

# ACTIVE PACKAGING FROM POLYLACTIC ACID BIOCOMPOSITE FILM VIA SUPERCRITICAL FLUIDS IMPREGNATION

- Biodegradable polymer
- High brittleness

## PLA



- Natural fibre
- Abundance agricultural biomass
- Low cost

## DSF



- As plasticizer agent
- Improve flexibility of PLA biocomposite
- Low toxicity

## EPO



- Anti-microbial agent
- Preserved food security

## CEO

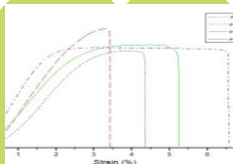


91 wt% PLA  
3 wt% DSF  
5 wt% EPO  
1 wt% CEO

Solution casting method

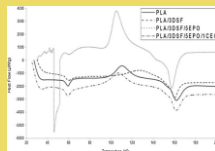
## SUPERCritical CARBON DIOXIDE (SCCO<sub>2</sub>)

- To modify the dispersion of filler loadings
- Inexpensive, nontoxic, non-flammable, easily recycled, possesses good properties as a solvent



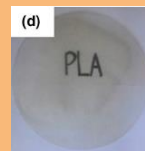
## Tensile Properties

- Elongation increased in addition of CEO and after SCCO<sub>2</sub> treatment



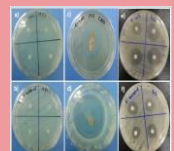
## Thermal Properties

- Glass temperature decreased → greater PLA chain mobility
- Crystallinity reduced → less rigid



## Optical Properties

- CEO reduced transparency of PLA biocomposite
- PLA biocomposite films are transparent, see-through packaging material



## Antimicrobial Activity

- Inhibition zone: *E. coli* and *S. aureus*
- Biocomposite films with CEO inhibit the growth of the bacteria