Yiqi Yang
PhD

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Education

- Undergraduate and MS
  - Textile Chemistry/Chemical Engineering
  - Donghua University, Shanghai
- PhD
  - Textile Science-Biotechnology Emphasis
  - Purdue University

Career Path

- Assist Prof of Textile Science-UIUC
- Assoc/Full Prof of Textile Chemical Engineering-ITT
- Senior Res. Specialist of Growth Tech-Monsanto Company
- Full Prof and Director-Department of Chemical, Energy and Environment-ITT
- Full Prof of Textile Science-Univ. of Nebraska-Lincoln

My Interests in Research

Greener and More Sustainable Materials

Major Focuses

- New fibers and Chemicals from Agricultural By-Products
  - Stover, straw, husk
  - Distiller's grain
  - Feathers
- Reuse of textiles and chemicals
  - Used clothing and carpets

CREDITS (TOP TO BOTTOM): GERRY ALLEN; HANDOUT/REUTERS/CORBIS; Y. YANG

<< AGRI-COUTURE

More than half of the 67 million tons of textile fibers produced annually are petroleum-based synthetics. But with rocketing oil prices, agricultural byproducts are gaining attention as natural fiber sources, scientists reported last week at the American Chemical Society meeting in San Francisco, California.

Textile scientist Yiqi Yang of the University of Nebraska, Lincoln, said he has gotten fibers from rice straw that are "long and fine enough for textiles but still very strong." Using alkali and enzymes, he and student Narendra Reddy extracted finger-length fibers that they say rival linen and cotton in flexibility and strength. Adding cotton, they spun a yarn and wove it into rice/cotton fabric. Yang estimates that 58 million tons of textile fiber could be produced from half of the 580 million tons of waste rice straw grown each year. Brian George, a textile engineer at Philadelphia University in Pennsylvania, says the relative stiffness of such fibers makes them hard to work with unless they are blended with cotton or flax, but that the idea seems economically viable if the fibers "can be processed on standard textile equipment."

Yang says rice-straw fibers are stronger than those from cornhusks, which he managed to make a sweater out of a few years ago. His next project is to get spinnable fibers from chicken feathers, whose honeycomb structure, he says, could potentially make for textiles lighter and warmer than wool.

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Of rice and hen: Fashions from the farm

SAN FRANCISCO, Sept. 11 — In the future, it might be perfectly normal to wear suits and dresses made of chicken feathers or rice straw. But don't worry: These clothes won't resemble fluffy plumage or hairy door mats. Scientists at the University of Nebraska – Lincoln plan to develop these agricultural waste products into conventional-looking fabrics as a way to reduce the use of petroleum-based synthetic fabrics.

The feather-based fabric will resemble wool, while the rice straw fabric will look and feel more like linen or cotton, according to the researchers. The study describing rice straw fabric was presented today at the 232nd national meeting of the American Chemical Society. The study about chicken feather fabric will be presented on Wednesday, Sept. 13. Both fabrics are still in early development and may not reach the consumer market for several years, the researchers say.

"We hope that the research reported here will stimulate interest in using agricultural byproducts as textile fibers, which would add value to agricultural crops and also make the fiber industry more sustainable," says Yiqi Yang, Ph.D., a professor of textile science at the university. His collaborator for both studies is research scientist Narendra Reddy, a doctoral candidate at the school.

