EXPLORING AND HARNESING THE POLYPLOIDY INDUCED DIVERSITY TO IMPROVE THE LIPID PRODUCTION AMONG THE TISSUE CULTURE BASED PHENOTYPES OF ARABIDOPSIS THALIANA SP.

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INTRODUCTION:
Biofuels are one of the most trending topics in the field of scientific research and debate. It is quite evident because we need to meet our growing demands for energy consumptions. Biomasses from Arabidopsis sp. holds promises in increasing biofuel production once treated with autoploidy variations. For the first time we are trying to establish cell culture suspension lines using plant tissue culture. These diploid plants are supposed to be over expressing the GDP gene (the gene responsible for lipid production).

HYPOTHESIS: We are willing to observe an increase in the lipid productivity in Arabidopsis thaliana plants by studying autoploidy levels and thereby observing the over expression of the GDP (GPS1 geranyl diphosphate synthase 1) gene.

OBJECTIVES:
Before treatment:
- To establish cell suspension cultures for the leaf explants of Arabidopsis.
- Extraction and estimation of biochemical characterization of the oil.
- Gene expression studies by Q-PCR using SybR green.

Yet to be done:
- To induce polyploidy using colchicine treatment.
- To screen and confirm the polyploidy traits using phenotypic and cytogenetic studies.
- RNA extraction from treated cell suspension biomass.

METHODOLOGIES:
- Growth and culture of Arabidopsis: Seeds were surface sterilized and implanted on suitable media for callus induction. Suitable callus clones were transferred into suspension culture, which was later implanted to shoot and root generation mediums subsequently.
- Lipid efficiency percentage

RESULTS:
Culture of Arabidopsis: Proper establishment of Arabidopsis plants through seeds and plant leaves was carried out.
Lipid efficiency percentage: The total lipid content from about 200mg plant extracts were estimated, in which on and average of three readings the lipid efficiency percentage was found to be 3.25%.

OUTCOME: The project is aimed for inducing polyploidy among the Arabidopsis sp. explants and to screen for increased levels of lipid and biomass production. To confirm efficient results additional gene expression and extraction studies will be carried out.

FUTURE WORK:
Till now we established proper plant tissue cultures of Arabidopsis thaliana and found the total lipid content of samples that were not treated with colchicine.
In the near future we are going to treat callus cultures with colchicine in order to check either up-regulation or down-regulation of the GDP gene which will help us to infer the change in lipid productivity levels.

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