

Idaho Incubation Fund Program

Bi-Annual Progress Report Form

Proposal No. IF13-005 (grant number) (UI grant #BF2889)
Name: B. Brian He
Name of Institution: University of Idaho
Project Title: Advancing glycerol conversion technology for commercialization for sustainable biodiesel industry

Information to be reported in your progress report is as follows:

1. Provide a summary of project goals/ milestones for the period just completed, accomplishments for the period just completed, and plans and goals for the coming quarter:

The project milestones as set in the proposal are:

Task 1. Implementation of heterogeneous powder catalyst in continuous-flow reactor system (07/2012 – 03/2013)

Task 2. Evaluation of multiple-catalyst system (07/2012 – 03/2013)

Task 3. Process Analysis and Conceptual Design (03/2013 – 06/2013)

The goal of this project is to realize the glycerin conversion using heterogeneous catalysts in a continuous-flow system. We are actively conducting experiments to achieve the objectives as set in Tasks 1 and 2 and progresses are made. Task 1 is currently slightly behind the schedule. The reason for the delay is that we found out that the powder catalyst in slurry form is difficult to be implemented in a tubular reactor for continuous-mode operation. Special internal structure for holding the catalyst is under consideration. Meanwhile, a shaped nickel catalyst that is prepared with special procedures is a targeted alternative. We have purchased a pelletized nickel catalyst from the BASF Company for this purpose. To ensure the similar effectiveness of this pelletized catalyst as compared to the powder slurry catalyst, an evaluation on the activity of the pelletized catalyst and process efficiency (i.e., product yield and selectivity) is now being performed in a batch reactor system.

Task 2 is actively conducted by Dr. Randy Maglinao at the Bio-Energy Center of Montana State University-Northern (MSUN). Experiments in evaluating the multi-catalyst system for the hydro-thermochemical processing of glycerol are on-going and progressive results are obtained. The task was slightly delayed because of the renovation of the Wet Chemistry Laboratory in February, when the continuous-flow reactor system had to be disassembled. The reactor was re-assembled and commissioned completely in March. Conduction of the experiments as specified in Task 2 is now on-going.

Task 3, the process analysis and conceptual process design, is started. As the experiments in Tasks 1 & 2 are completed and the results analyzed, a conceptual process design will be performed.

Starting from January 2013, a graduate research assistant was recruited and on board to conduct the project experimental activities. After the Spring 2013 semester, we have been focusing on the project and the activities are on-going in a full mode. We are confident that we will accomplish the tasks on time as scheduled for project.

2. Provide a summary of budget expenditures for the period just completed:

The major costs in this project are the research assistantship for the graduate research assistant (GRA) and the PI's summer salary. The GRA was started to be paid from early February. Fund has been encumbered to pay the GRA from May 13 through June 22, 2013, approximately \$2,220 plus fringe benefits of approx. \$200. Summer salary and fringe benefits of 150 hours for the PI are encumbered for the pay period of May 13 through June 15, totaling approx. \$9,900. One undergraduate research assistant (URA) is also recruited for the project from May 13 through June 22. The salary encumbered for the URA is \$2,880. Therefore, the total fund for salary and fringe benefits encumbered through June 22, 2013 is approx. \$15,200. With approx. \$5,230 paid for the GRA from early Feb through May 11, the total expenditure on salaries and fringe benefits will be approx. \$20,430, or 94% of the request by June 22, 2013.

The PI and the GRA took a trip (May 21-24, 2013) to the Bio-Energy Center of Montana State University-Northern (MSUN), the collaborator's site on project activities as scheduled. The total expense on this travel is estimated \$1,600, roughly on the travel budget as requested.

Among the request for operating expenses (OE), \$18,000 was requested for the collaborator (as explained below) and approx. \$4,000 for activities on UI campus. Currently, a balance of \$640 left in the OE, or approx. 84% of the proposed OE has been spent/ encumbered.

The collaborator at the MSU-Northern Bio-Energy Center has spent a total of \$2,500 during December 2012 to April 2013 on project activities of testing services for using the continuous-flow reactor system and analytical services of using GC/MS and corresponding supplies. As to date, the accumulative expense from the collaborator is approx. \$6,500 or 36% of the requested funds. As more experiments and testing are on-going, more spending is expected in May and June of 2013.

3. List patents, copyrights, plant variety protection certificates received or pending:

Invention patent: US patent application: A 61,609,971. March 11, 2013. Catalytic Conversion of Glycerol to Alcohols. Inventors: Brian He, Randy Maglinao.

4. List invention disclosures, patent, copyright and PVP applications filed, technology licenses/options signed, start-up businesses created, and industry involvement:

n/a.

5. Include funding burn rate:

The spending rate (including that of encumbered) is approximately 64% of the total \$50,000 project funding as of early May 2013.

The portion of the unspent is mainly the un-reimbursed expenditure from the collaborator, which is approx. \$11,500, or 64% of the subcontract.

The burn rate for the funds allocated to the activities (including that of encumbered) on UI campus is currently 79%.

6. Any other pertinent information:

n/a.