



POLITECNICO
MILANO 1863

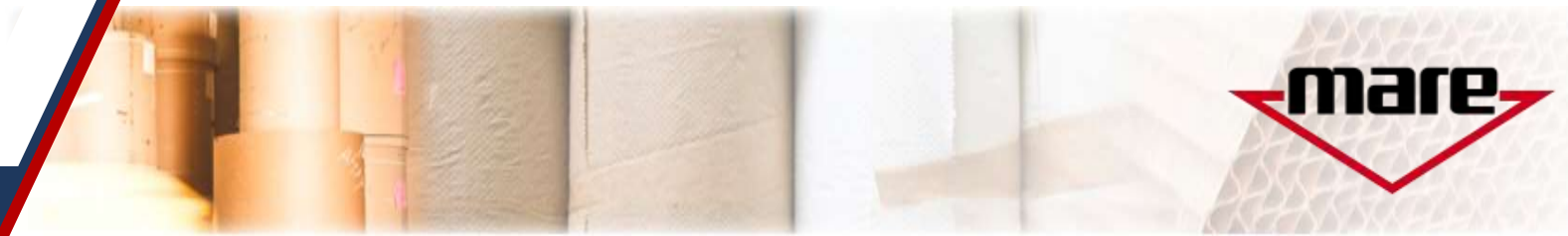
DIPARTIMENTO DI CHIMICA
MATERIALI E INGEGNERIA CHIMICA
GIULIO NATTA

Carlo Punta

Dalla Chimica Verde ai Materiali Funzionali: Innovazione Sostenibile per l'Industria

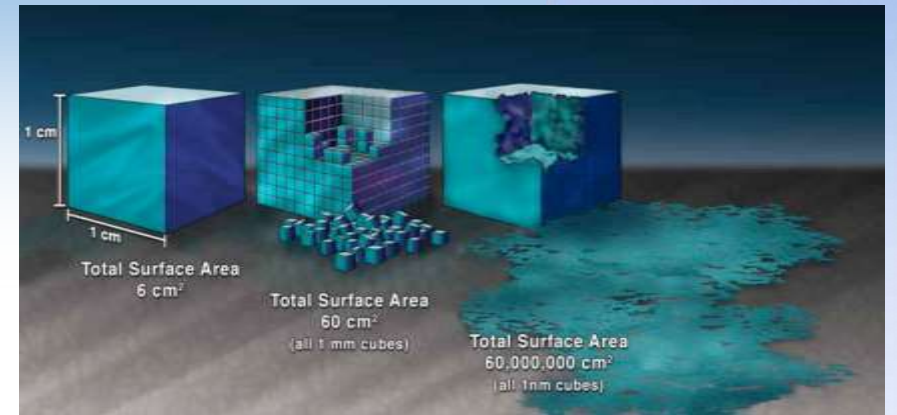


Emanuele Viganò





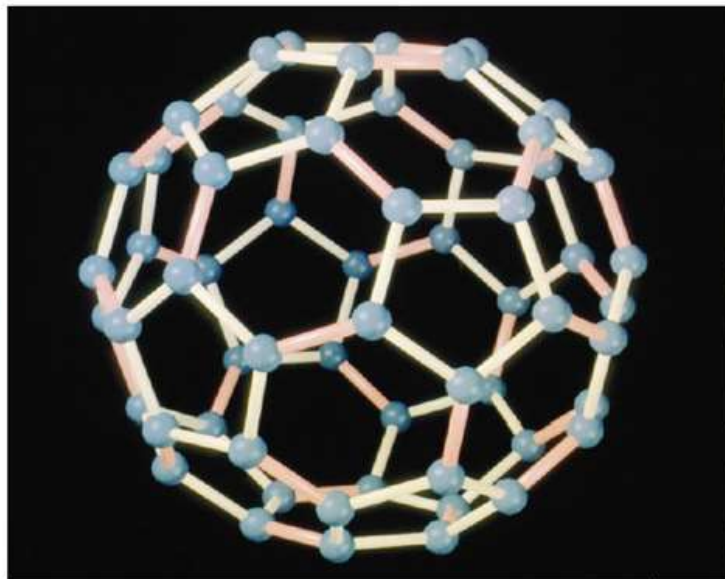
Una via verde ai nanomateriali?



news feature

A little knowledge...