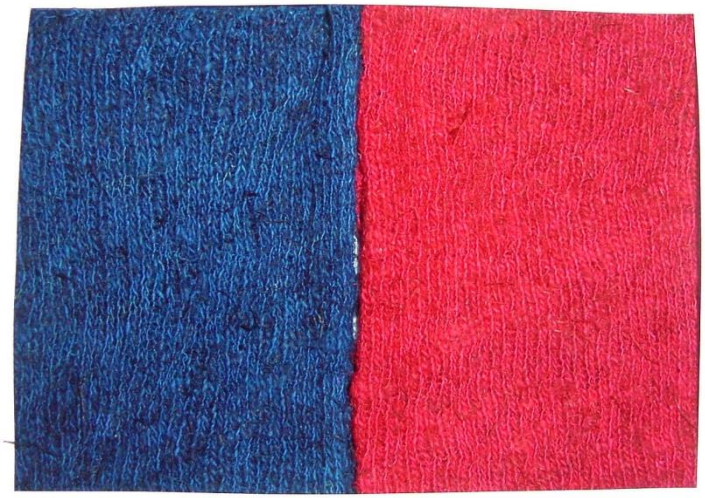
With millions of tons of chicken feathers and rice straw available worldwide each year, these agricultural wastes represent an abundant, cheap and renewable alternative to petroleum-based synthetic fibers, Yang says. And unlike petroleum-based fibers, these agro-fibers are biodegradable. The development could be a boon to the nation's rice and chicken farmers, Yang says.

Rice fabrics are the most developed of the two fabric concepts to date. Rice straw consists of the stems of the rice plant that are left over after rice grains are harvested. Like cotton and linen, rice straw is composed mostly of cellulose.

