Bioplastiche a base di Chitosano: blending, viscosimetria, film e proprietà termo-meccaniche

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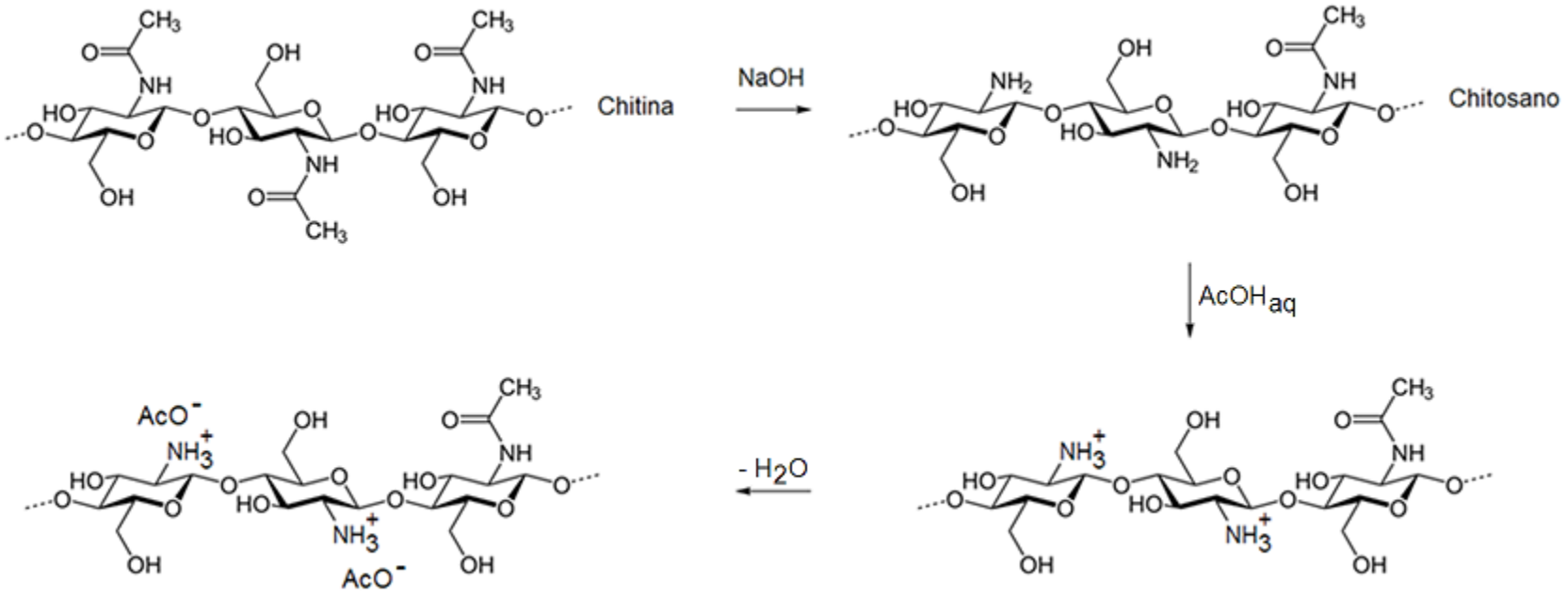
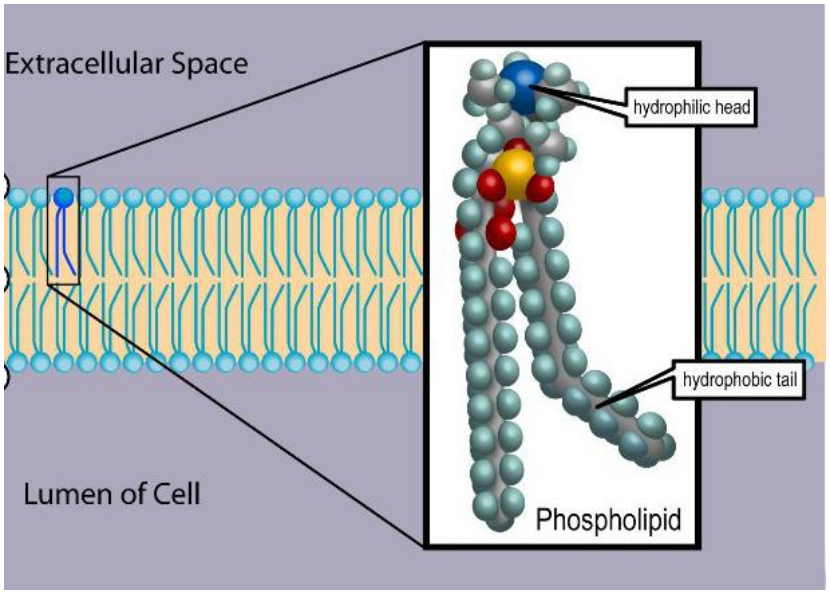
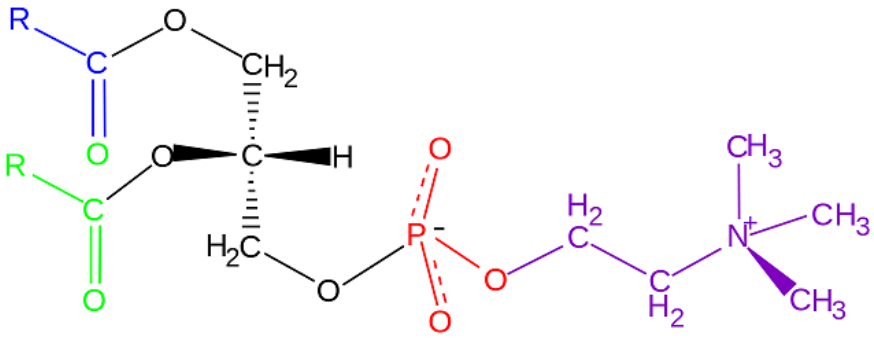
Parziale deacetilazione della Chitina a Chitosano policatione, a Chitosano acetato