Nanotechnology is set to be the next campaign focus for environmental groups. Can scientists avoid the mistakes made over genetically modified food, and secure public trust for their research? Geoff Brumfiel investigates.



Tiny fears: environmentalists are worried about the safety of nanoparticles such as carbon 'buckyballs'. SPL

Zurutuza & Marinelli, 2014 *Nature Nanotech*

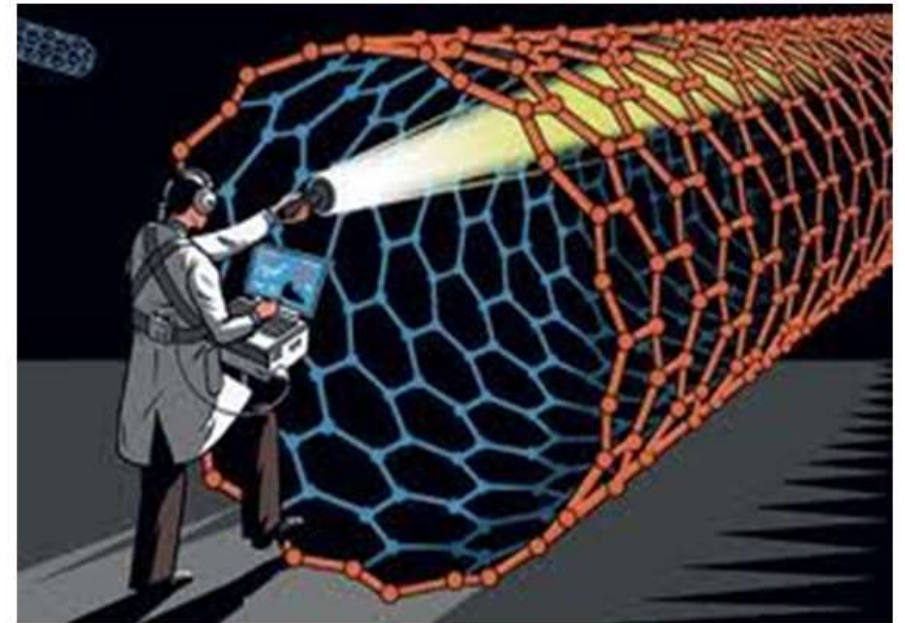
NATURE NANOTECHNOLOGY

news & views

The unusual properties of tiny particles contain huge promise. But nobody knows how safe they are. And too few people are trying to find out

