

# Biopolymers



## BIODEGRADABLE POLYMERS

### NATURAL (BIOPOLYMERS)

#### MICROORGANISMS

PHAs  
BC

#### BIOMASS

#### POLYSACCHARIDES

VEGETAL:  
CELLULOSE  
STARCH

ANIMAL:  
CHITIN  
CHITOSAN

#### BIOMONOMERS

#### PROTEINS

ANIMAL:  
COLLAGEN  
GELATIN

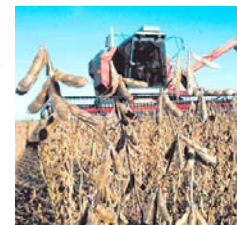
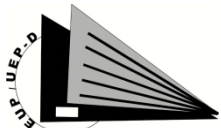
VEGETAL:  
SOYA

#### PLA

### SYNTHETIC

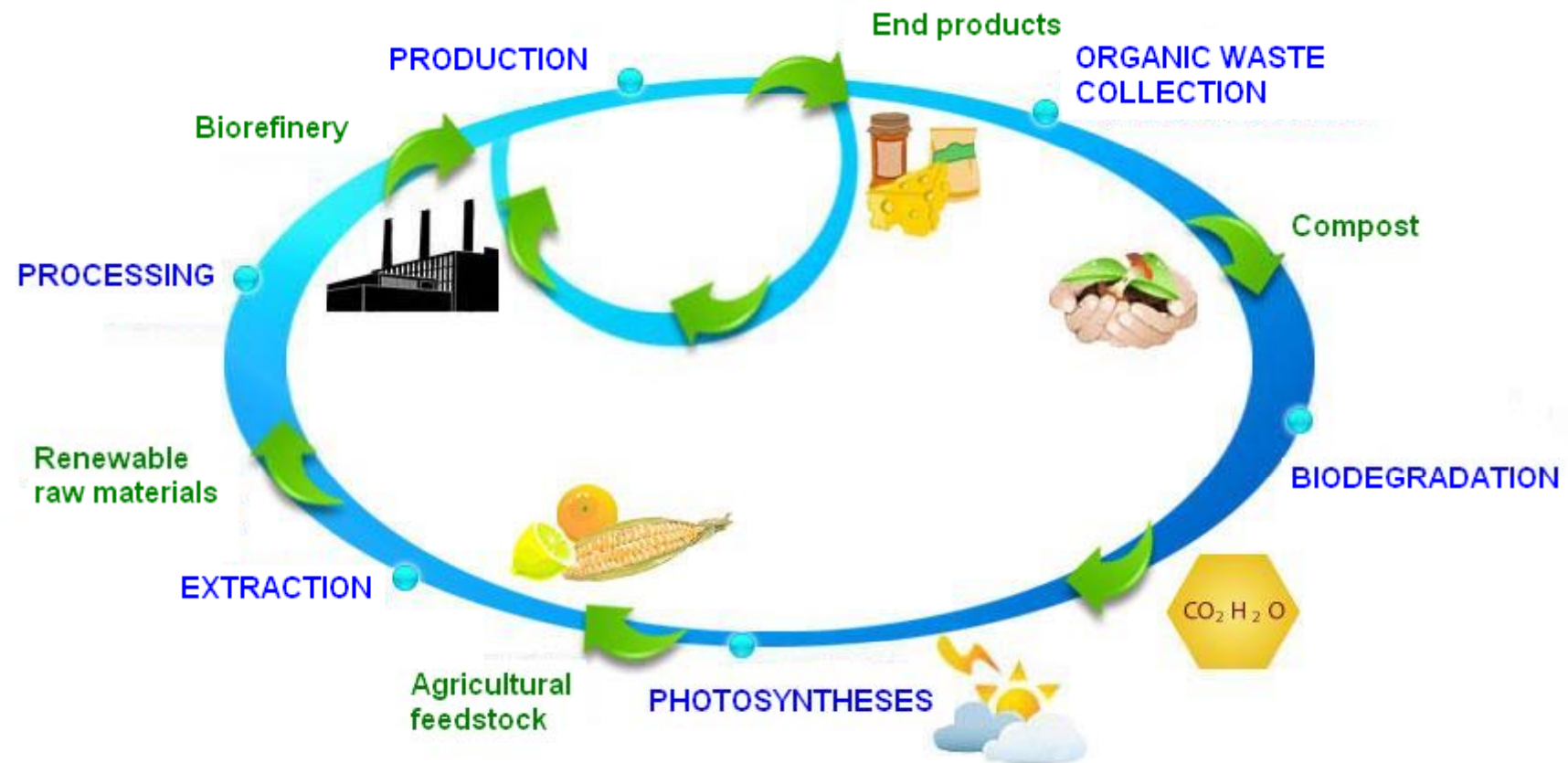
#### PETROLEUM

#### PCL





# Biopolymers



If one way be better than another,  
that you may be sure is nature's way  
Aristotle



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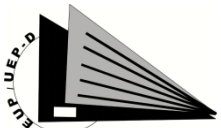
## Advantages

Good physical, chemical and mechanical properties

## Disadvantages

Origin: non-renewable sources  
Recovery: recycling  
Many types of plastics  
Contamination with foodstuffs

**COMMODITY  
POLYMERS  
VS  
BIOPOLYMERS**





# Biopolymers

## Advantages

Origin: renewable sources

Destiny:

Biodegradability  
Compostability

## Disadvantages

Small production  $\longrightarrow$  high cost

Service-life  $\longleftrightarrow$  biodegradation process

Low physical, chemical and mechanical resistance

High water absorption

**BIOPOLYMERS  
vs  
COMMODITY  
POLYMERS**