Phospholipids of cell membranes

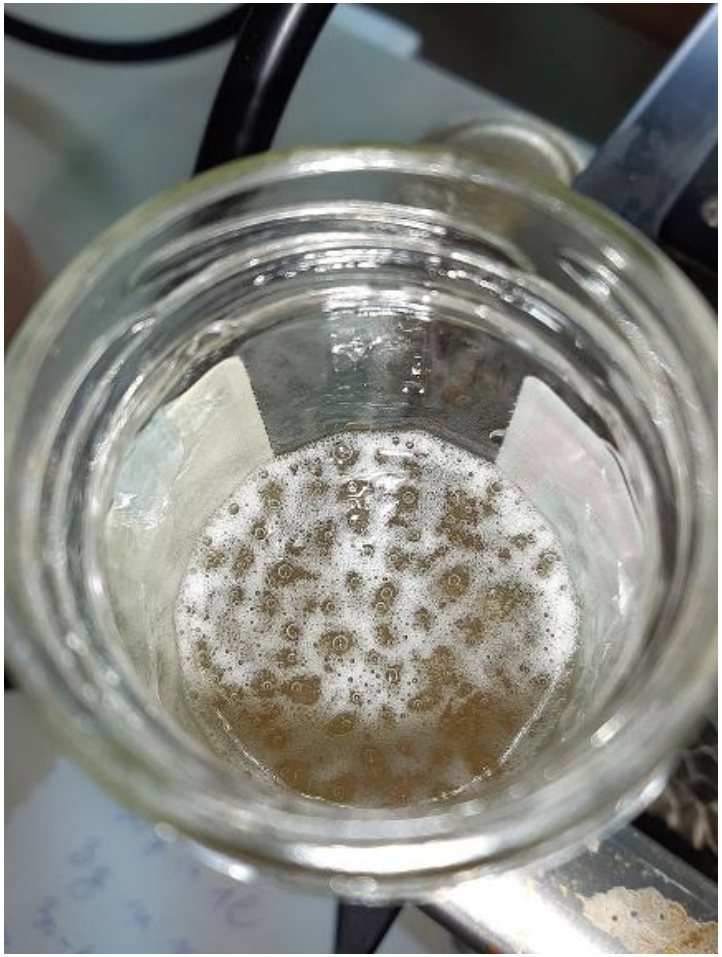




- Chitosano in soluzione acquosa di acido acetico al 6% a pH 2.5

Chito3 Aceto100 a 40°C
1

Chito3 Aceto100
2

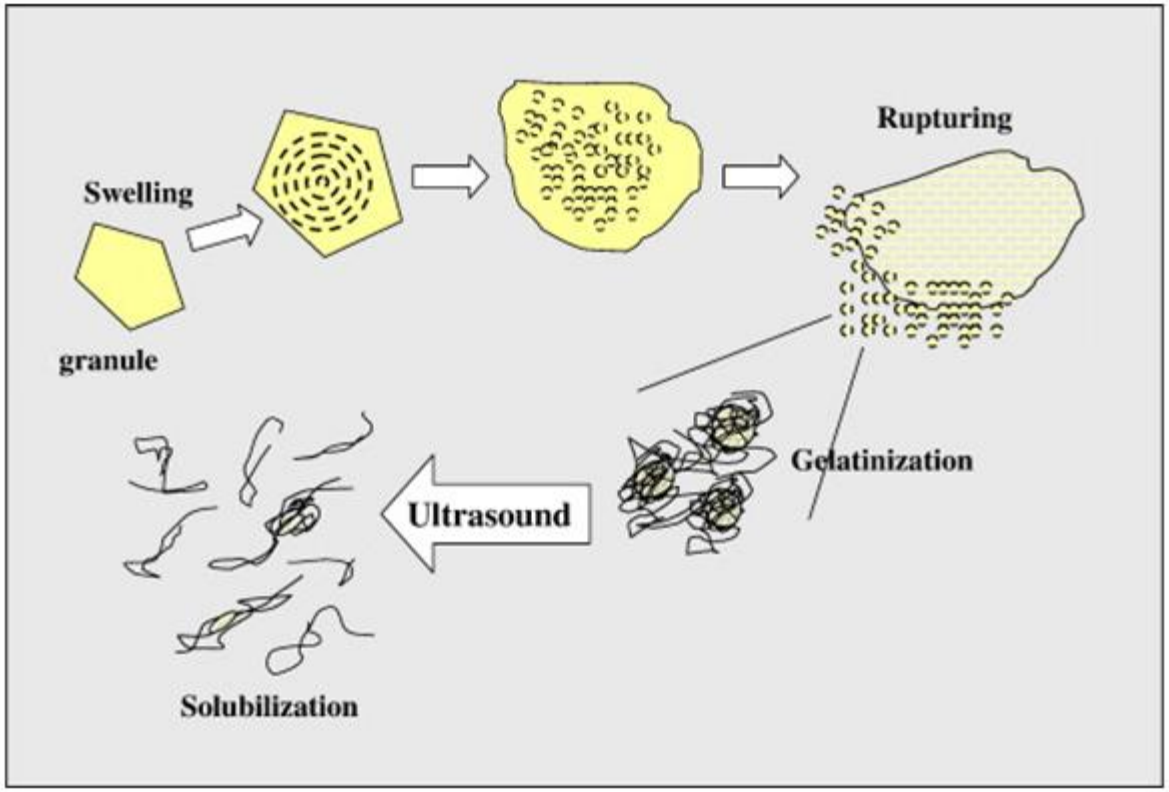


Chito3 Aceto100
3

Chito3 Aceto100
4


GT SONIC
PROFESSIONAL ULTRASONIC CLEANER

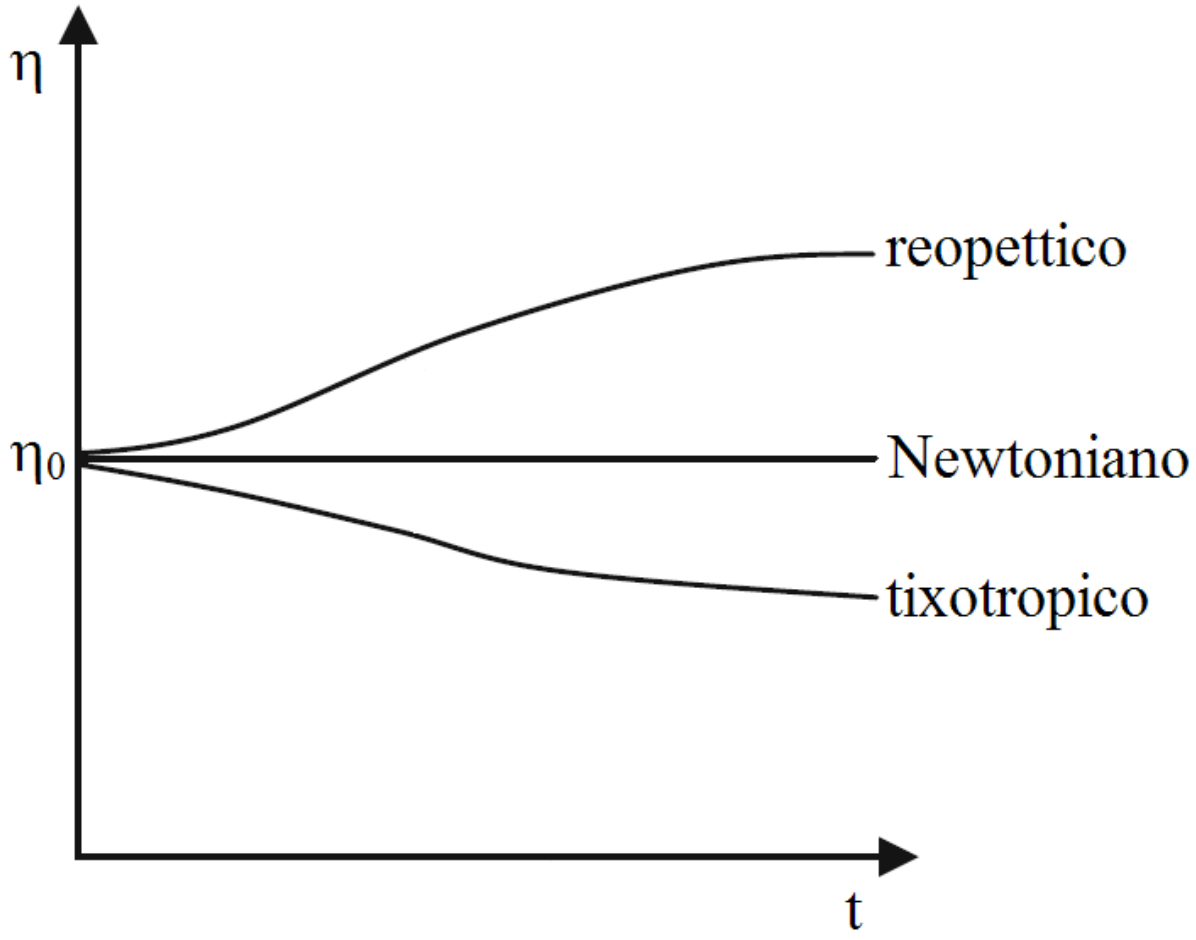
Chito3 Aceto100
5

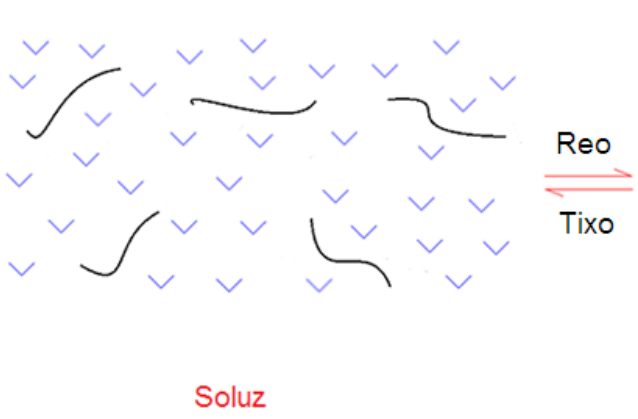

Swelling
granule
Rupturing
Gelatinization
Ultrasound
Solubilization

$$\tau = \eta \cdot \frac{d\gamma}{dt}$$


HAAKE
DC 10

Comportamento reologico



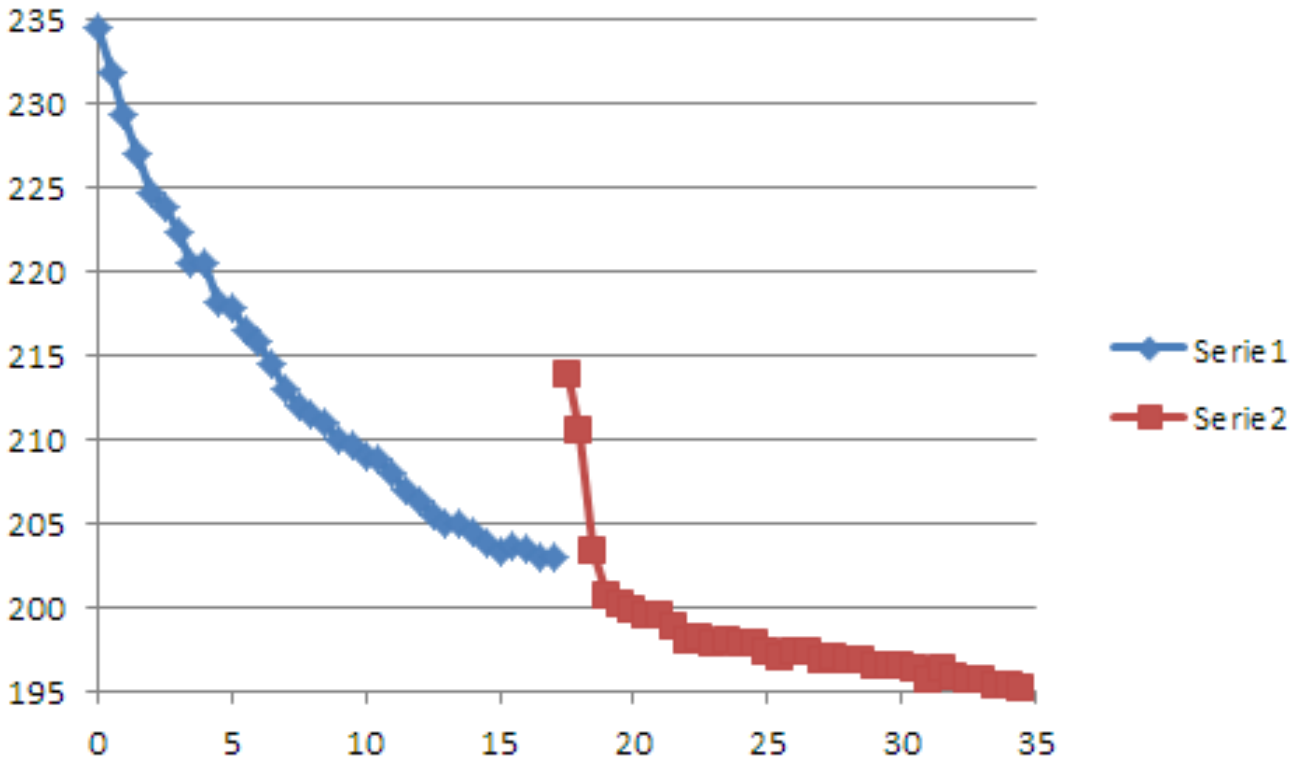


Soluz

Sol

Gel

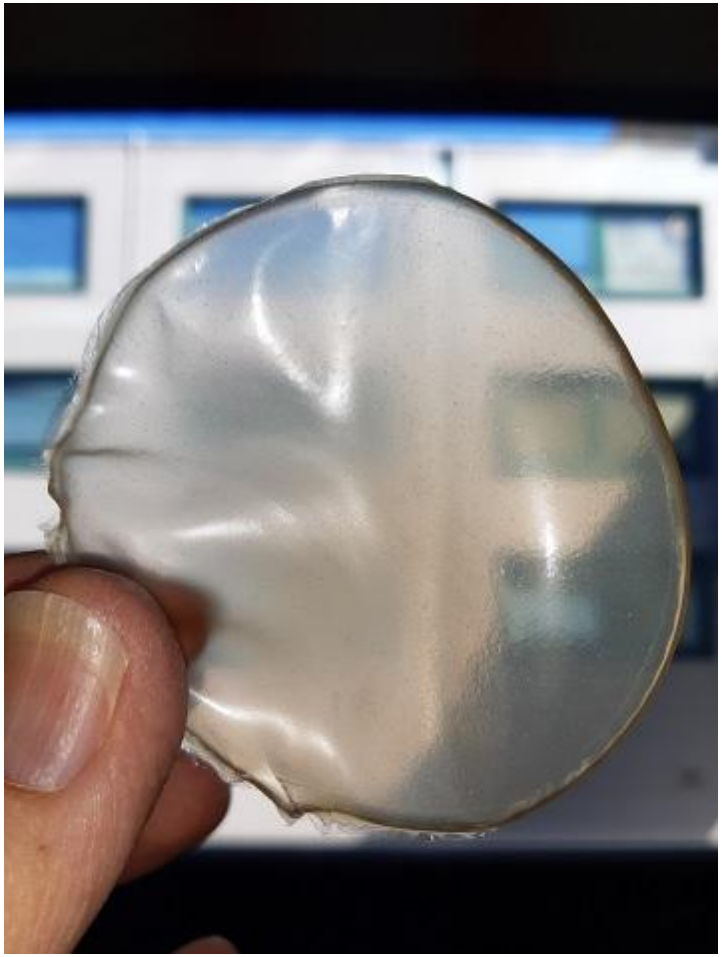
Chito3 40°C
run1 →stop 20’ → run2



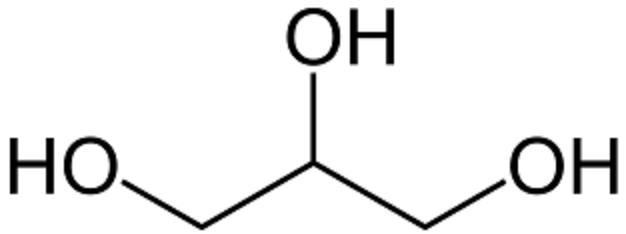
Chito3

Chito3

Chito3
Film



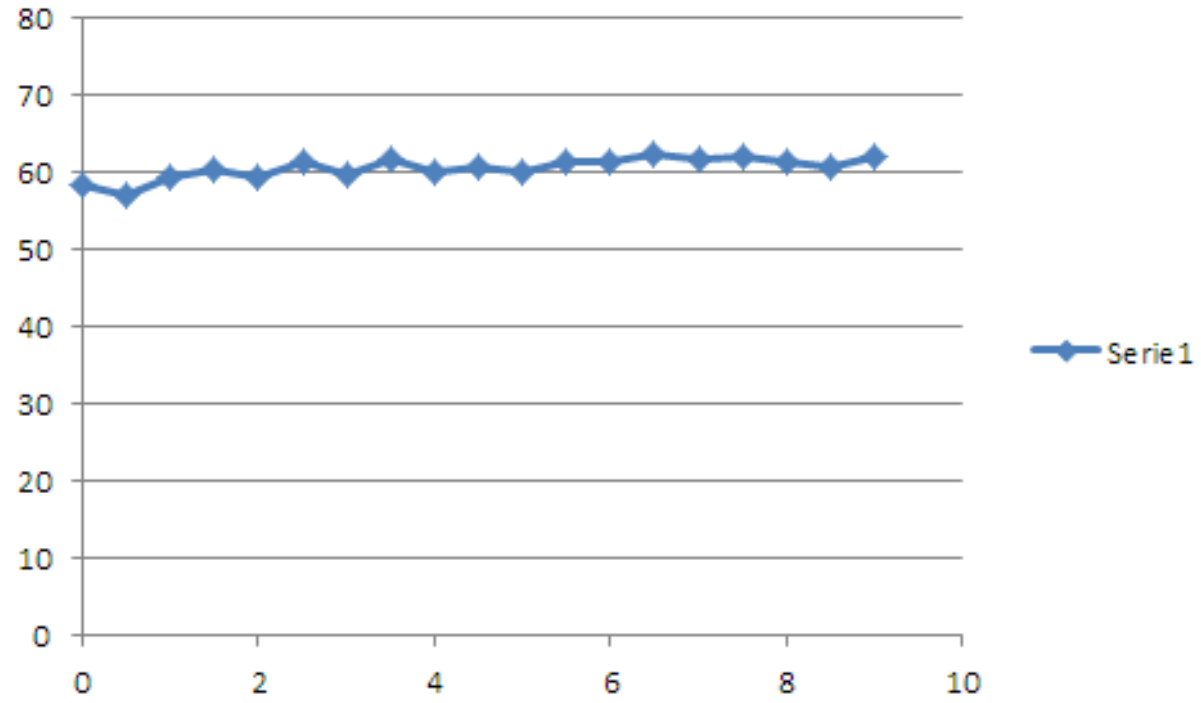

CASACETO
ACETO BIANCO
DI ALCOL
Condisce, conserva
e pulisce
6%
L'ORIGINALE
GLICEROLO
VEGETALE F.U.
1000 g


