

EVALUATION OF SELECT BLENDS OF COTTON BYPRODUCTS IN THE MANUFACTURE OF BIODEGRADABLE PACKAGING MATERIAL

G. A. Holt
J. D. Wanjura
M. G. Pelletier
USDA-ARS
Lubbock, TX
G. McIntyre
D. Flagg
E. Bayer
Ecovative Design, LLC
Green Island, NY

Abstract

Polystyrene is one of the most widely used plastics in the manufacture of packaging materials. Extruded polystyrene foam is commonly sold under the trademark name of StyrofoamTM. Polystyrene packaging is a multibillion dollar a year industry. Since polystyrene is non-biodegradable, a biodegradable material that is eco-friendly is being sought as a substitute for packaging consumers. Ecovative Design, LLC has developed a process whereby they can produce an eco-friendly packaging product known as EcoCradleTM. The objective of this research was to develop and evaluate various blends of cotton gin byproducts (i.e. burs) as a substrate in Ecovative's process. Tests were conducted to evaluate six cotton waste blends to prescribed standards. Evaluations were conducted on samples produced using a single fungal species, *Ganoderma resinaceum*, using two inoculation methods, grain and agar. Properties evaluated included: density, strength (compressive and tensile), dimensional stability, modulus of elasticity, sterilization efficacy, colonization rate, thermal conductivity, flame retardance, and accelerated aging. Results revealed blends that were superior or equal to ASTM standards and polystyrene. One of the higher performing blends was used to launch EcoCradleTM with two Fortune 500 companies during the summer of 2010.