A little risky business

The Economist





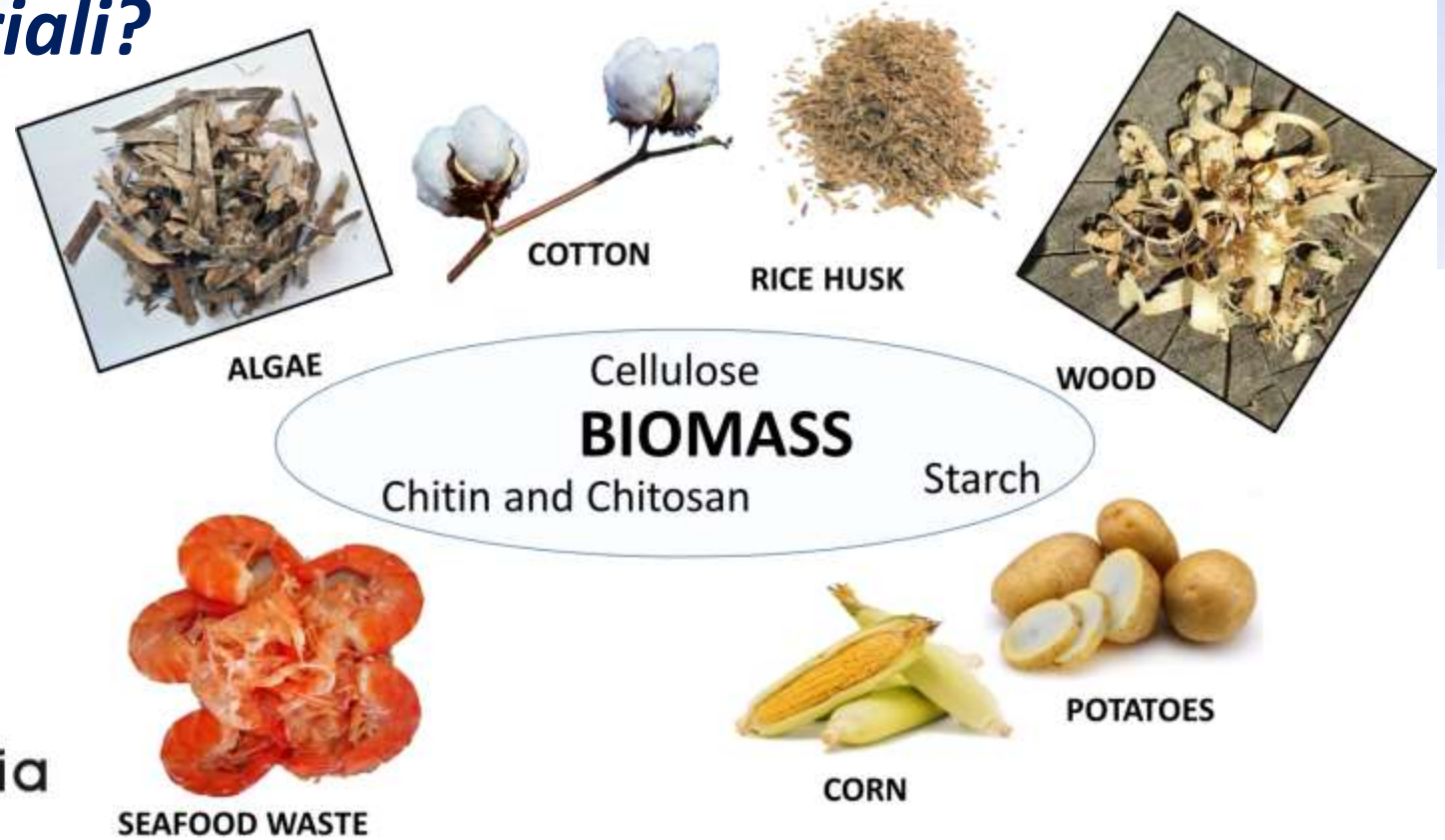
Una via verde ai nanomateriali?





