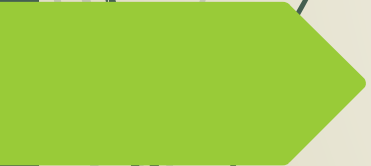


PhD in Agri-Food Sciences, Technologies and Biotechnologies - UNIMORE

XXXIV CYCLE: II year

***Development of innovative protocols and technologies to enhance
food safety and to reduce food loss***

Annual Workshop: 4th Dec. 2020



PhD student: Francesco Bigi

Tutor: Prof. Dr. Andrea Pulvirenti

***PhD STEBA School Co-ordinator:
Prof. Dr. Alessandro Ulrici***

PROBLEMS

88 million

TONES FOOD WASTED/YEAR
IN EUROPE



173 kg/year
per person



25.8 million

TONES PLASTIC PACKAGING/YEAR
IN EUROPE



less than 30%
recycled



CONSEQUENCES OF FOOD AND PLASTIC WASTE

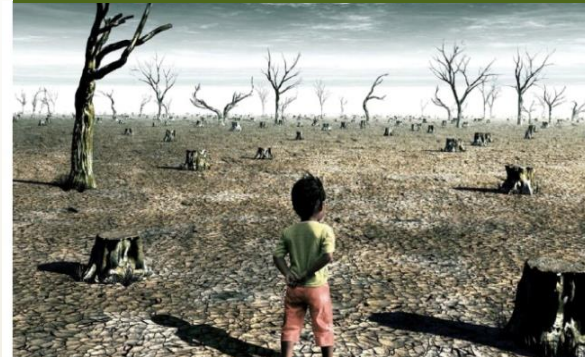
FOOD LOSS



HUNGER



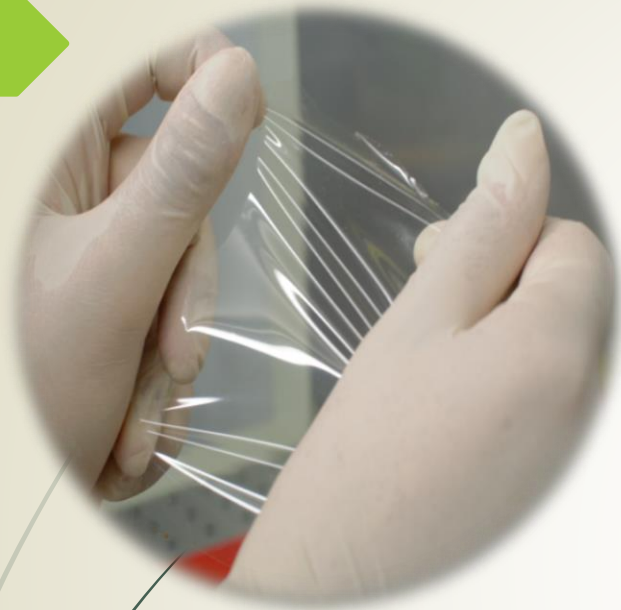
ENVIRONMENTAL DAMAGE