OH
HO
OH

Chito2 Glice6 Aceto100
1

Chito2 Glice6 Aceto100
2

Chito2 Glice6
40°C

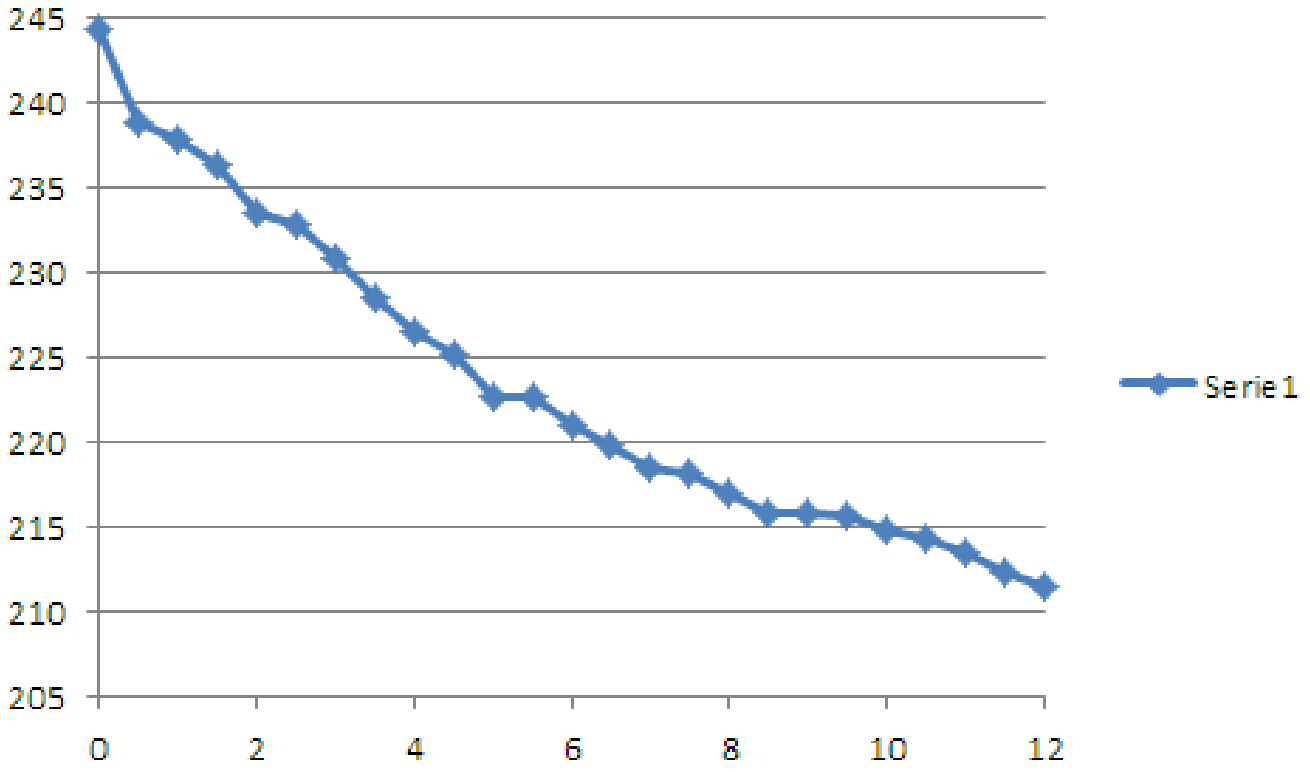


Chito2 Gli6

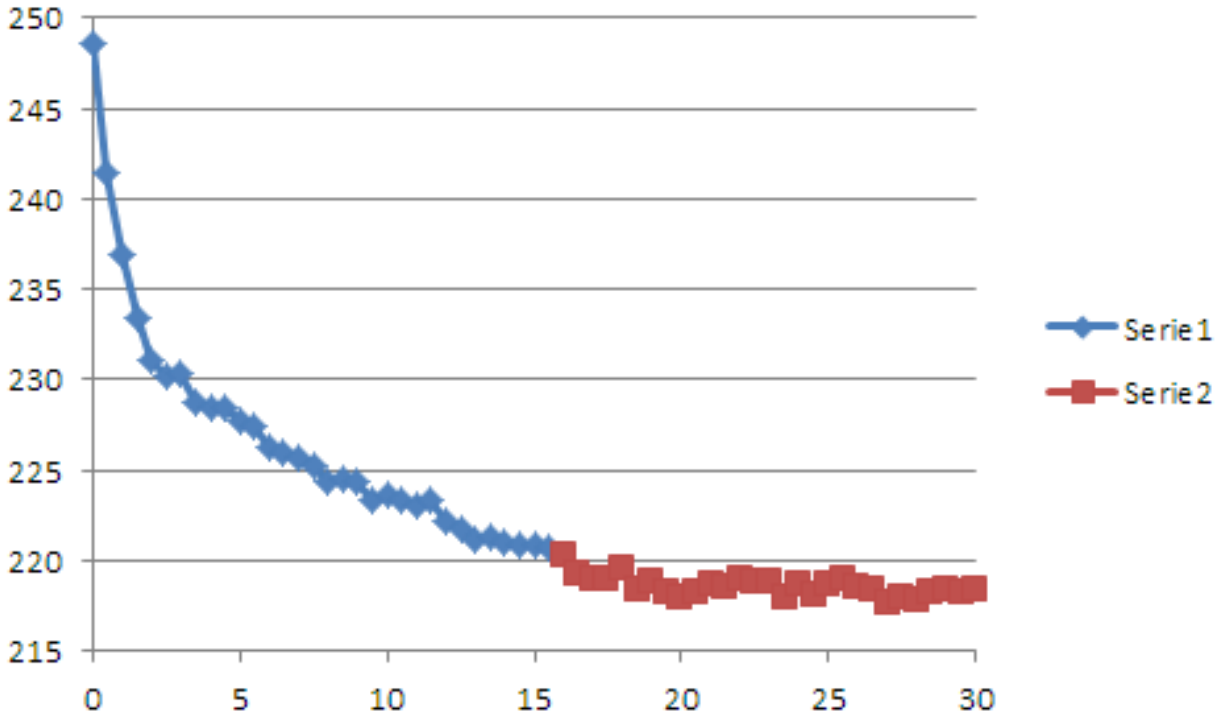
Chito2 Gli6

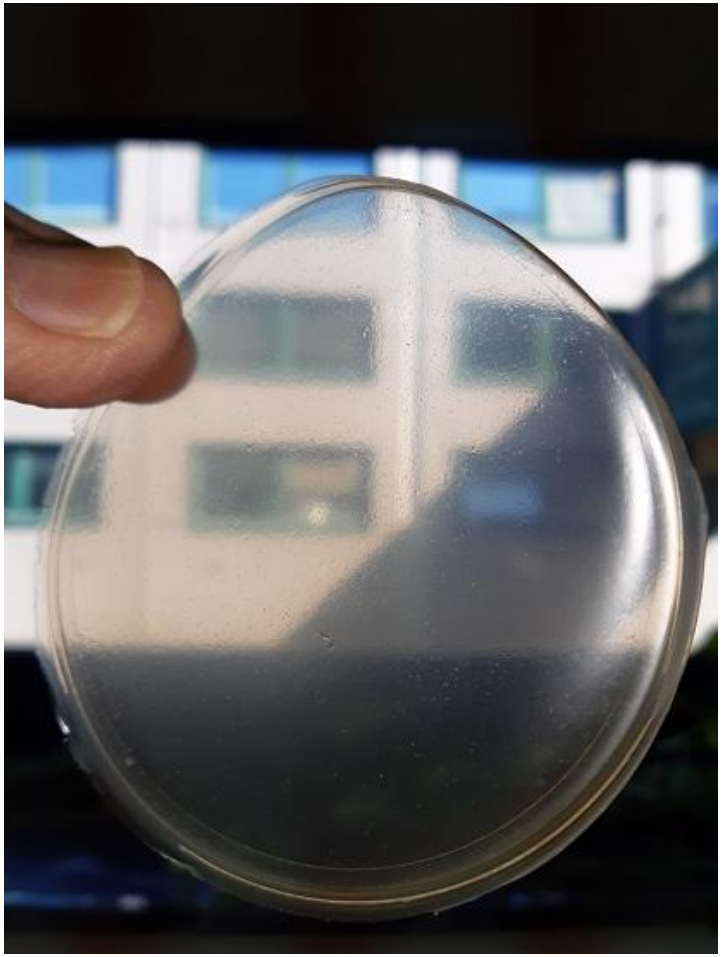
Chito2 Gli6
Film

Chito3 Gli6



Chito3 Glice03
run1→stop15'→ run2

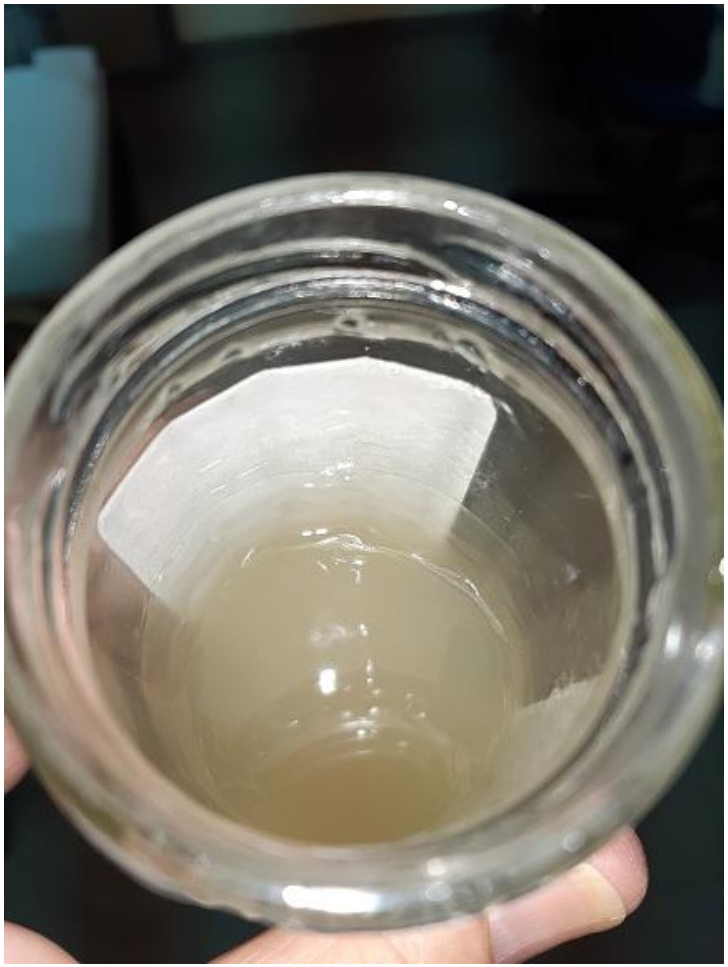




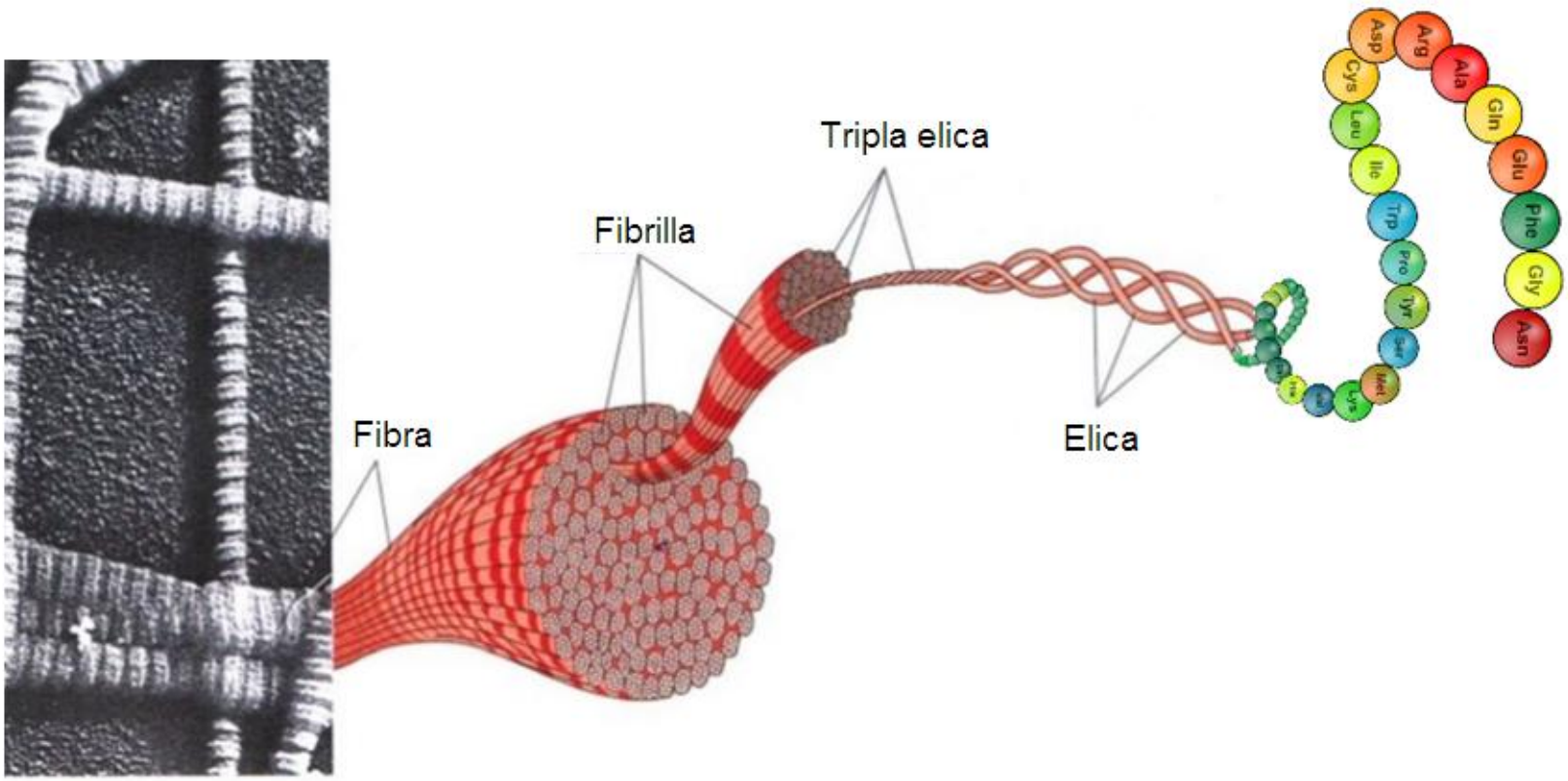
Blending

- Chitosano-Gelatina: la gelatina idrolizza in soluzione acida
- Chitosano-PVA: protonation of PVA under acidic conditions
- Chitosano-PEG: il PEG non idrolizza
- Chitosano-Pectina: la pectina può gelificare pH 2-3
- Chitosano-Amido
- Chitosano-Alginato: l'alginato → Acido alginico
- Chitosano-Ialuronato: Ialuronato → Acido ialuronico

