

antithrombotic drug ginkgolide B was achieved, with optimal simultaneous solubilization, using 6<sup>l</sup>-S- $\alpha$ -maltosyl-6<sup>l</sup>-thiocyclomaltoheptaose. Water solubility enhancements of the almost insoluble anticancer drug Taxotere<sup>®</sup> up to 4.5 g L<sup>-1</sup> were obtained with 6<sup>l</sup>-methylthioureido- $\beta$ -CD.

From a systematic investigation on the role of the chemical modification with regard to the hemolytic character of cyclodextrins, conclusions have been brought about the charge and the geometry of the modification: i) Substitution at primary hydroxyl groups usually decreases the hemolytic character; ii) introduction of an amino group, resulting in a positive charge at physiological pH, decreases the hemolytic character; iii) negative charges are comparatively less effective; iv) zwitterionic groups seems to enhance the hemolytic character of the cyclodextrin molecule. Most of these data probably relate to interactions with erythrocyte membranes which may result in extraction of components. Taking into account the above results, it is anticipated that convenient functionalization with biological markers, oligosaccharides or proteins, may result in site-specific drug delivery systems based on these supramolecular carriers.

### Determination of Sugars, and Some Other Compounds in Infant Formulae, Follow-up Milks and Human Milk by HPLC-UV/RI

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Progressive attempts have been made by the industry to bring composition of the infant formulae closer to that of the human milk. Follow-up milks are given to infants after 4–6 months of age to make the transition from human or infant formulae to cow's milk. The composition of these artificial milk formulae, relative to some constituents, namely, the sugars, does not correspond to that of genuine cow's milk from which they are originally prepared. A Regulation (91/5/EC Directive, J.O.E.C., #L 175/35, 4.7.91) establishes the type and limits of carbohydrates which can be added. Other milk endogenous compounds such as uric and orotic acids appear naturally in these formulae and because their levels can be good indicators of the quality of cows' milk used their quantification is also important.

In the present study the composition of sugars, uric and orotic acids in infant formulae and follow-up milks commercially available on the local market is reported. The levels found are compared with Portuguese and European Standards and with human and cows' milk composition. 50 samples including all of these products were analysed, using a rapid and accurate HPLC procedure developed for that purpose, which allowed simultaneous determination of lactose, glucose, galactose, saccharose, maltose, uric and orotic acids by HPLC using refractive index and UV detectors in series.

For the analysed sugars all, except two, infant formulae contained exclusively lactose, as happens with human and cow's milk. The two exceptions were lactose free infant formulae used for lactase-deficient infants and contained maltose and glucose. In follow-up milks the prevailing carbohydrate was lactose but they also contained other sugars such as, maltose, saccharose and traces of glucose and galactose, at the levels allowed by regulation. With respect to uric and orotic acid composition no significant differences between their levels were obtained when determined by ANOVA methodology, followed by Fisher's PLSD test ( $p > 0.01$ ).

### Fiber Preparation of N-acylchitosan and its Composite With Cellulose by Spinning Their Sodium Xanthate Solutions

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Chitin, chitosan and cellulose have a structural backbone of (1  $\rightarrow$  4)-linked  $\beta$ -D-glucan. Cellulose xanthate is used widely in the global rayon industry, but chitin xanthate is little used in the textile field. The present paper aims to develop a method of generating novel fibres of N-acylchitosan and its composite with cellulose from their aqueous alkaline sodium xanthate solutions.

A sodium N-acylchitosan solution in aq. 14% NaOH was treated with CS<sub>2</sub> to afford the corresponding aq. sodium N-acylchitosan xanthate solution. The xanthate solution and its clear mixed solution with sodium cellulose xanthate were spun at 45–50°C through a viscose-type spinneret into a coagulation bath containing aq. 10% H<sub>2</sub>SO<sub>4</sub>, 32% Na<sub>2</sub>SO<sub>4</sub> and 1.3% ZnSO<sub>4</sub>.

Eight kinds of novel fibers were prepared from N-acetylchitosan, N-propionylchitosan, N-acetylchitosan-cellulose composites (6:4, 4:6 and 3:7, w/w), and N-Propionylchitosan-cellulose composites (4:6, 5:5 and 3:7, w/w). All the fibers obtained were white and showed absorptions at 1650–1657 and 1550–1554 cm<sup>-1</sup> (C=O and NH of N-acyl) in FTIR spectra (KBr). N-Propionylchitosan-cellulose composite filament had better mechanical properties than did N-acetylchitosan-cellulose composite filament, because of the relatively firm interaction of N-Propionyl groups. These fibers are usable not only as biomedical materials (e.g., controlled digestible surgical suture, tissue wound-dressing etc.) but also as general functional textile materials.

### Modelling Cucose Crystallization – A Simulator for Operator Training

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Here, we report on the study of the operation of an industrial semi-batch evaporative-crystallizer for cane sugar refining, making use of an in-house developed process simulator with the required capacities for development and training in process control. Today, computer-based supervisory and control systems are routinely employed in plants, running applications on-line and in real-time. A major job for the future, which has already started, will be to incorporate new methodologies into those industrial equipment and thus to bring such methodologies into process operation. A practical difficulty hindering development in this direction is that experiments with real industrial processes, both for the assessment of new strategies and for the required operator training, are difficult to carry out for reasons of economy and safety. Such limitations can be overcome with the available technology and theory, building new laboratory environments and tools, focusing on computer control and on the concepts related to the use of information in real-time.

The theory on process modelling and simulation plays a key role in the development of such environments and tools. For a significant number of processes, deterministic models can be written which, with appropriate parameters determined by