

Wood Materials Engineering Laboratory

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V(A). Planned Program (Summary)

1. Name of the Planned Program

Wood Materials Engineering Laboratory

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
511	New and Improved Non-Food Products and Processes			100%	
	Total			100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2007	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	5.7	0.0
Actual	0.0	0.0	2.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	11564	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	84481	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	163653	0

V(D). Planned Program (Activity)**1. Brief description of the Activity**

For the past 12 months, several aspects of processing and application development of biopolyesters (PLA and PHAs) were investigated. We studied effects of processing methods on mechanical and physical properties of wood/PHA composites, including injection molding and extrusion. Reinforcing and toughening mechanisms of PLA using rigid inorganic filler were further elucidated. Effect of bamboo fiber-induced crystallization of PHBV on mechanical properties and effects of the added nucleating agent on the fiber induced crystallization and mechanical properties of the composites were investigated.

Reinforcing PHBV with cellulose nanowhisker was also investigated. The research results from this project were presented at professional conferences. Three invited oral presentations were given at: 1. ACS symposium on polymers from Renewable Resources, 234th ACS National Meeting, Boston, Aug, 19-23, 2007 2. 9th International Conference on Wood Biofiber Plastic Composites, Madison, WI, May 21-23, 2007; 3. The symposium on Biomedical/Biorelated Materials at the AAAS Pacific Division conference; ACS Northwest regional meeting, Boise, ID, June 1-21, 2007. A general oral presentation at the International Symposium on Polymers and the Environment: Emerging Technology and Science, the 2007 BioEnvironmental Polymer Society Annual Meeting, Vancouver, WA, October 17-20, 2007. An invited seminar was given at the USDA Eastern Regional Research Center, Wyndmoor, PA, May 25, 2007.

2. Brief description of the target audience

The target audience for this program will be the forest products industry, composite industry, and packaging materials industry.

V(E). Planned Program (Outputs)**1. Standard output measures****Target for the number of persons (contacts) reached through direct and indirect contact methods**

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	0	0	0	0
2007	100	500	0	0

2. Number of Patent Applications Submitted (Standard Research Output)**Patent Applications Submitted**

Year	Target
Plan:	0
2007:	0

Patents listed**3. Publications (Standard General Output Measure)****Number of Peer Reviewed Publications**

	Extension	Research	Total
Plan			
2007	0	3	3

V(F). State Defined Outputs**Output Target****Output #1****Output Measure**

Peer Reviewed journal Articles

Year	Target	Actual
2007	3	3

V(G). State Defined Outcomes

O No.	Outcome Name
1	Methods to improve the compatibility of natural fiber and biopolyesters and melt strength of biocomposites, knowledge of composition-morphology-property relationships of composites
2	Microcellular foaming extrusion process design and processing optimization of biocomposites; characterization of composition-morphology-property relationships of microcellular foam
3	Product application development of microcellular foaming technology of biocomposites

Outcome #1

1. Outcome Measures

Not reporting on this Outcome for this Annual Report

2. Associated Institution Types

3a. Outcome Type:

3b. Quantitative Outcome

Year	Quantitative Target	Actual
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3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
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V(H). Planned Program (External Factors)

External factors which affected outcomes

Public Policy changes
Government Regulations

Brief Explanation

Cellulose and starch are the two most abundant plant polymers extensively available in the United States. Utilization of these polymers or their derivatives for materials results in direct energy saving and environmental benefit. Favorable governmental regulations such as the federal procurement of biobased products boost the research and development interest from both academic institutions and industry. This project addresses the research need in the national biomass technologies roadmap for the development of alternatives to petroleum-based chemicals, polymers, plastics, and synthetic fibers. According to this roadmap, production of chemicals and materials from biomass will need to increase from 5% of the production of target US chemical commodities in 2001, to 18% in 2020, and to 25% in 2030. The proposed research is directly responsive to one National Research Initiative priority in Biobased Products and Bioenergy Production Research, which calls for innovative non-food uses of biomass for the sustainable production of industrial products. This project is also aligned with the current NRI and USDA strategic planning in enhancing economic opportunities for agricultural producers and protecting the nation,s environment.

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

Before-After (before and after program)
During (during program)

Evaluation Results

Key Items of Evaluation