

Idaho Incubation Fund Program

Final Report Form (submitted June 30, 2012)

Proposal No.	IF11-012
Name:	Erik R. Coats, P.E., Ph.D.
Name of Institution:	University of Idaho
Project Title:	Constructing a Pilot-scale Bioplastic Production Facility

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

1. Provide a summary of overall project accomplishments to include goals/milestones met, any barriers encountered, and how the barriers were overcome:

Accomplishments relative to our scope of work are detailed below.

Task 1 – Pilot System Design. The goal of this task will be to complete the engineering design of the mobile 3-stage PHA production system.

Outcome: the system design was completed.

Task 2 – Pilot System Construction. With the design completed and the funds secured, we will proceed to procure the necessary materials and construct the PHA production system.

Outcome: All materials have been procured for the project. System construction is nearly complete. The only barrier encountered was the reality of leveraging this project to educate graduate students on real engineering design (a time consuming process, but being a university it is imperative that we leverage such projects to that end); the educational process ultimately delayed final construction. Construction will be completed Summer 2012.

Task 3 – Pilot System Startup Testing and Operation. Extended testing of the mobile pilot unit will be required to troubleshoot operations and stabilize the processes.

As noted above, system construction is not quite complete. However, the system will be placed in operation in summer 2012. Further, and perhaps more importantly, we have already leveraged this project to secure funding from the Idaho Dairymen, wherein this pilot scale unit will be used to test our technology at a full-scale dairy in SE Idaho.

2. Describe the current state of the technology and related product/service:

We have advanced our lab-scale research to further refine operational criteria for our PHA technology. Recent investigations have further ensured critical linkages to and within anaerobic digestion, which is a technology currently employed at some dairies to process manure. Deployment and testing of the pilot scale system constructed under this project is the final step in proving the economic and technical viability of our technology.

3. List the number of faculty and student participants as a result of funding:

Drs. Erik R. Coats (civil engineering) and Armando McDonald (bioproducts) participated on the project, while Nick Guho (civil engineering Ph.D. student led the project design). We also leveraged the time and skills of Don Parks (civil engineering technician) to help with system

construction. Note that this SBOE funding was not used to support Drs. Coats or McDonald, nor Don Parks – thus, significant matching funding was intrinsically provided by UI.

4. What are the potential economic benefits:

Idaho is 3rd in dairy production nationally. The Idaho dairy industry continues to grow and has a significant impact on Idaho's economy. Based on data from the United Dairymen of Idaho: (i) In 2008, on-farm (Idaho) cash receipts from milk amounted to \$2.1B, ranking it as the largest single sector in the state's agriculture industry; and (ii) Idaho dairies employ >29,000 people.

As Idaho dairies look to a sustainable future, they face two economic challenges: i) their product is perishable and profit margins are small, and ii) they are under increasing pressure to more effectively manage manure. Our technology that generates high-value products from manure will ultimately construct a more stable economic foundation for dairies, thereby enhancing the sustainability of this critical Idaho industry. Specifically, a preliminary economic assessment of our PHA production process estimates that a 2,000 head dairy could generate a net profit of \$0.25-0.50/cow/day. This revenue would be significant (currently milk sales generate \$0.50-0.60/cow/day). Further, the milk and forage (corn) markets can be quite volatile. Our process would yield an enhanced and more stable economic portfolio for dairies.

5. Description of future plans for project continuation or expansion:

As noted above, we have leveraged the SBOE funding that facilitated construction of this pilot scale unit to secure additional funding from the Idaho Dairymen's Association; this additional funding will be used to refine process operational criteria and to assess the pilot system at a full-scale commercial dairy in SE Idaho. We have also secured three years of funding from USDA to further investigate the process. Funding of this SBOE project was most certainly helpful in securing the additional funding, as it demonstrated a commitment to the technology.

6. Please provide a final expenditure report (attached) and include any comments here:

See attached report.

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

We continue to work closely with the UI office of technology transfer to address IP issues.

8. Any other pertinent information:

none

FINAL EXPENDITURE REPORT

A. FACULTY AND STAFF		
Name/Title	\$ Amount Requested	Actual \$ Spent
	0	0
B. VISITING PROFESSORS		
Name/Title	\$ Amount Requested	Actual \$ Spent
	0	0
C. POST DOCTORAL ASSOCIATES/OTHER PROFESSIONALS		
Name/Title	\$ Amount Requested	Actual \$ Spent
	0	0
D. GRADUATE/UNDERGRADUATE STUDENTS		
Name/Title	\$ Amount Requested	Actual \$ Spent
Nick Guho (PhD student); Ben Carleton, Ben Watson, Eric Hughes (undergraduates)	0	10,825
E. FRINGE BENEFITS		
Rate of Fringe (%)	\$ Amount Requested	Actual \$ Spent
Nick Guho (PhD student); Ben Carleton, Ben Watson, Eric Hughes (undergraduates)	0	1,083
PERSONNEL SUBTOTAL:	0	11,908
F. EQUIPMENT: (List each item with a cost in excess of \$1000)		
Item/Description	\$ Amount Requested	Actual \$ Spent
1.Pilot scale materials and supplies		34,292
2.Enclosed trailer for pilot scale unit		3,800
EQUIPMENT SUBTOTAL:	50,000	38,092
G. TRAVEL		
Description	\$ Amount Requested	Actual \$ Spent
TRAVEL SUBTOTAL:	0	0

H. PARTICIPANT SUPPORT COSTS:		
Description	\$ Amount Requested	Actual \$ Spent
PARTICIPANT SUPPORT COSTS SUBTOTAL:	0	0
I. OTHER DIRECT COSTS:		
Description	\$ Amount Requested	Actual \$ Spent
OTHER DIRECT COSTS SUBTOTAL:	0	0
TOTAL COSTS (Add Subtotals):	50,000	50,000
TOTAL AMOUNT REQUESTED:		50,000
TOTAL AMOUNT SPENT:		50,000