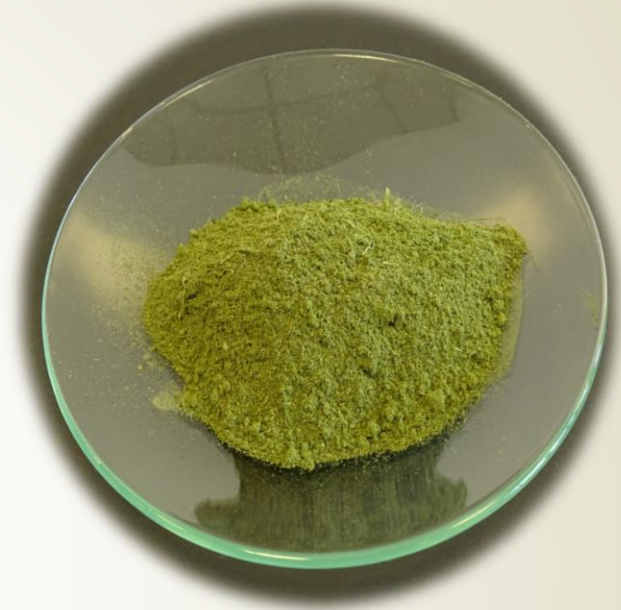
POLLUTION



POSSIBLE SOLUTION



BIODEGRADABLE FOOD
PACKAGING FILMS



BIOACTIVE NATURAL
COMPOUNDS

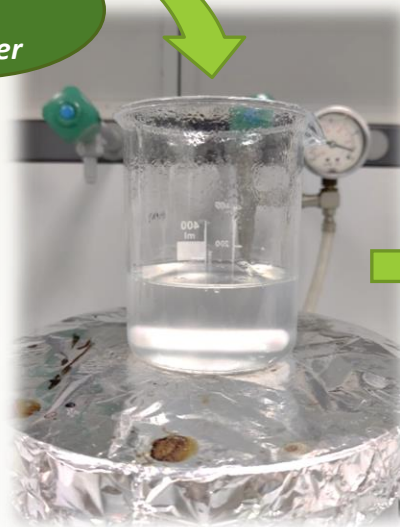
Preparation and characterization of active chitosan-hydroxypropyl methylcellulose blend films enriched with nettle and sage polyphenolic extracts

HOW?

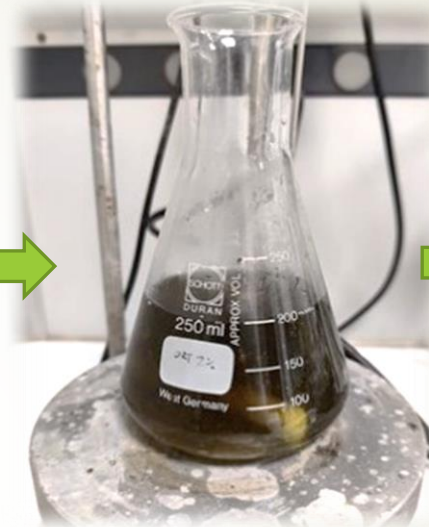


HYDRO-ALCOLIC EXTRACT
(ultrasound-assisted
extraction)

7.5 or 15%
w/w
polymer



CH-HPMC BLEND
(1,5% w/v)



MICROSTRUCTURE / PHYSICAL PROPERTIES

- Scanning electron microscopy (SEM)
- FT-IR Spectroscopy
- Thickness
- Color/UV-Vis barrier

WATER-RELATED PROPERTIES

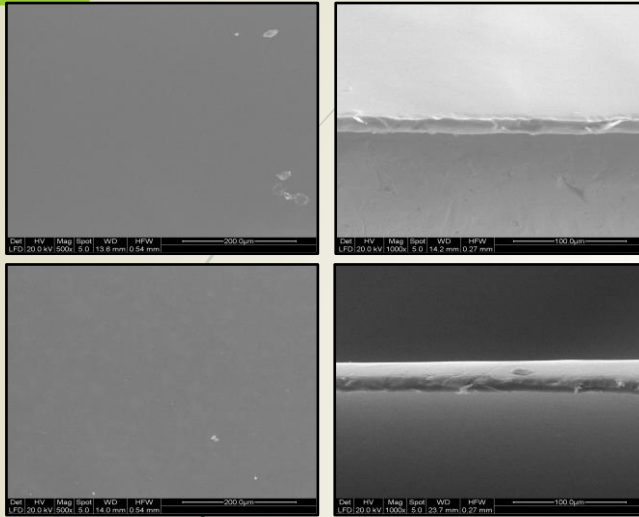
- Moisture content
- Water solubility
- Water vapor permeability