Chito3 Coll

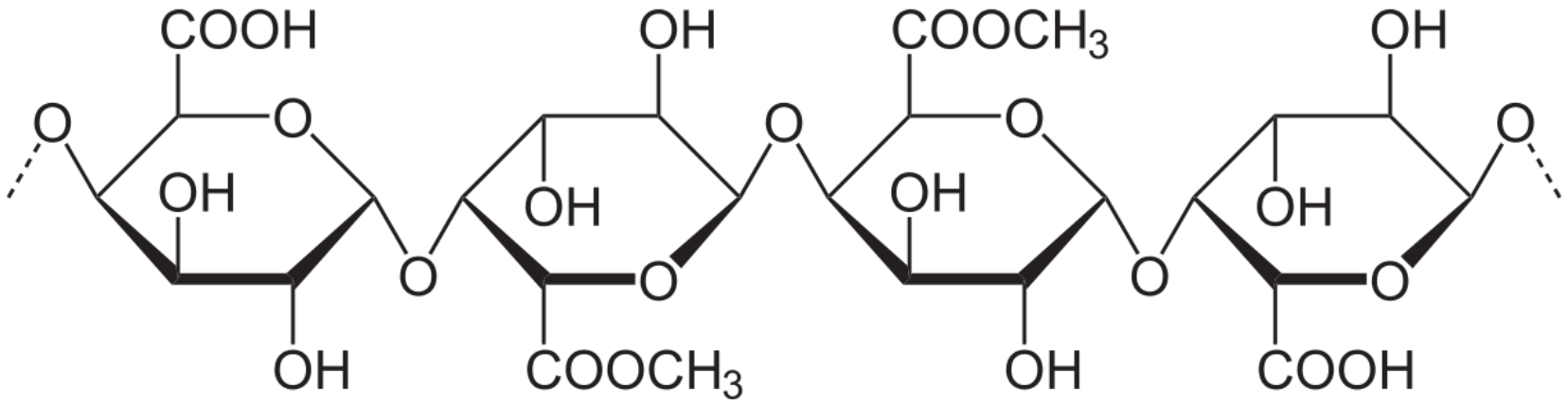


Gelatina di Collagene



Pectina

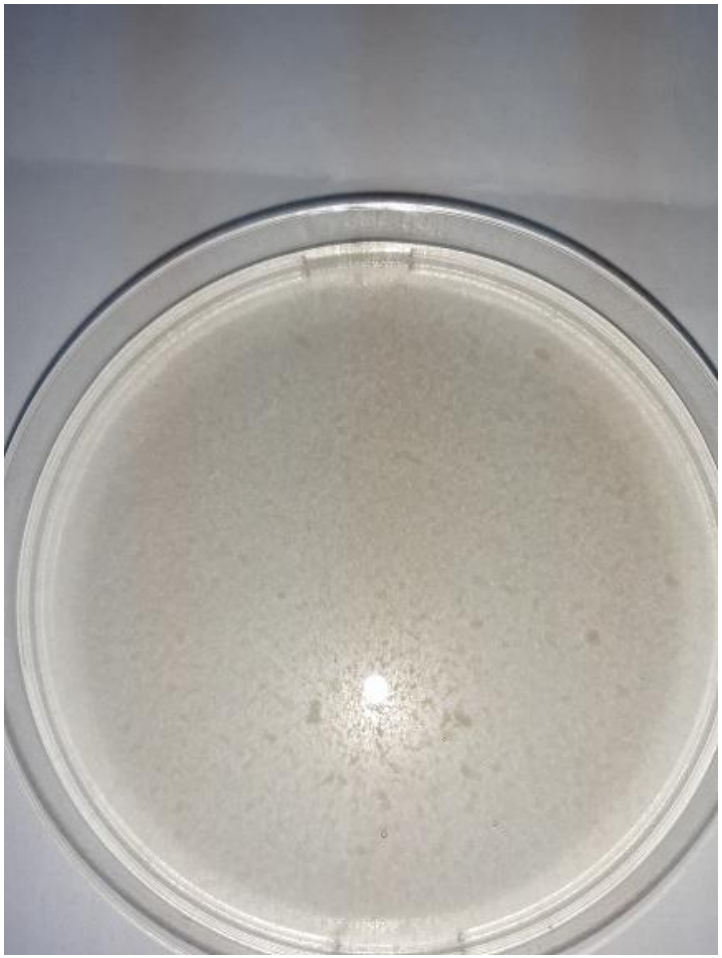
poli(1,4-α-D-galatturonide)



Henri Braconnot (1780 -1855)

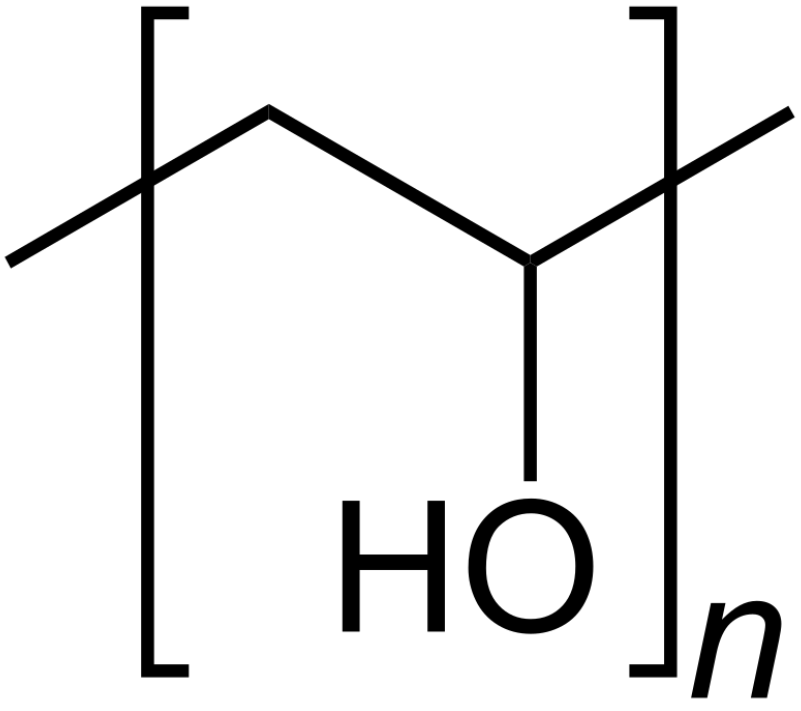
- Chitina (1811
- Idrolisi della C io (1819)
- Idrolisi della C la
- Nitrazione de idina
- Estrazione della pectina (1825)

