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# COMMUNICATIONS FROM RESEARCH GROUPS: ADVANCES IN THE CHEMICAL MODIFICATION OF CHITIN AND PERSPECTIVES OF APPLICATIONS

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During the last few years, important advances have been made in the chitin field: for instance, new solvents have been proposed (*N*,*N*-dimethylacetamide + LiCl; trichloroacetic acid + chloral + methylene chloride; methanesulphonic acid, etc.); novel chemical derivatives have been prepared (from aldehydes, dicarboxylic anhydrides and other chemicals); new technologies have been worked out for the preparation of membranes to be used for various applications (Muzzarelli, 1977; Muzzarelli & Pariser, 1978).

While cooperating in the industrial production of chitosan from *Pandalus borealis*, and chitosan-glucan from *Aspergillus niger*, we have worked on analytical aspects related to establishing quality criteria for chitins and have compared a number of industrial and laboratory chitosans from crabs and shrimps in terms of infrared, alkalimetric, viscometric and X-ray diffraction data (Muzzarelli *et al.*, 1982*a*).

In view of the interest in the possible future exploitation of polysaccharides stemming from fermentation processes, we have studied, in addition to the waste from *Aspergillus niger*, *Streptomyces*, *Mucor rouxii*, *Choanephora cucurbitarum* and *Phycomyces blakesleeanus* from which a novel chitosan-glucan complex has been isolated by treating the mycelia with warm NaOH (Muzzarelli *et al.*, 1982*b*).

A new route has been established for the production of water-soluble polyampholytes; the reaction of chitosan with aldehydoacids such as glyoxylic acid and phthalaldehydic acid leads to Schiff bases which can be easily reduced to *N*-carboxymethyl chitosan and *N*-(*o*-carboxybenzyl) chitosan. These novel water-soluble derivatives have been characterised in terms of infrared and ultraviolet spectrophotometry, alkalimetry and ability to produce insoluble chelates with transition metal ions (Muzzarelli *et al.*, 1982*c*,*d*).

We have also proposed dithiocarbamate chitosan for the collection of transition metal ions (Muzzarelli *et al.*, 1982*e*).



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The interaction of a number of amino acids with chitosan and with chitosan-Cu chelates has been studied (Muzzarelli *et al.*, 1978) to establish a background for the understanding of the mechanism of immobilisation of enzymes on chitin and chitosan (Muzzarelli, 1980).

Two review articles on recent applied research on chitins are now being published: it appears that this field is quickly expanding in various directions, including textiles and membranes, pulp and paper, metal ion recovery, semi-synthetic polymers, flocculants, fungicides, anti-cholesterolemics, immobilised enzymes and food technologies, blood anticoagulants, wound healing and molecular recognition (Muzzarelli, 1982, 1983).

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