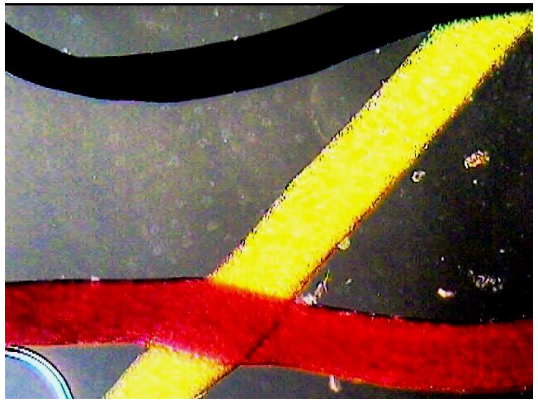
– more –

Textiles from Agricultural Byproducts

Cornhusk Fabric

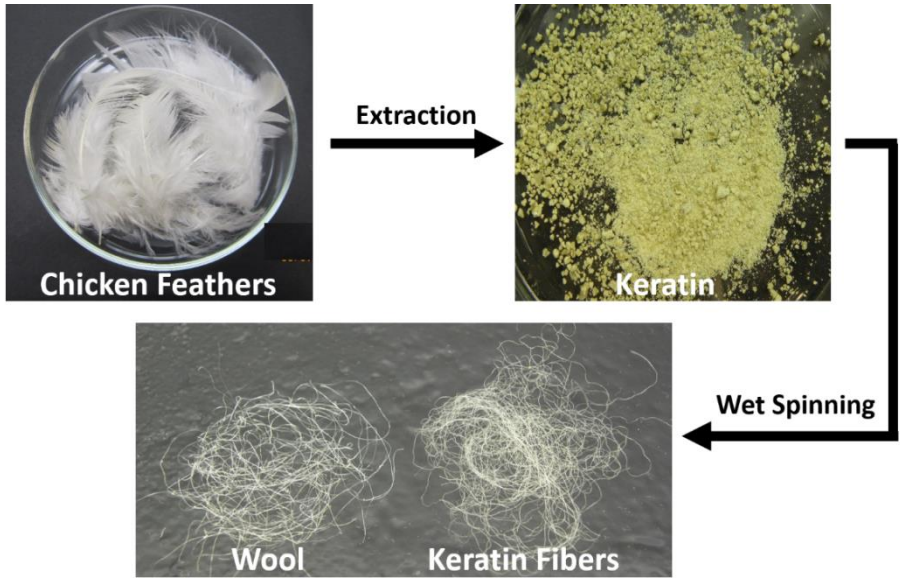


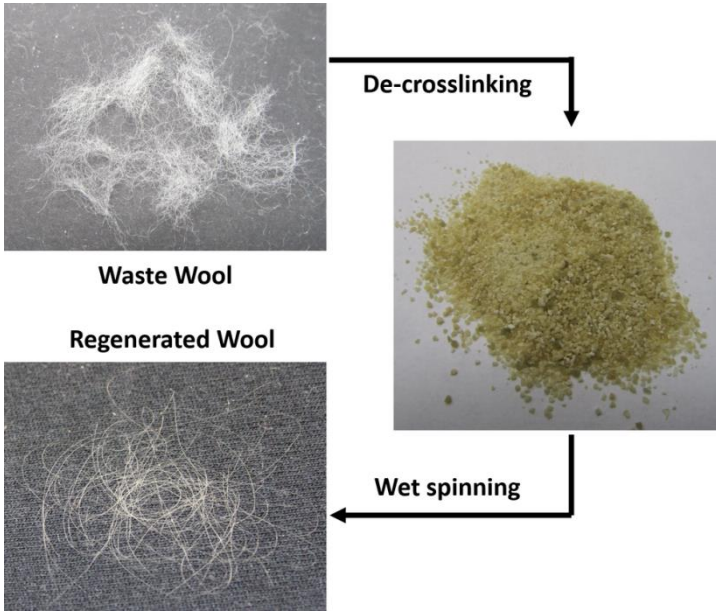
Rice straw Fabric



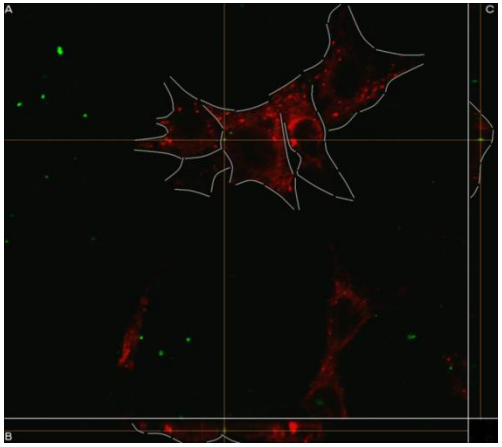
Wheat Gluten Fiber

Textiles from Agricultural Byproducts

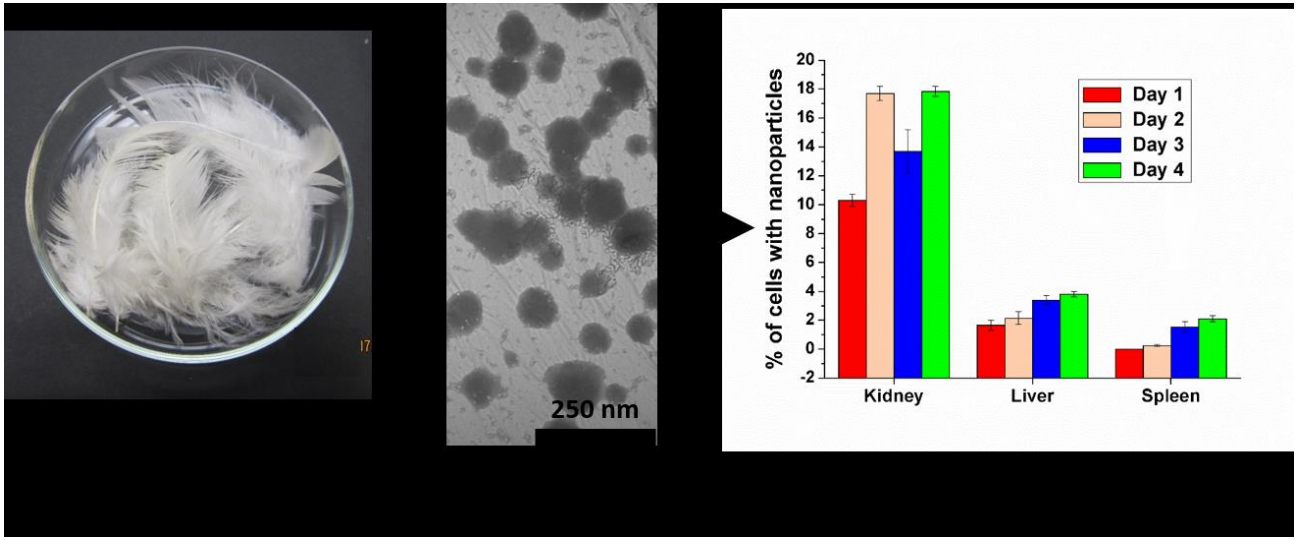




Biopolymers for Medical Applications



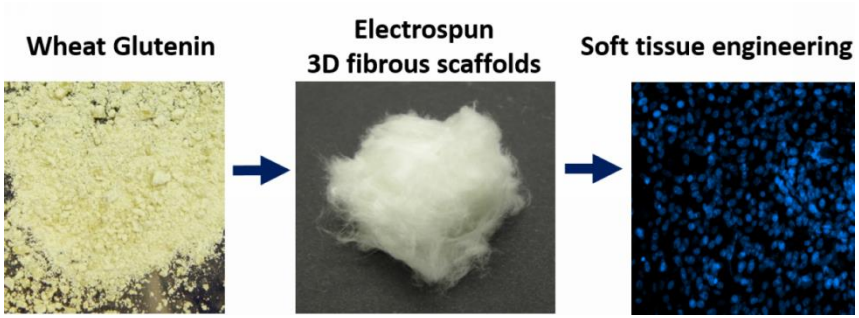
