

## **CNF Composite and Polymer Film Laminates for Food Service Media: Let's Make Better Paper Straws**

### **Research Proposal/Description:**

Cellulose nanofiber (CNF) coatings can reduce oxygen and moisture transport through packaging materials. CNF composites have shown potential for forming axially durable free-standing films. However, due to the hydrophilic nature of CN, using CNF films directly in application areas of food service for media such as biodegradable disposable straws, cup lids, and service cutlery, CNF and composites primarily composed of CNF fail to meet the desired properties. To address this, combining CNF/CNF-composite films with biodegradable thin films (PBS, PBSA, PLA, etc.) could provide a means to successfully develop fully or almost fully biodegradable single-use food service media. Such combinations would synergize the structure and properties of CNF composites with the improved permeability of flexible polymer films. If such a composite material/device is successfully developed, it could be used to replace current biodegradable options for straws (i.e., the expensive paper straws that are not popular).

### **Objectives:**

Assist researchers in formulating CNF based “paper” composite substrates and combine/laminate with biodegradable flexible films

### **Targeted Media:**

Beverage straws

### **Evaluation Methods (not limited to):**

Test water absorption (ASTM Cobb test), crosshatch tests, structural testing (tensile and compression), thermal cycling structural tests.

### **Research Goals:**

Develop a functional food service media and prepare data for peer reviewed publication.

### **Practical Question:** Why do this research?

**Practical Answer:** Everyone dislikes paper straws. Why not make a better option???