Chito2 Pecta1 Glice6
Soluzione eterogenea

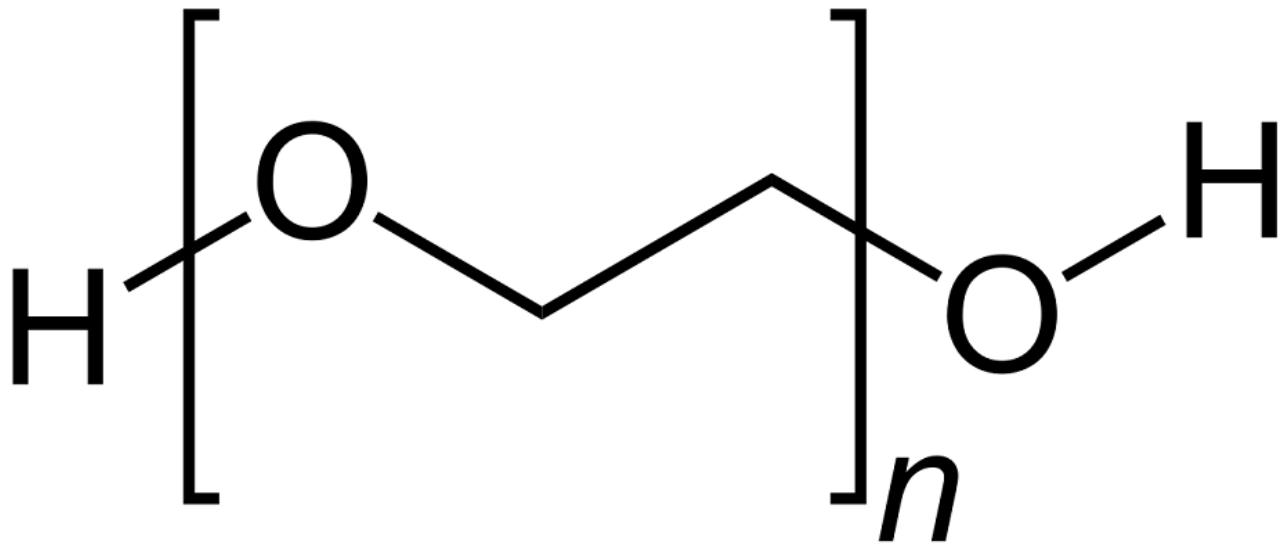


Chito2 PVA

PVA



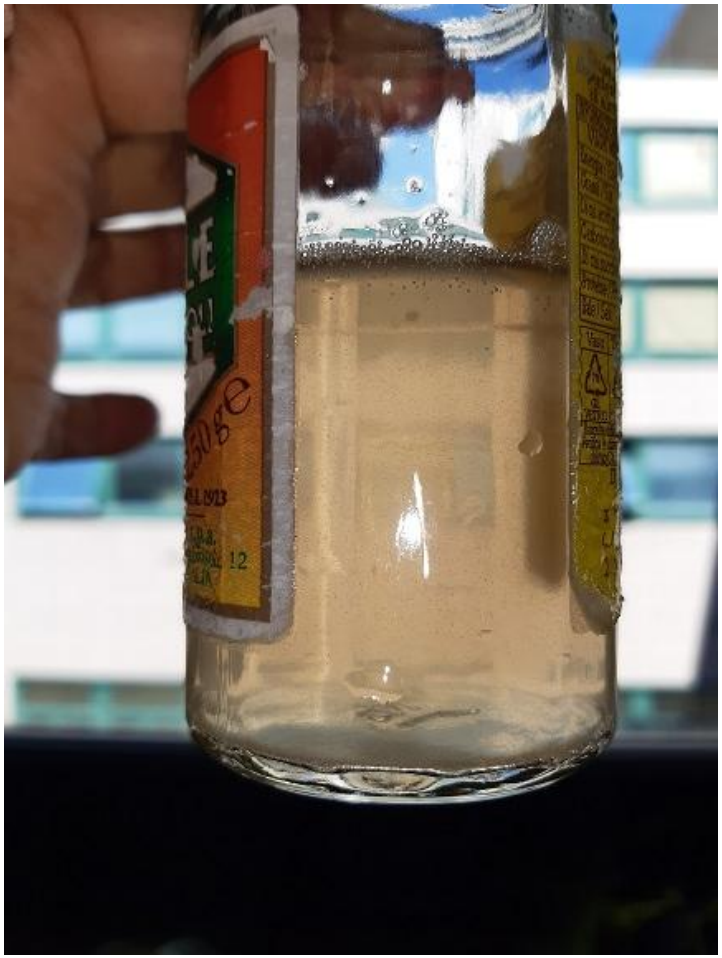
PEG



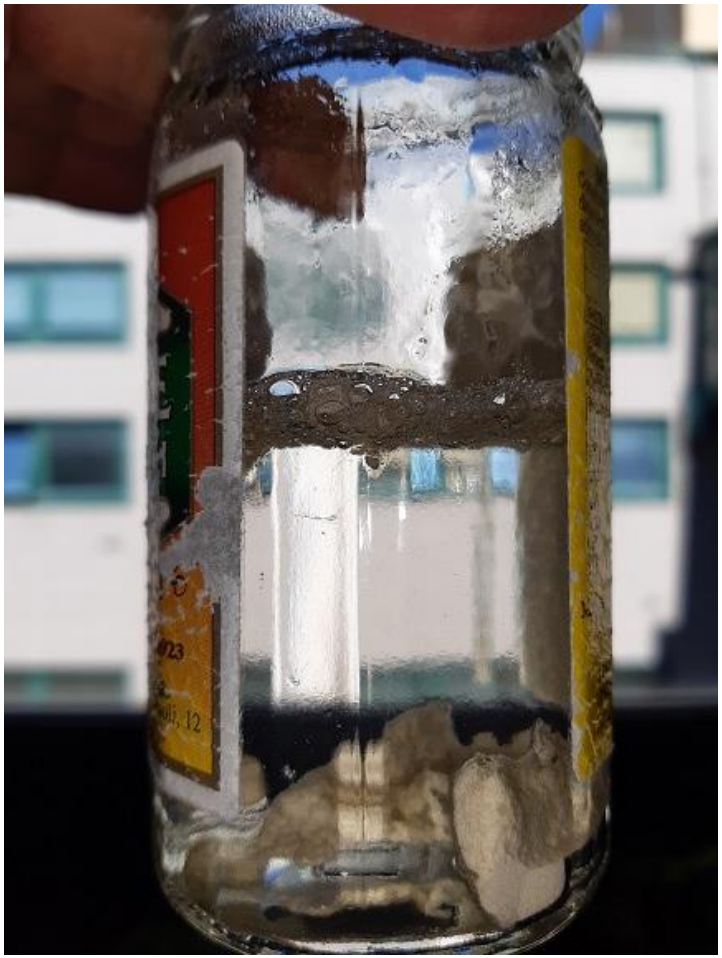
Soluz omogenea di
PVA3 (a sinistra) PEG3(a destra)


CHITOSAN
POWDER
biOrigins
ZEUS
Prodotti per arte e hobby - www.restauro
ALCOOL POLIVINILICO
Art.: 852-0001
Lot: 190129
100 g