Penetration of zein (70nm) into cells

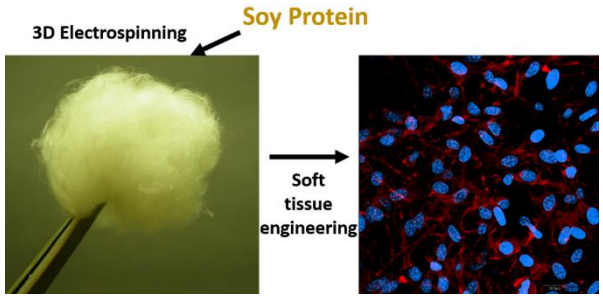


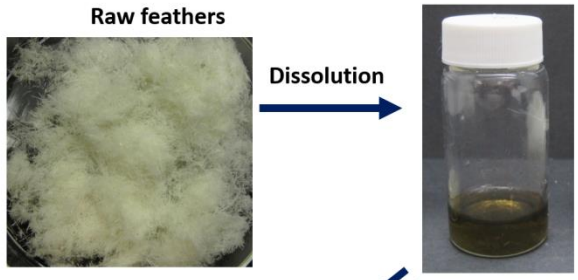
Penetration of nanoparticles from feather into various organs

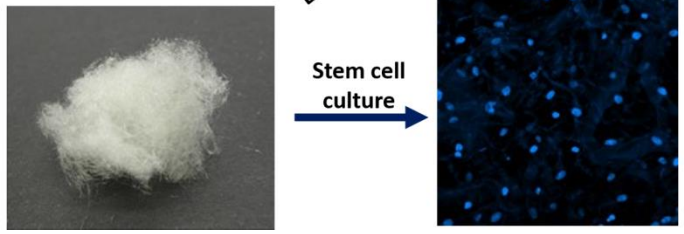
Biopolymers for Medical Applications

Water-stable three-dimensional ultrafine fibrous scaffolds mimicking the native extracellular matrices of soft tissues have been developed from various proteins without external crosslinking.

