

## Conference Report

### BIOLOGICALLY-ENGINEERED POLYMERS CONFERENCE, 21-23 JULY 1986, CHURCHILL COLLEGE, CAMBRIDGE, UK

The Biologically-Engineered Polymers Conference was organized under the auspices of the Polymer-Physics Group of the Institute of Physics and the Royal Society of Chemistry and in collaboration with the British Biophysical Society. The aim of the conference was to review the possibilities for producing or tailoring polymers by the intervention of biological agents in order to obtain particular physical properties. The logical sequence to the programme was structured around four main themes: (1) structure-property relationships; (2) naturally-occurring variations in structure; (3) enzymic polymerization and modification *in vitro*; and (4) the role of physiology, biochemistry, and genetics in engineering polymers for a particular application. The general intention was firstly to establish the role of particular structural features in determining the behaviour and properties of biopolymers before going on to consider how appropriate modifications once identified could be achieved.

The session concerned with structure-property relationships was anchored on the invited lectures of Professor Atkins (Bristol, UK), who highlighted the importance of the linkage geometry in controlling conformation and molecular properties of polysaccharides in comparison to proteins, and Professor Marchessault (Xerox, Canada), who examined and compared the macroconformation and texture of paramylon, starch and PHB granules and also their crystallation for solution.

In an exciting presentation, Professor Klibanov (MIT, USA) presented his latest work on enzyme-catalyzed polymerization/depolymerization in organic solvents giving some hint of the future potential of this technique. Dr McCleary (Biocon, Eire) presented several examples of different applications of endodepolymerases and debranching enzymes to modify

polysaccharides of industrial importance. The modification of polysaccharides was also the theme of the lecture by Dr Gacesa (Cardiff, UK), but here the emphasis was on epimerases with the specific example of the C5-epimerase conversion of blocks of polymannuronic acid to polyguluronic acid in alginate, resulting in changes to the gelation behaviour.

Dr Holmes (ICI, UK) gave the invited lecture in the session devoted to PHB, a bacterial polymer of great industrial potential. His talk reviewed the structure-property relationships in polyhydroxyalkanoates produced by different organisms and their variation with substrate.

The invited lecture of Dr Morris (Institute of Food Research, UK) considered the effect on physical properties of minor naturally-occurring variations in structure found within 'families' of extracellular polysaccharides, and, in particular, the effect of short branches and non-carbohydrate substituents. Professor Rinaudo (CERMAV, France) presented recent work on relationships between solution properties and the structure of xanthan gum and succinoglycans from *Pseudomonas* or *Rhizobium*.

Recent advances in the study of modifications that can be achieved by controlling physiological growth conditions or by use of mutant strains were presented in an interesting lecture by Dr Sutherland (Edinburgh, UK). An understanding of the molecular-genetic basis of extracellular polysaccharide biosynthesis has been advanced by some exciting work of Dr Daniels (John Innes Institute, UK) who spoke on a study of *Xanthomonas* strains. Knowledge of the molecular genetics of protein biosynthesis is considerably greater than in polysaccharides, and the potential and strategies of protein engineering were elucidated by Dr Freedman (Kent, UK) in the final lecture of the conference.

The conference was successful in attracting scientists over a wide range of disciplines and sponsorship by several major organizations allowed a wide international participation from industry, research institutes and universities. The cross-discipline interactions initiated at the conference auger well for the development of a potentially extremely fruitful field.

**Mervyn Miles**