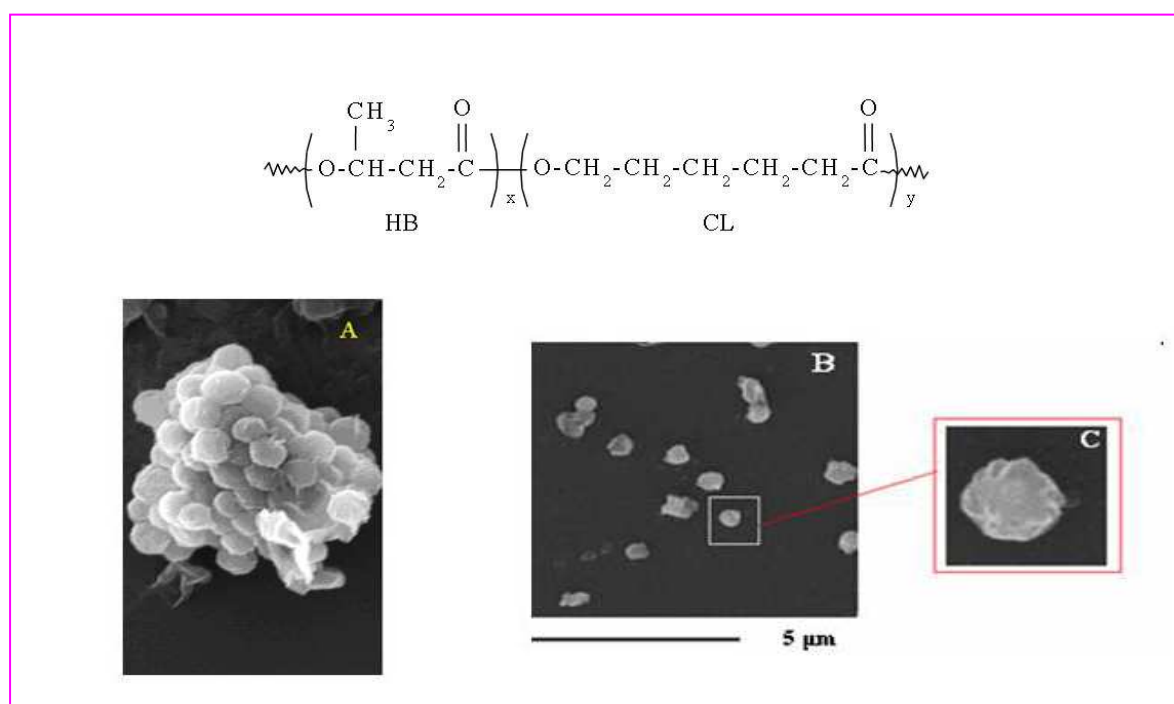


Novel polyester biomaterials for producing micro- and nanoparticles

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Research for biodegradable and biocompatible polymer materials is an appealing and still open field for the pharmaceutical industry. Literature analysis suggests that poly(lactides), poly(glycolides) and their copolymers (PLGA) are widely used and officially approved materials for producing drug nanocarriers. Other polyesters have been developed to enlarge the domain of these polymers and to achieve materials with additional and modulable properties.



1. Description of the product

Poly(3-hydroxybutyrate-*co*- ϵ -caprolactone) copolymers P(HB-*co*-CL) and poly(3-hydroxybutyrate-*co*-3-hydroxyvalerate-*co*- ϵ -caprolactone) terpolymers were used by a solvent deposition technique to prepare colloidal particles. On the basis of copolymer composition and properties, either micro- or nanoparticles were obtained; nanoparticle size was below 500 nm for the suspensions obtained from P(HB-*co*-CL) copolymers, and even smaller (200–300 nm) for those obtained using the terpolymers. Some copolymers produced hetero-dispersed microparticles under the same conditions. The obtained systems are able to encapsulate with different efficacy both hydrophilic or lipophilic molecules.

2. Innovative aspect of the product

The proposed micro- and nanocarriers are biocompatible and biodegradable. The possibility of a large physico-chemical modulation of their properties, as well as of the nanoparticle production conditions, make them an interesting alternative biomaterial for the drug delivery. We have already loaded model drugs, such as NSAID (Diclofenac) and anticancer drugs (Doxorubicin) in these systems.

3. Main advantages of the offer

The systems realized in our laboratories:

- use a simple and reproducible preparation procedure
- use largely versatile polymeric materials
- ensure a controlled and/or prolonged release of drugs
- are biocompatible and biodegradable.

4. Technology key words

PHB-PCL; PCL-(PHB-PHV); microparticles; nanoparticles; drug delivery; biopolymers; biomaterials.

5. Current Stage of Development

In developing - phase-tested in laboratory.

6. Intellectual Property Rights

No patent applied.

Technical and scientific publications

R. Pignatello, T. Musumeci, G. Impallomeni, G.M. Carnemolla, G. Puglisi, A. Ballistreri. Poly(3-hydroxybutyrate-co-ε-caprolactone) copolymers and poly(3-hydroxybutyrate-co-3-hydroxyvalerate-co-ε-caprolactone) terpolymers as novel materials for colloidal drug delivery systems. *Eur. J. Pharm. Sci.* 37:451-462 (2009).

G. Impallomeni, M. Giuffrida, T. Barbuzzi, G. Musumarra, A. Ballistreri, *Biomacromolecules*, 3: 835-840 (2002).

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