Chito2.5 PVA0.5

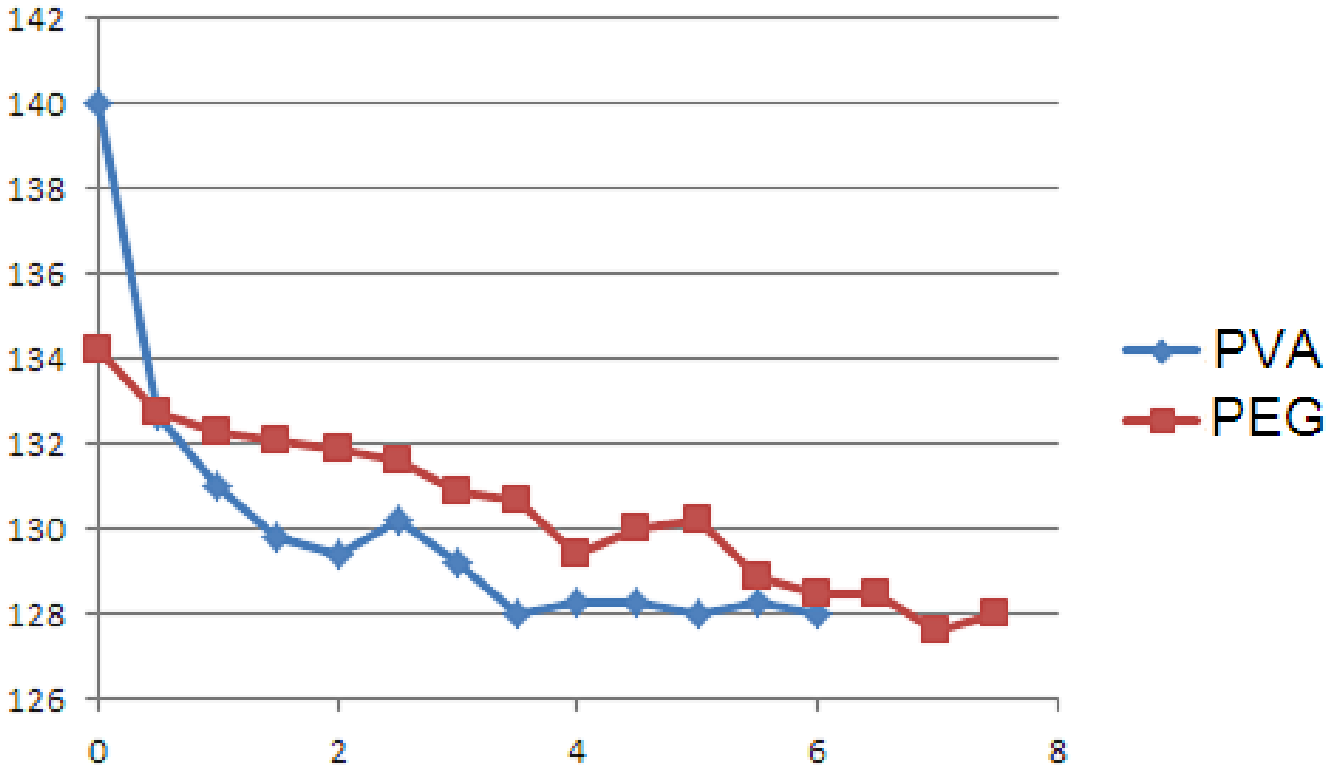


Chito2.5 PEG0.5

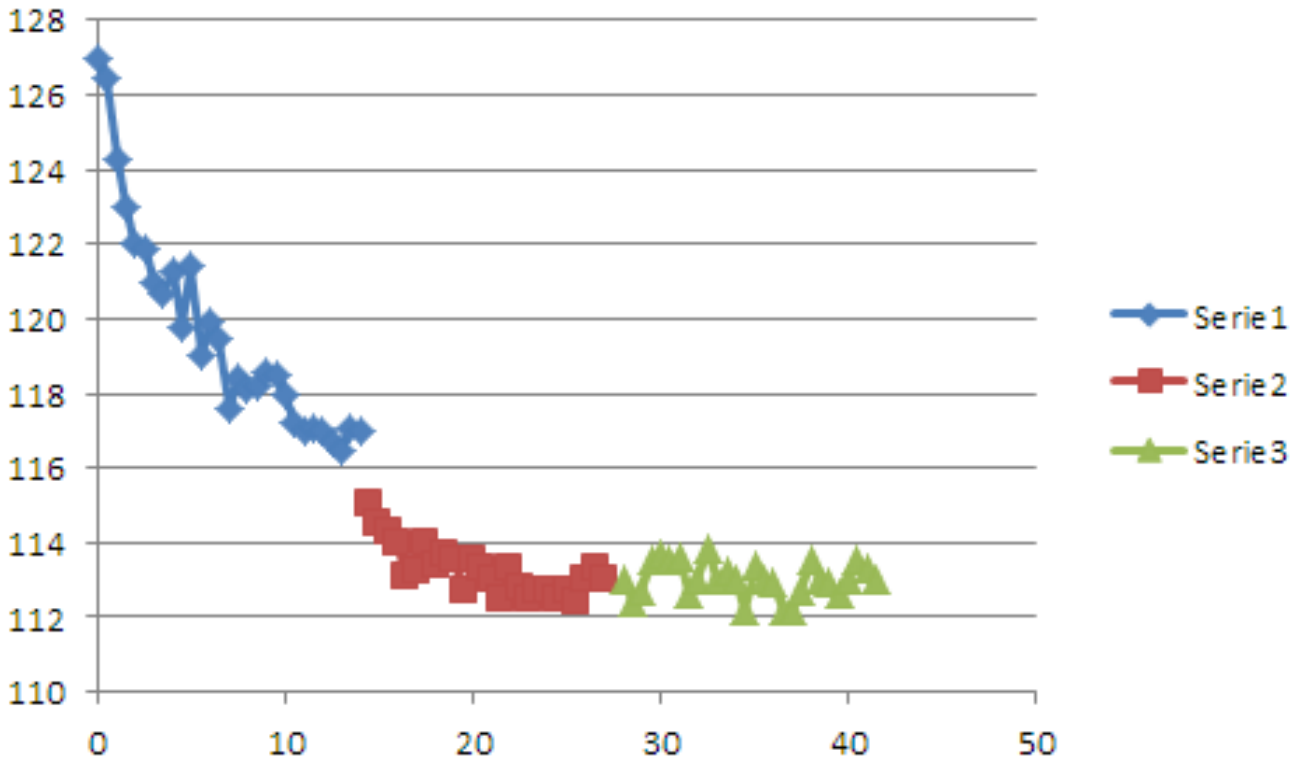


Chito2.5 PEG0.5

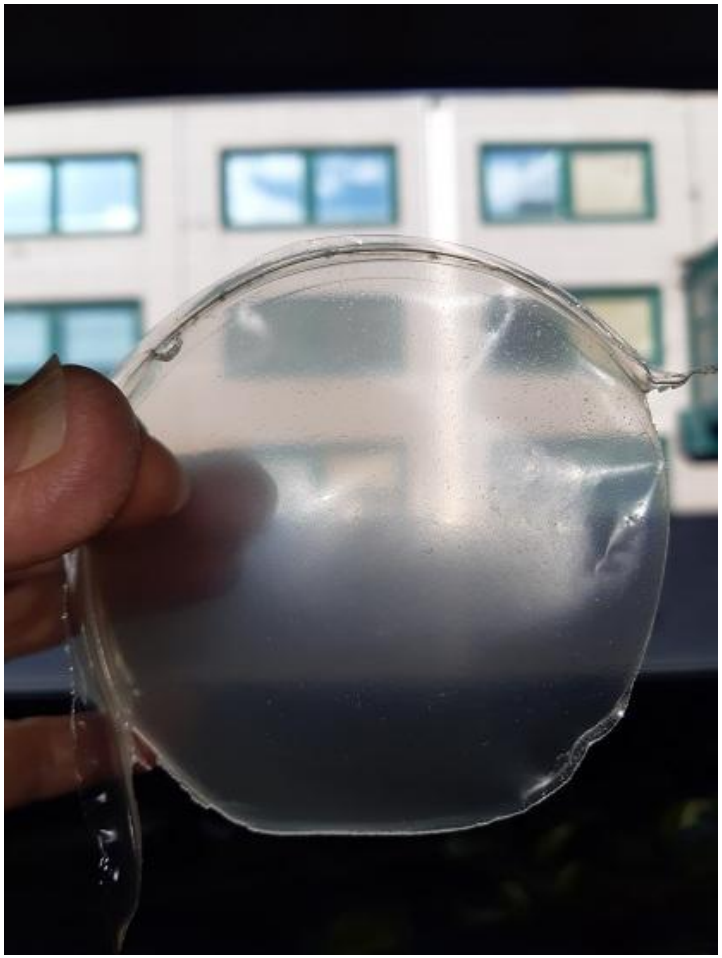
Chito2.5 PVA05 Gly6



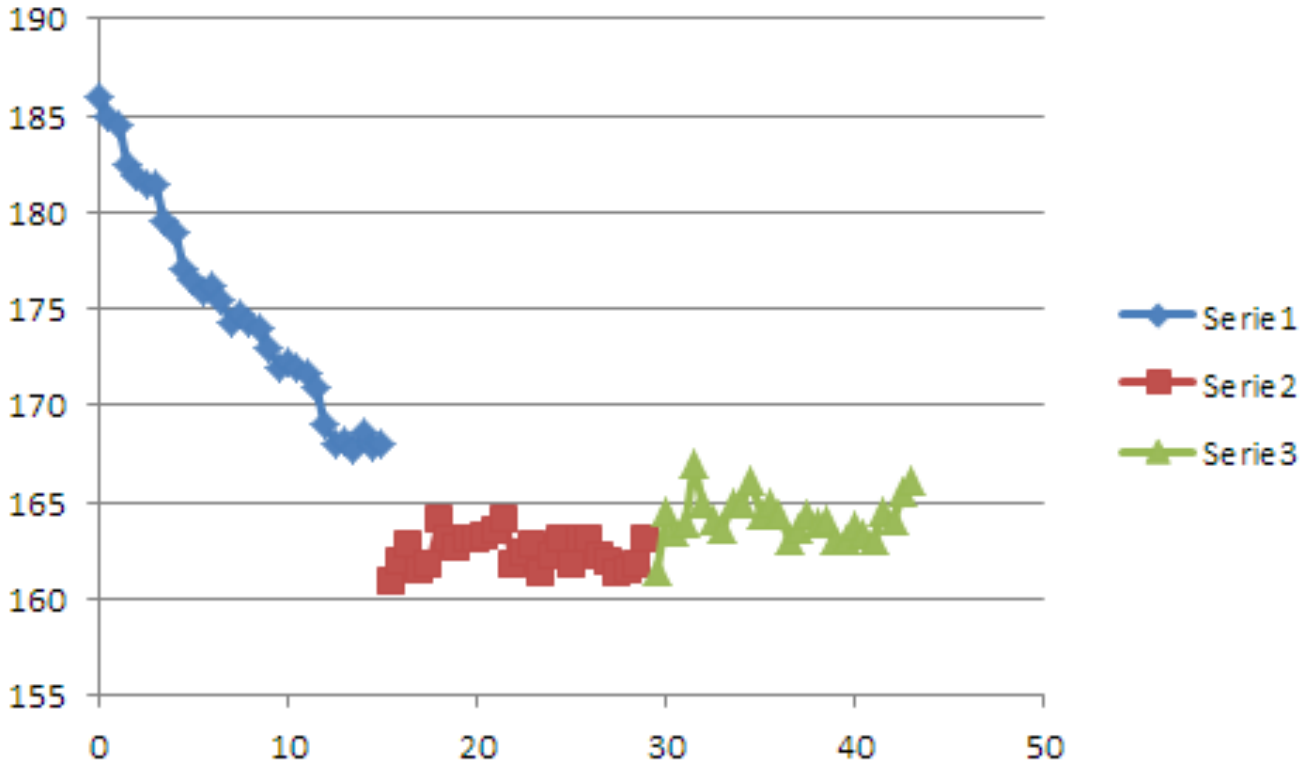
Chito2.5 PVA0.5
run1→ stop10'→run2→ stop30'→run3



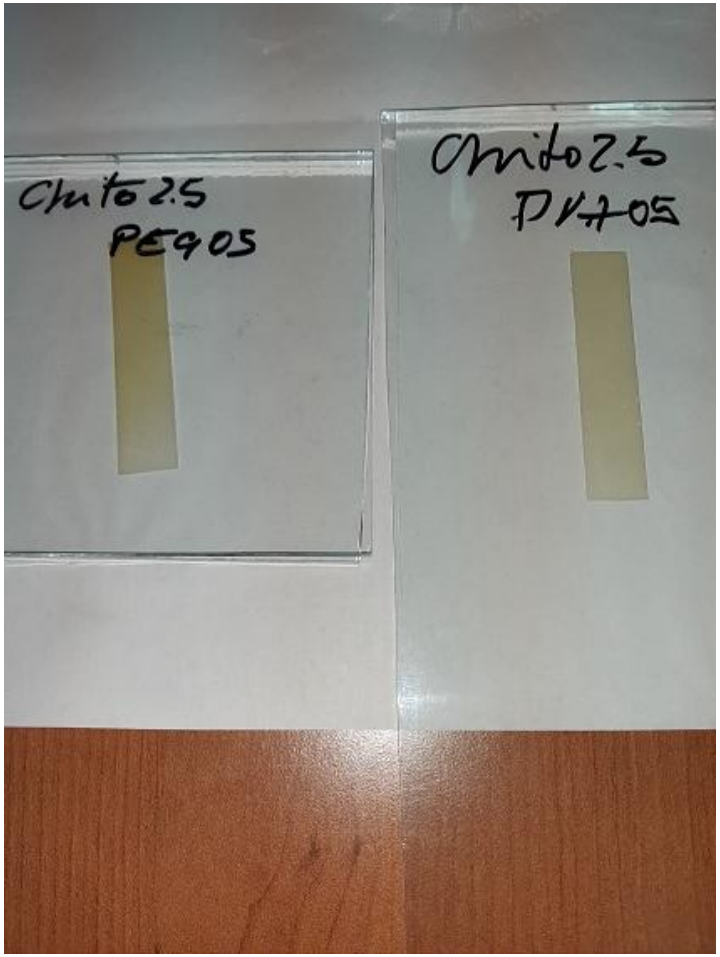