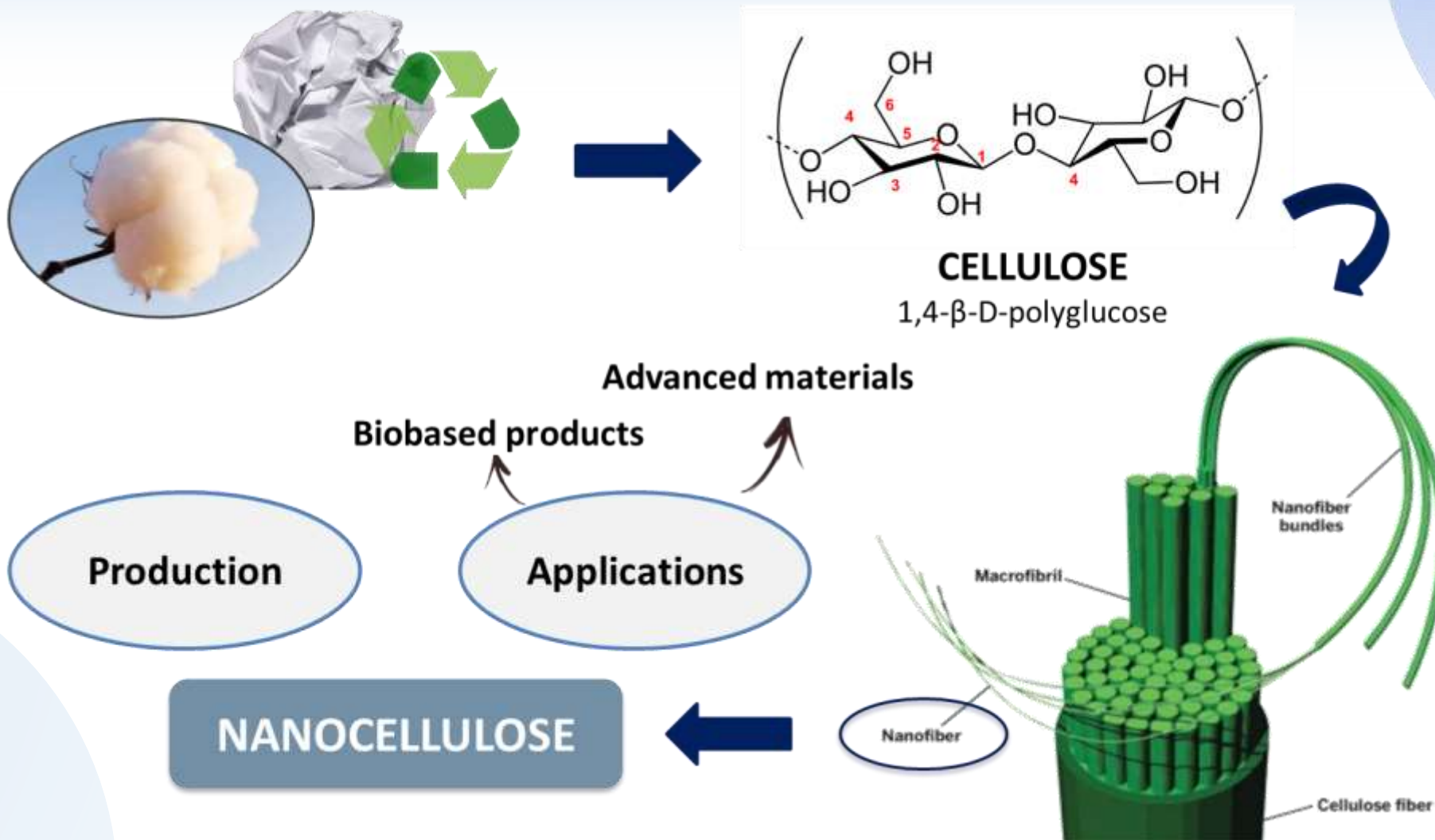
Una via verde ai nanomateriali?

