Biochemical characteristic of acyl-CoA:lysophospholipid acyltransferases (LPLATs) and their role in remodeling of phospholipids during development of *Camelina sativa*

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Remodeling process of phospholipids occur in many organism including plants, animals and microorganisms, however, it still remains insufficiently understood. One of the enzymes involve in this process are acyl-CoA:lysophospholipids acyltransferases (LPLATs). Due to their ability to conduct forward and reverse type reaction, they play significant role in exchanging fatty acids between acyl-CoA pool and phospholipids and in this way contribute to the production and remodeling of membrane and storage lipids. In forward reaction, LPLATs can utilize a broad spectrum of lysophospholipids and acyl-CoA, leading to production phospholipids, whereas in reverse reaction they transfer fatty acids from phospholipids to cytosolic acyl-CoA. LPLAT enzymes are divided according to their substrate specificity toward lysophospholipids e.g. LPCATs are enzymes exhibit the highest activity toward lysophosphatidylcholine, and lead to phosphatidylcholine production.

Until now, the LPLATs enzymes have not been studied in *Camelina sativa* (false flax), which is an oil crop used not only for food production but also in industry. Nowadays, false flax arouses growing interest due to its unique nutritional value and agronomic properties, and by its genetic similarity to model species *Arabidopsis thaliana* it becomes important subject of research.

The main goal of my study was to investigate biochemical properties and role of LPLATs in remodeling of phospholipids in *C. sativa* seeds. First step of work focused on determination the composition of fatty acids in *C. sativa* seeds and analysis the content of individual lipid classes and their composition. Lipids analysis have been performed for seeds from different stages of seed development. The second step was determination of biochemical properties of each analyzed enzyme in microsomal fraction isolated from seeds, at different stages of development. This research project assumed optimization of parameters such as: time, temperature, pH, amount of microsomes, positional specificity and different concentration of magnesium, calcium and potassium ions. After biochemical characterization, the activity and substrate specific in forward and reverse reaction have been established. Based on all obtained results it was possible to set the potential role of tested enzymes in phospholipids remodeling (relative time of complete exchange of acyl groups and amount of exchanged fatty acids in given phospholipids). As a first, analysis focused on LPCATs enzymes, in future work LPAAT and LPEAT type of enzymes (produce phosphatidic acid and phosphatidylethanolamine, respectively) will be analyzed.

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