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Enzymes: Molecular Evolution, Biochemistry and Biotechnology

1. Novel lipids for green manufacturing industries: exploring the fatty acid biosynthesis capabilities of S-adenosyl-methionine (SAM)-dependant fatty acid synthase enzymes.

SAM-dependant fatty acid synthase enzymes act on a number of lipid substrates to produce unusual modified fatty acids, which have applications as “green” alternatives to petrochemical feedstocks for manufacturing industries. Potential projects can be tailored to suit individual requirements, but might involve:

A. Directed evolution of the E.coli cyclopropyl fatty acid synthase enzyme to explore the catalytic limits of SAM-dependant fatty acid synthase enzymes.

B. Exploration of the transgenic production of unusual fatty acids and enzymatic activity of novel SAM-dependant methyltransferase enzymes in yeast and/or plant cells, and in vitro assays.