- FONTI RINNOVABILI
- SOSTENIBILITA'
- VALORIZZAZIONE DEL RIFIUTO
- CIRCULAR ECONOMY



Italiadomani
PIANO NAZIONALE DI RIPRESA E RESILIENZA







Biobased Materials

Fertilizers & Pesticides Delivery

Paper applications

Catalysis

Automotive

Sensing



Biomedical

Nanoremediation



Packaging

Fitodrugs

Cosmetics

Paint industry

Building industry

Antibacterial materials

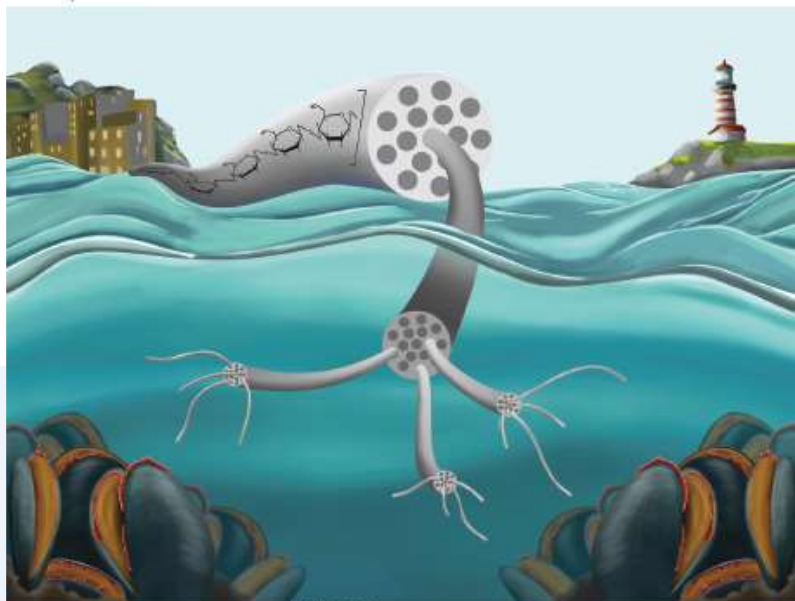


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Environmental Science Nano

rsc.li/es-nano



ISSN 2051-8153

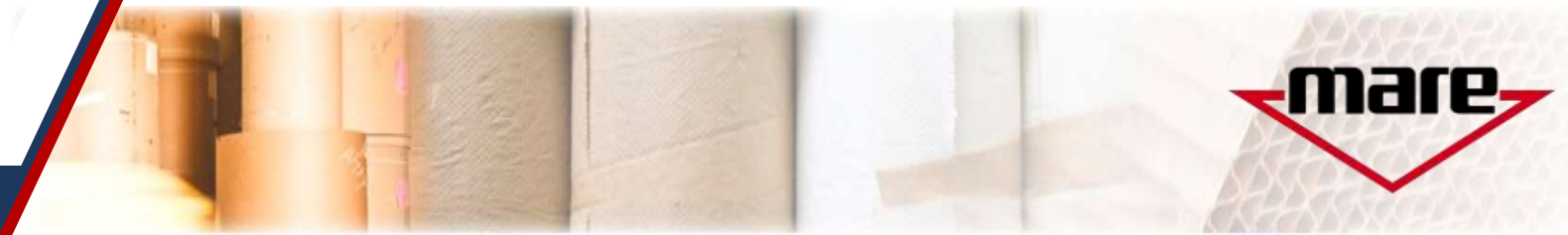


PAPER
Taina Corsi et al.
Environmental safety of nanocellulose: an acute in vivo study
with marine mussels *Mytilus galloprovincialis*



INNOVHUB
STAZIONI SPERIMENTALI
PER L'INDUSTRIA

innovazione e ricerca



Perché la Nanocellulosa nella carta?



È TUTTA CARTA?



MONOMATERIALE



Perché la Nanocellulosa nella carta?

