidopsis plants, gene encoding PDAT is expressed not only in the seeds, were triacylglycerols are accumulated, but also in leaves and roots were these lipids appear as a very minor fraction.

In the presented study seeds of *A. thaliana* (cv. Columbia) expressing an At5g13640 gene (encoding Arabidopsis PDAT) under the control of a 35S promoter were germinated on agar (contained 1/3 MS, 1% sucrose and in some experiments kanamycin) or in soil and the growth rate of seedlings/plants were compared with the control ones.

Seedlings from seeds germinated in the presence of kanamycin were smaller than corresponding control ones germinated on agar without the antibiotic. When both transformed and not transformed seeds were germinated without the presence of kanamycin, the transformed plants growth much faster than the control ones. When the transformed seedlings geminated in the presence of kanamycin were transferred to the medium without this antibiotic, or to the soil, these plants surpassed the control plants in growth after 3 – 4 weeks. In the greenhouse experiments, germination of transformed seeds were also faster than the control ones. After 2 month growth dry weight of transformed plants was about 16% bigger than control plants and the amount of produced seeds *per* plant was also about 16% higher. However, only small increase in lipid content *per* mg seeds were observed. One hypothesis to the faster growth is that PDAT has high activity towards oxygenated fatty acids and thereby alleviates some of the negative impact of oxygen stress on plant development.