Chito2.5 PVA05



Chito2.5 PEG0.5
run1→ stop10'→run2→ stop15'→run3



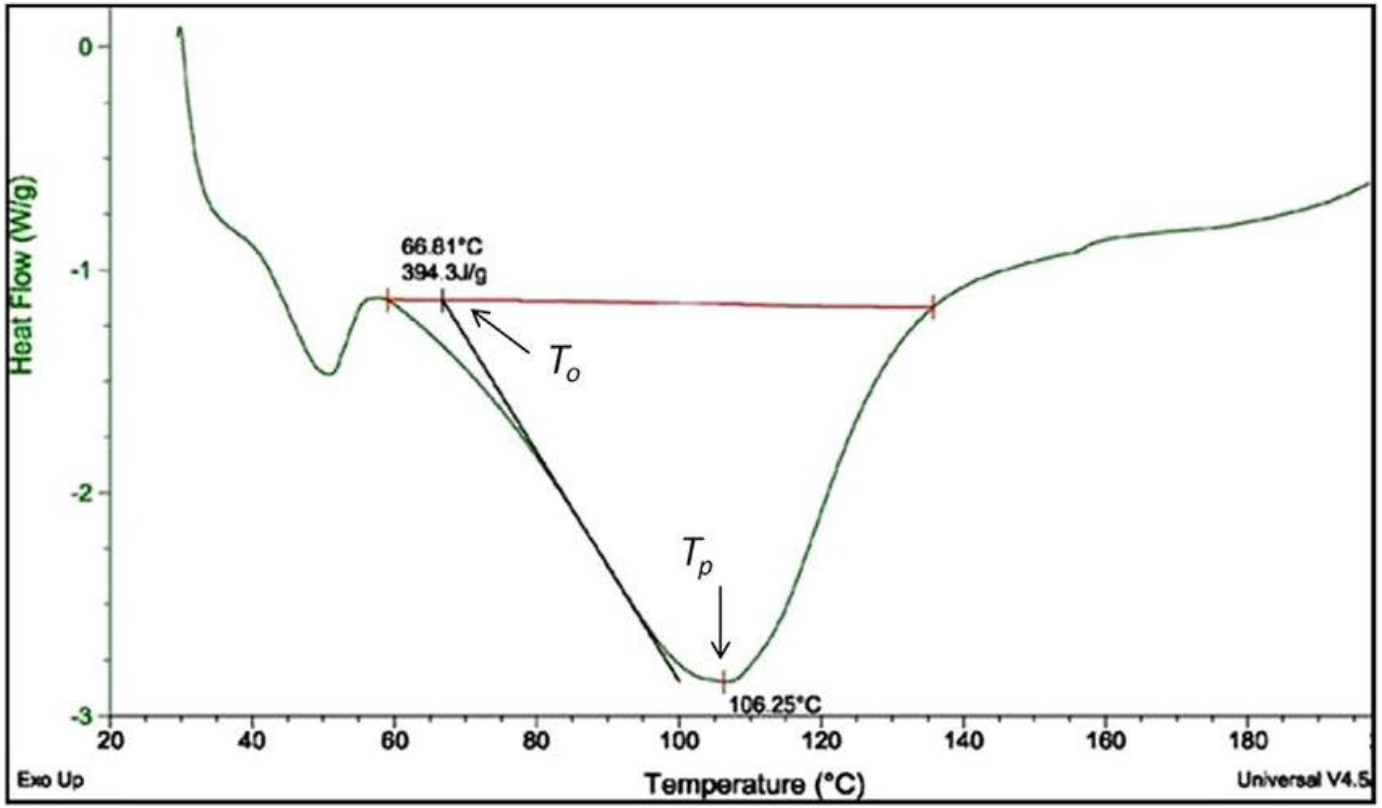
Chito2.5 Peg05


Chito 2.5
PEG05
Chito 2.5
DV705

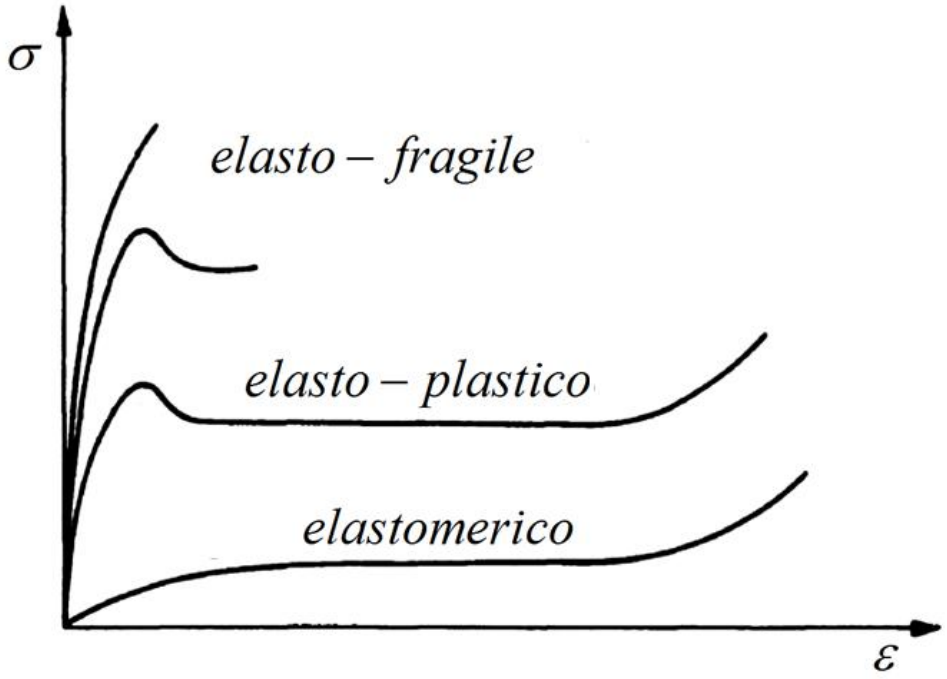

PERKIN ELMER
Differential
Scanning
Calorimeter
DSC 7


CAUTION
DO NOT USE ALUMINUM PAN ABOVE 500°C.

