

**COMPOSITES OF COTTON NON-WOVENS AND
SUCROSE-BASED EPOXIES**

**Navzer D. Sachinvala, David L. Winsor, Christopher
Hemming**

**Hawaii Agriculture Research Center at SRRC-USDA-
ARS**

New Orleans, LA

**D. V. Parikh, Eugene J. Blanchard, Noelle R.
Bertoniere**

and Timothy A. Calamari

**Southern Regional Research Center, USDA-ARS
New Orleans, LA**

Abstract

Recyclable non-woven cellulose can be used as a filler in moldable and thermoset plastics. Depending upon the degree of cellulose loading, composites become light in weight, inexpensive to produce, and degradable in the environment. Traditional sources of cellulose for filler use include waste cotton, flax, jute, wood-pulp, and bagasse and other agricultural wastes. Cellulose cannot be used in load bearing plastic composites because the following incompatibilities: (1) The moduli of plastics and cellulose contrast. While plastics are visco-elastic substances of low moduli, the fibrous structure of cellulose makes it a high modulus material. (2) Attraction among cellulose fibers is high and the filler tends to agglomerate in the plastic matrix. Therefore, cellulose filled polymers are neither load bearing nor adhesive. To transcend these problems, we will show that cellulose can be easily epoxidized and the products wet and bind aluminum, ceramic, glass, and steel. Furthermore, when bisphenol-A-based and sucrose-based epoxies are incorporated into non-woven fabrics in the presence of flexibilizers, and wetting and curing agents, the resultant materials fasten dissimilar surfaces. Light weight needlepunched nonwoven fabric (1:1 recycled bleached cotton fines/greige mechanically cleaned cotton on cellulose scrim) made at SRRC was used in the above procedure.