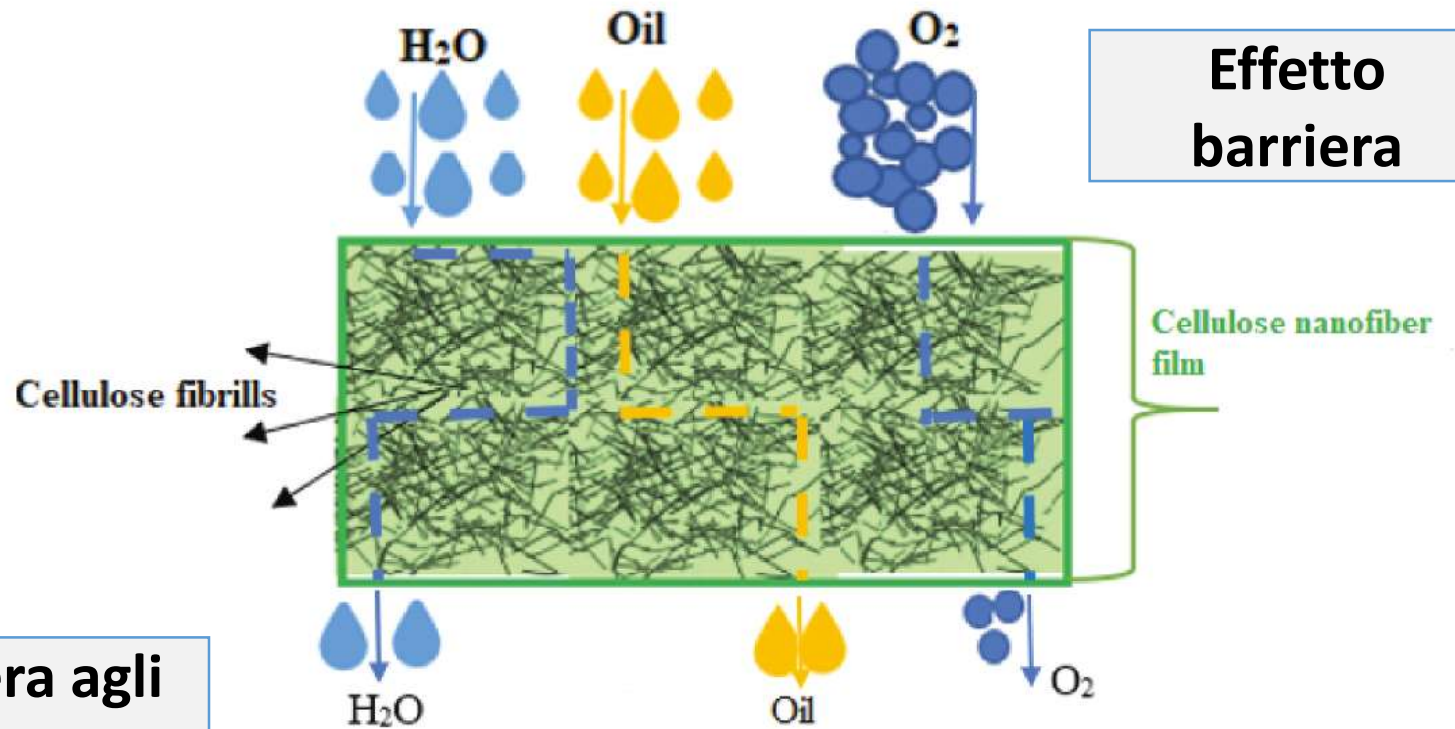
Nanocellulosa
in bulk

Agente rinforzante la resistenza in umido e a secco

Nanocellulosa come
principale componente per
la produzione di film
barriera o attivi

Effetto
barriera

Azione
antimicrobica



Packaging
Attivo

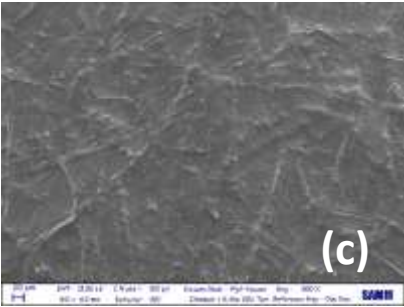
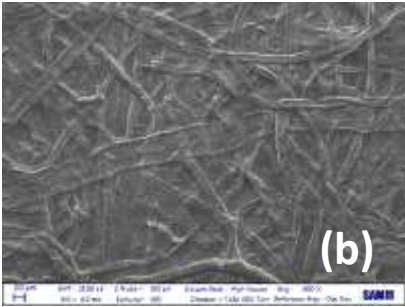
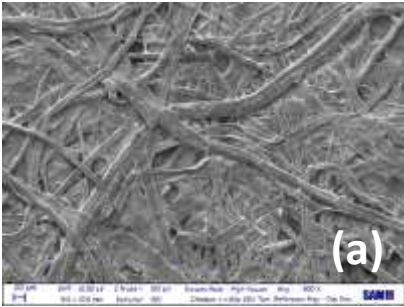
Barriera agli
UV

Journal of Natural Fibers, 2022, DOI: 10.1080/15440478.2022.2146830

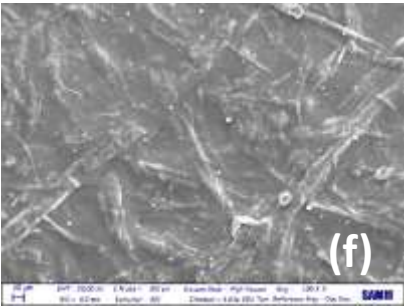
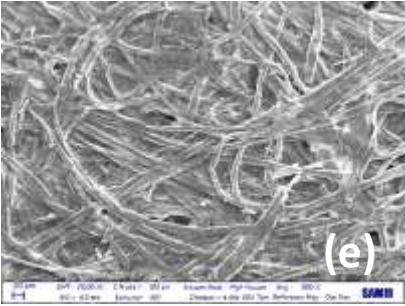
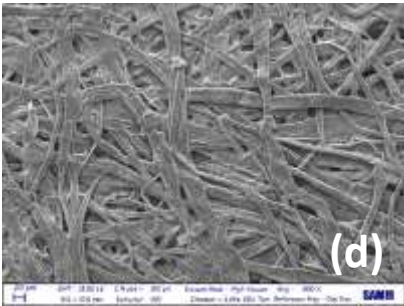