FUNCTIONAL PROPERTIES

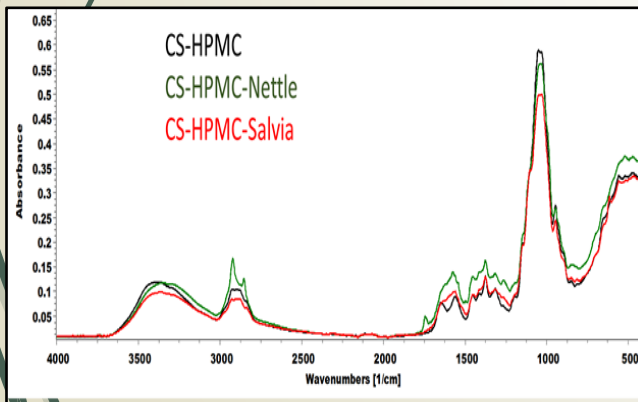
- Mechanical (TS, E%, EM)
- Antioxidant activity: TPC and ABTS assay
- Antibacterial activity: disk diffusion assay

RESULTS

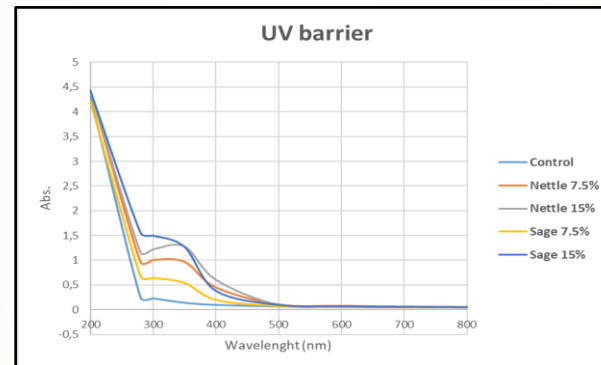
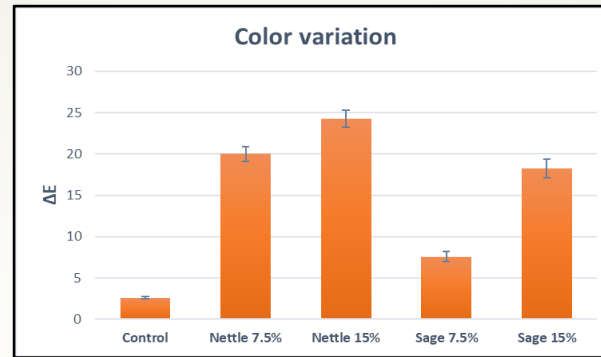
MICROSTRUCTURE



