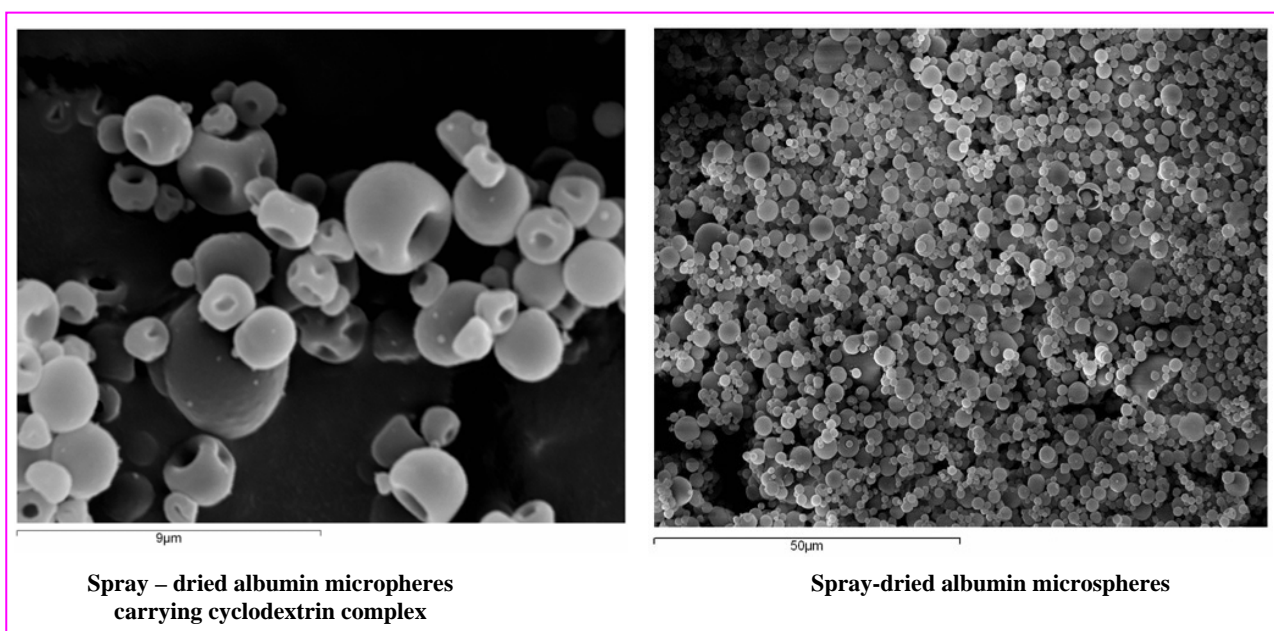


## Site-specific microparticulate systems for delivery of drugs with unfavourable biopharmaceutical properties

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Growing interest has focused on peptidic or proteic drugs in the wake of rapid advances in biotechnology and genetics. These drugs are usually administered intravenously, but this often gives rise to complications like thrombophlebitis and tissue necrosis raising the need for alternative administration routes. The oral route is generally preferred as being well tolerated. Colon specific drug delivery systems have been devised to overcome the problem of peptide degradation and consequently peptide inactivation in the gastrointestinal tract.



### 1. Description of the product

Colon specific delivery systems have been developed for oral administration of peptidic or proteic drugs. In particular, our research has focused on the study of micro-nanoparticles and self-assembling systems for time-dependent and pH-dependent delivery of vancomycin. Great attention has been given to the choice of new polymeric materials (properly reticulated, substituted or salified bovine serum albumin, polyvinyl alcohol, polymethacrylic acid and chitosan), preparative technologies (traditional techniques from two-phase systems, spray-drying, lyophilisation and coacervation) and the functional properties of the carriers (morphological aspect, loading efficiency, swelling ability, mucoadhesion properties, site specificity and drug release kinetics).

### 2. Innovative aspect of the product

Precise colon drug delivery requires that the triggering mechanism in the delivery system only respond to the physiological or pathological conditions particular to the colon. Hence, continuous efforts have been focused on designing colon specific delivery systems with improved site specificity and versatile drug release kinetics to accommodate different therapeutic needs. Our research concerns the development of innovative drug delivery systems based on new polymeric materials and recent micro-nano preparative technologies.

In particular the systems studied include:

- swelling microspheres based on crosslinked polyvinylalcohol for controlled drug release;
- pH-dependent microcapsules based on chitosan salts coated with fatty acids of different chain length;
- nanovesicular systems based on substituted polymethacrylic acid able to decrease drug availability at acid pH and increase it at alkaline pH;
- pH-sensitive microcapsules based on crosslinked albumin nanospheres coated with fatty acids of different chain length.

### 3. Main advantages of the offer

The choice of polymeric materials with specific functional properties like pH-dependency, time-dependency and enzyme-dependency associated with the application of appropriate preparative methodologies has led to the development of innovative pharmaceutical systems for peptidic drugs like vancomycin and in general drugs with unfavourable biopharmaceutical properties.

### 4. Technology key words

Peptidic or proteic drugs; colon drug delivery; nano and micro preparative technologies.

### 5. Current Stage of Development

Completed research: swellable microspheres based on reticulated polyvinylalcohol; nanovesicular systems based on substituted polymethacrylic acid; microcapsules based on chitosan salts coated with fatty acids; microcapsules based on albumin nanospheres coated with fatty acids. Work in progress: polyelectrolyte complexes based on chitosan-pectinate or chitosan-hyaluronate.

### 6. Intellectual Property Rights

The product of the research is not covered by patent.

## Technical and scientific publications

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