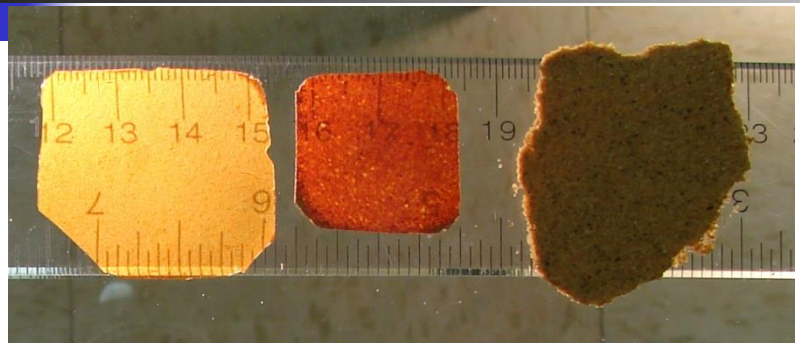




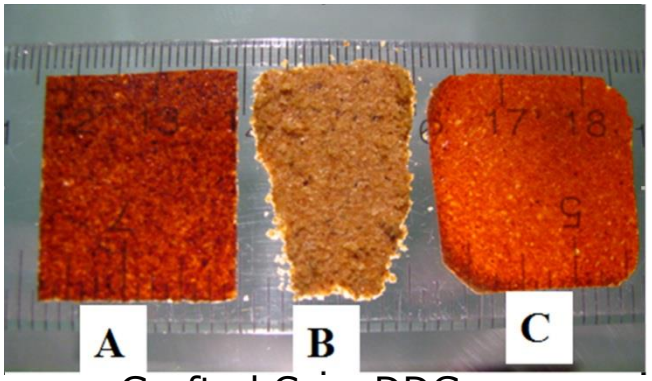




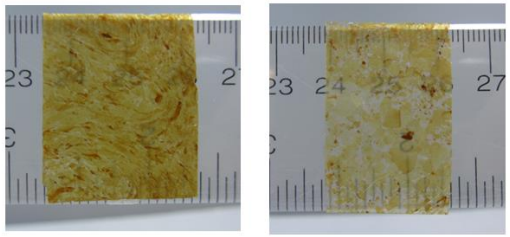
Biothermoplastics



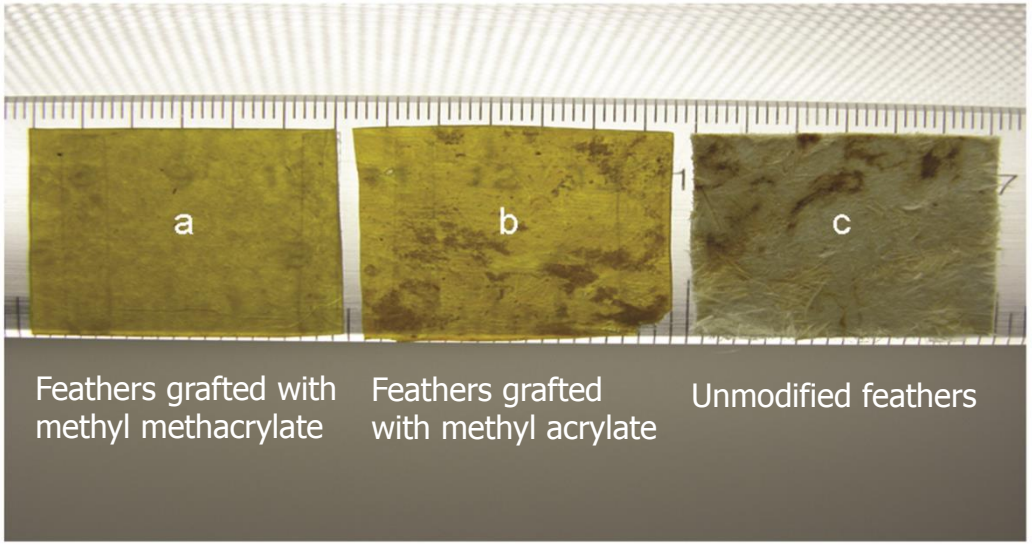
Acetylated Corn DDG



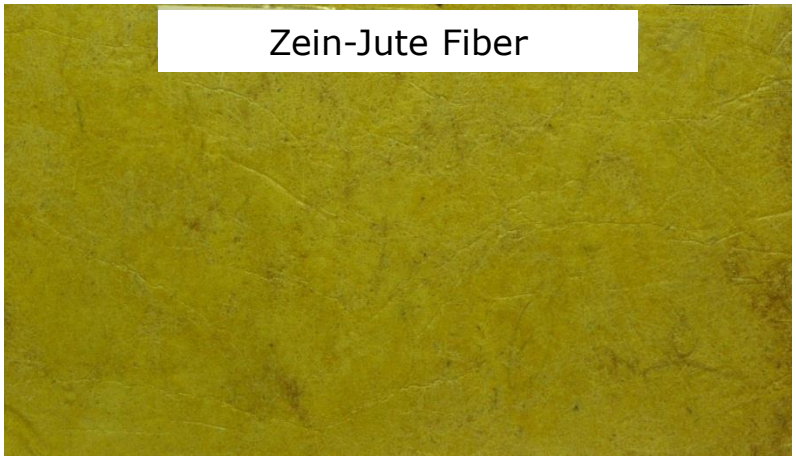
Grafted Corn DDG

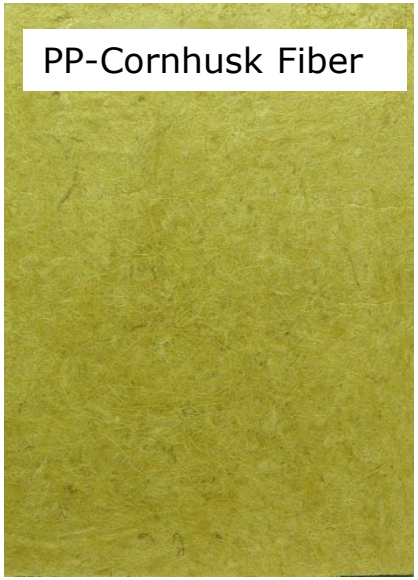


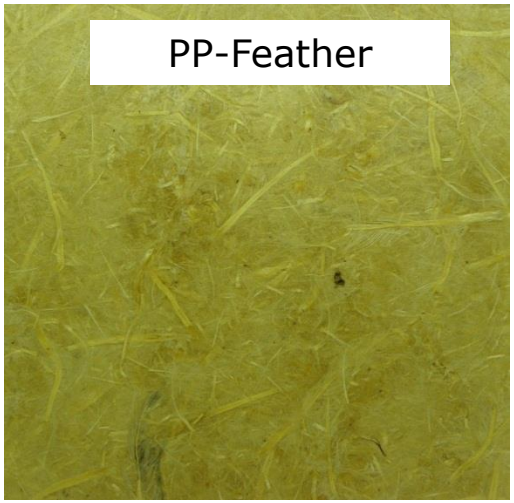
Grafted Soyprotein

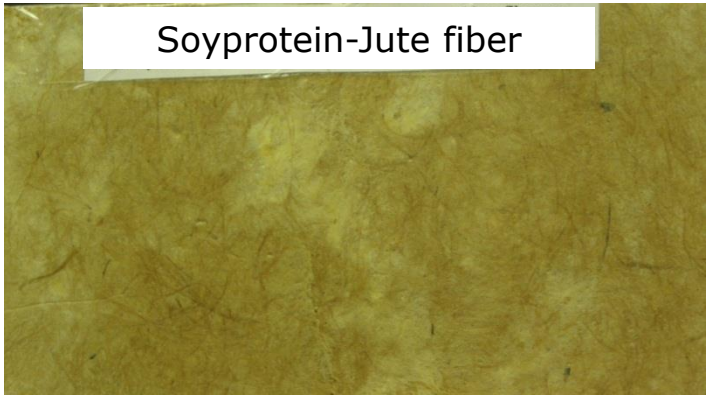


Biopolymers for Composites









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Impact

- Develop sustainable fiber/material industries
- Decrease the cost of biofuel production
- Increase jobs in agricultural industry
- Add value to agricultural by-products