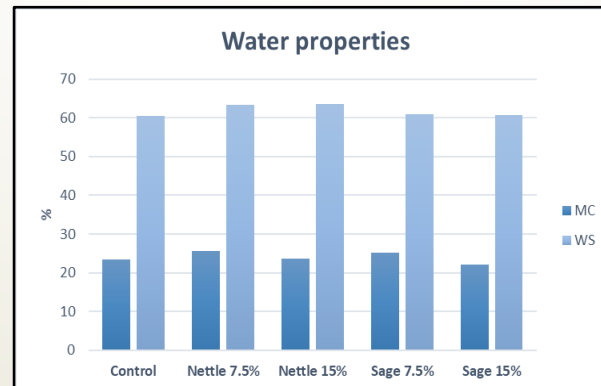
FT-IR SPECTROSCOPY



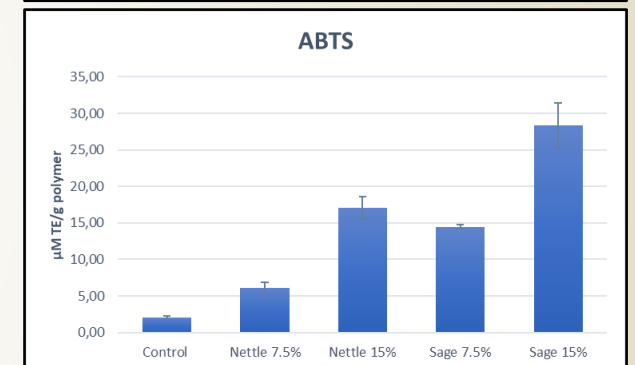
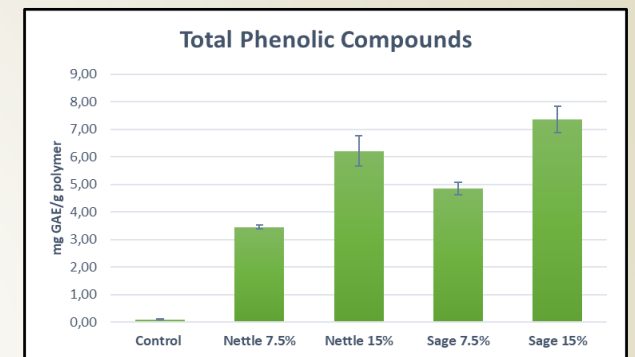
OPTICAL PROPERTIES



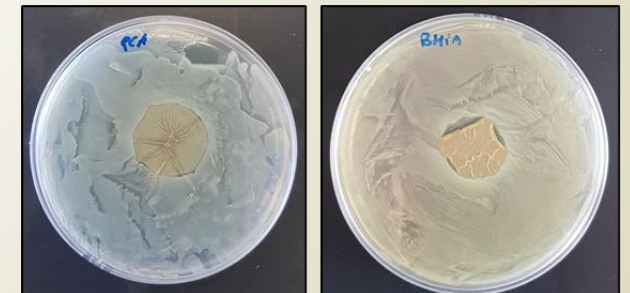
WATER PROPERTIES



ANTIOXIDANT PROPERTIES



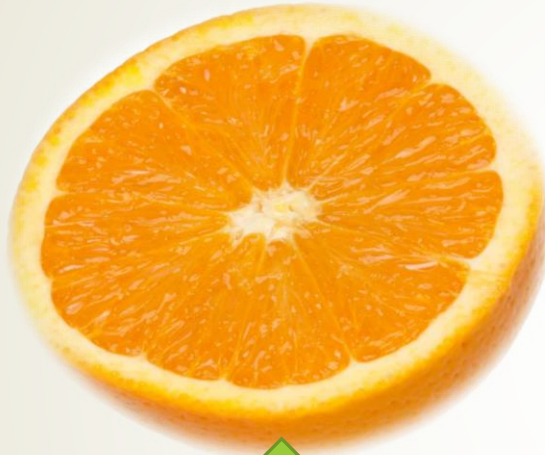
ANTIBACTERIAL ACTIVITY



FUTURE PERSPECTIVES

Could food waste.....become food plastic?

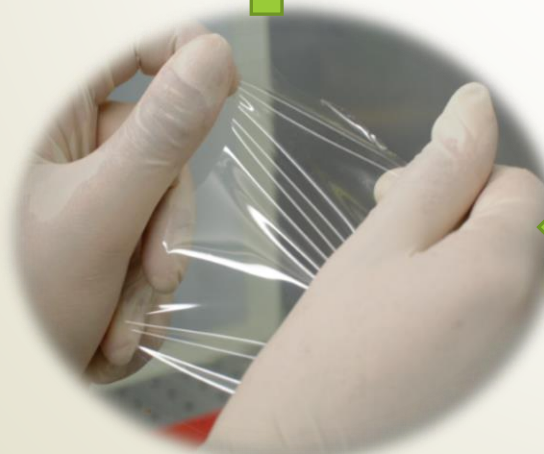
TESTING



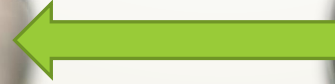
**STABILISED
PEELS**



**ISOLATION OF
CELLULOSE
NANO
WHISKERS**



**DEVELOPMENT
OF
NANO-
REINFORCED
PECTIN FILMS**





THANKS FOR YOUR ATTENTION!!