Spray coating di nanocellulosa su carta...in piccolo

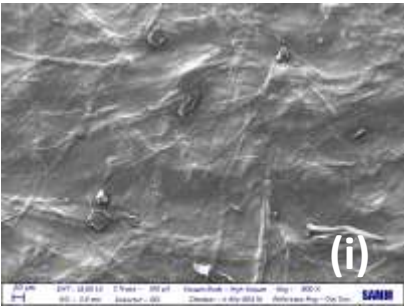
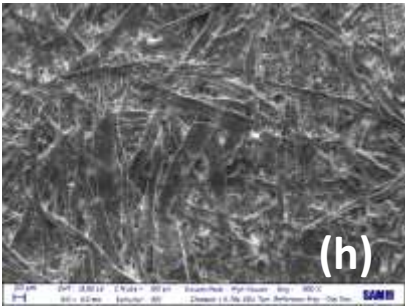
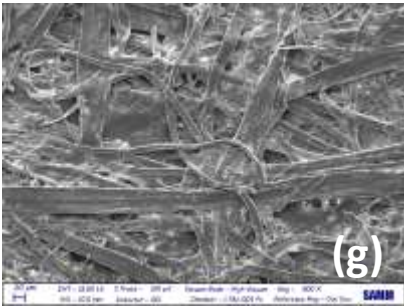
FC45



FC100



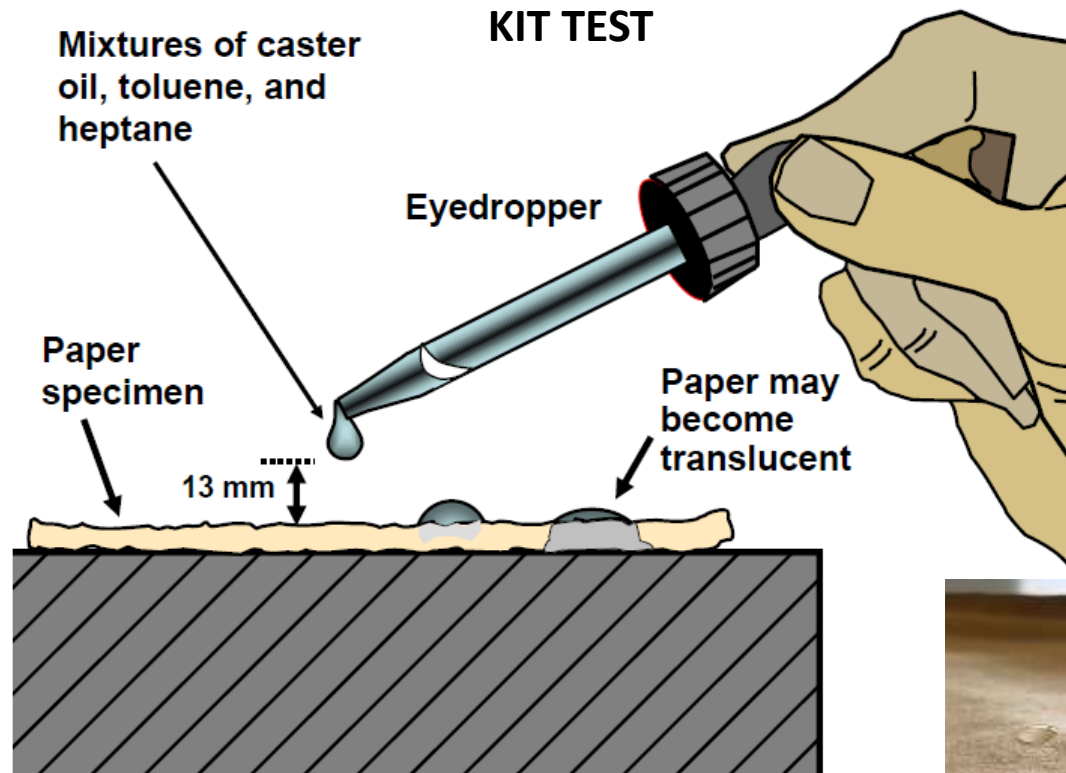
RC



Nanocellulosa su carta per resistenza ai grassi



SPRAY APPLICATION



BioResources 2020, 15(1), 1978-2004



KIT 12



Nanocellulosa su carta per resistenza all'acqua



L'innovazione sostenibile richiede investimenti



...e strategiche sinergie

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 **PON**
RICERCA
E INNOVAZIONE
2014 - 2020