Chito3
DSC

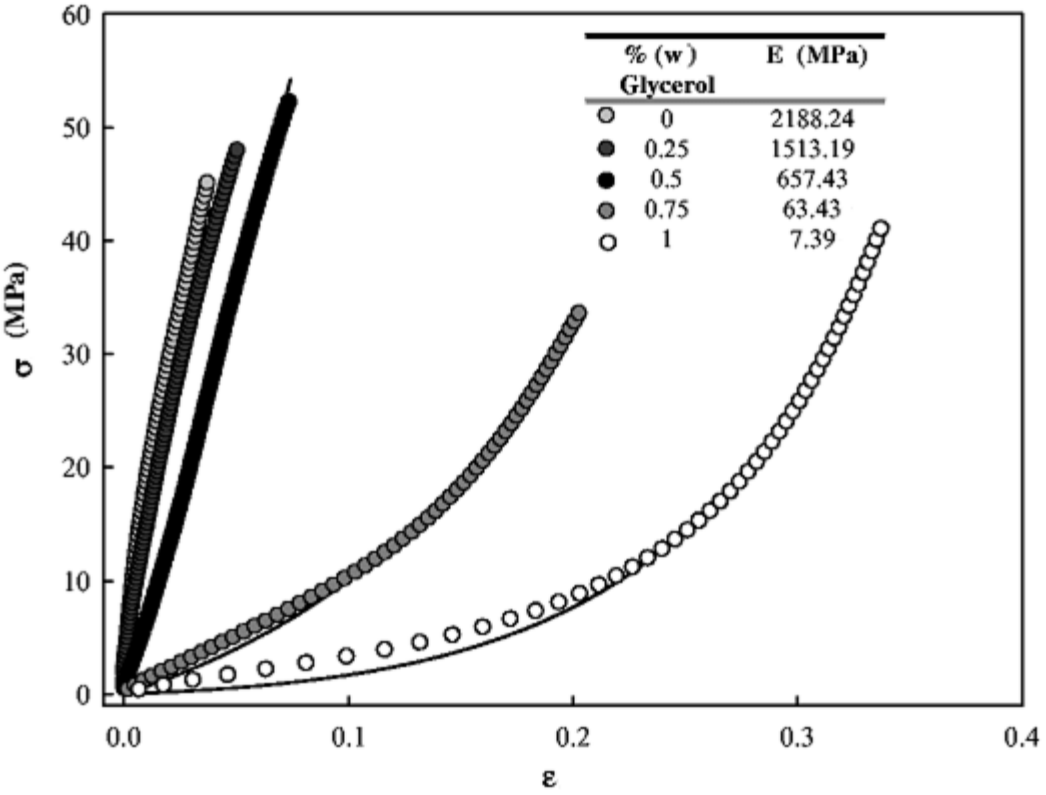

Heat Flow (W/g)
0
-1
-2
-3
66.81°C
394.3J/g
T_o
T_p
106.25°C
20
40
60
80
100
120
140
160
180
Exo Up
Temperature (°C)
Universal V4.5

Curva stress-strain

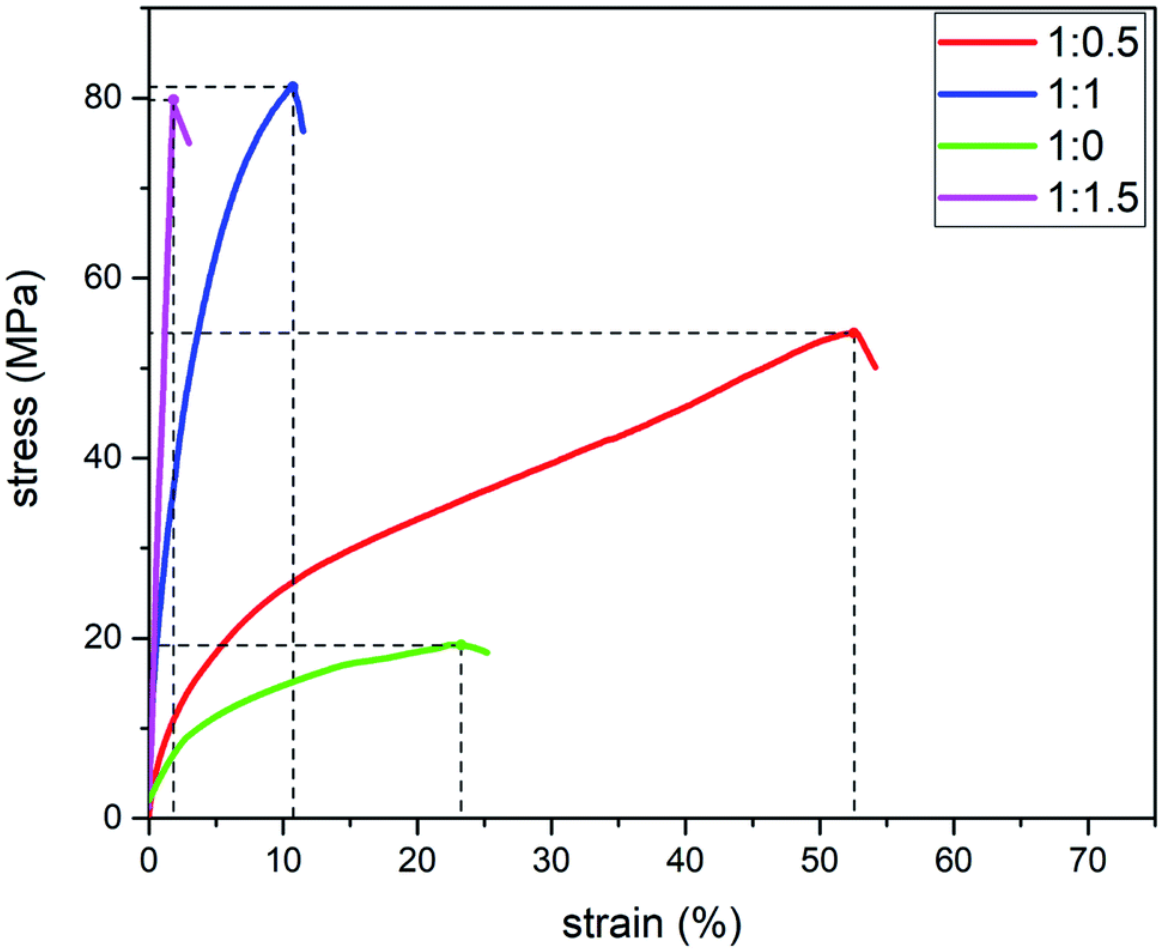


$$\sigma = E \cdot \varepsilon$$

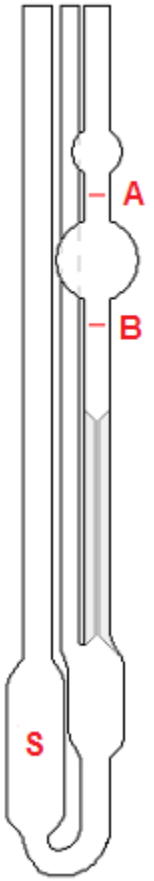
Chitosano Glicerolo



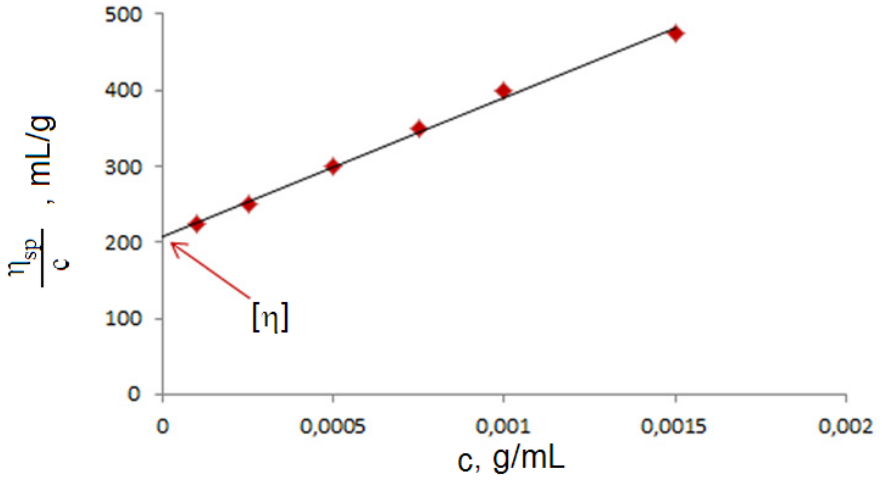
Chitosano-amido



Viscosimetro Ubbelohde



$$[\eta] = \lim_{c \to 0} \frac{\eta - \eta_0}{\eta_0 c} = \lim_{c \to 0} \frac{\eta_{sp}}{c}$$



$$[\eta] = K \cdot M^{\alpha}$$

K = 1.38 × 10−5 and α= 0.85.

M = 322.04 kDa

Hydrogel di chitosano
in compressione e trazione