PROJECT SUMMARY

Instructions:
The summary is limited to 250 words. The names and affiliated organizations of all Project Directors/Principal Investigators (PD/PI) should be listed in addition to the title of the project. The summary should be a self-contained, specific description of the activity to be undertaken and should focus on: overall project goal(s) and supporting objectives; plans to accomplish project goal(s); and relevance of the project to the goals of the program. The importance of a concise, informative Project Summary cannot be overemphasized.

Title: Seed-Based Lipase And Phospholipase Production For Enzymatic Biodiesel

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CO-PD: PD/PI 7 Name (Last, First, MI)	**Institution:**

The manufacture of large volumes of inexpensive enzymes for the production of biodiesel provides a market opportunity for the plant production system. Biodiesel predominantly is commercially manufactured through treatment of feedstock oil or fat with alcohols and chemical catalysts such as sodium hydroxide. Although this method works, it can be commercially profitable only when the feedstock oils are inexpensive, less than 2% free fatty acids (FFA), very low in phospholipids. Used cooking oils are high in FFA and phospholipids and these compounds must be removed prior to making biodiesel. Using enzymes for manufacture of biodiesel resolves these contamination issues, increasing yield and lowering unit operations. Lipase and phospholipase are the preferred biodiesel synthetic enzymes and are too expensive today for widespread use. We hypothesize that lipase and phospholipase can be expressed at high enough levels in the corn bio-production system to make them cost-effective for enzymatic biodiesel manufacture. The Phase I objective is to determine the potential success of maize expression of the enzymes through transient expression of their genes in maize tissues. The specific tasks to accomplish this objective are: 1) Synthesize enzyme genes with the first 40 amino acid codons optimized for maize. 2) Target each gene to embryo and endosperm, and to 3 subcellular locations. 3) Do transient expression in maize tissues to choose constructs for stably transforming into corn. 4) Develop assays for each of the enzymes. Facilitating biodiesel manufacture using enzymes will promote better quality biofuel and lower environmental impact of the process.

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