EDITORIAL

Polysaccharides

In the midst of a generalized explosion of research on, and industrial use of, renewably sourced polymers, one category that has stood out on its own is long carbohydrates, or polysaccharides. That is of course also due to the fact that these polymers have long been singled out for technological applications, and for long here we mean since the second century AD, when paper production from cellulose started in China.

Modern applications of polysaccharides come in a large variety of flavors, and here we want to give an overview of this exciting field, through the sheer variety of research published by the *Journal of Applied Polymer Science*.

The main carbohydrate polymers, often complex branched heteropolymers derived mostly from plants (but chitosan and chitin are often derived from animal byproducts, such as shrimp shells), are used in a variety of contexts and products. One of the most important polysaccharides in this context is starch, whose applications range from its use in the production of poly(lactic acid), to its modification with additives to make thermoplastic starch then used in turn to make bioplastics. Thermoplastic starch,[1] similarly to all other biopolymer-derived plastics, often suffers from relative poorer mechanical and barrier properties and moisture absorption with respect to its petroleum-derived competitors, for example in the field of packaging materials. Research is, however, improving upon these aspects at a rapid pace, and commercial products based on this material are being introduced.

Cellulose, aside from papermaking, is used in a myriad other applications: reinforcement of bioplastics in the form of microfibrillated cellulose,[2] use of hydroxyethyl cellulose[3] as a fluid loss control additive in oil wells, or production of hydrogels.

Biomedical uses of polysaccharides are developing at a fast rate, in drug delivery (as the arabinogalactan capsules described in Ref. 4 and the alginate-chitosan hydrogels shown in Ref. 5) or tissue engineering (as in the dextran hydrogel scaffolds shown in Ref. 6) given the typically good biocompatibility of these biopolymers.

Because carbohydrate polymers are being taken in so many different directions, both with respect to materials used, as well as applications, it is a complex task to give a complete snapshot of the field. We hope the panoramic view we present in this special issue will be useful both to those "in the know" and to polymer scientists outside this particular area to understand the richness of this field and its potential in delivering effective solutions for a variety of technological challenges. In addition, of course, this enables us to showcase the great content published by the *Journal of Applied Polymer Science* in an area in which we strive to continuously increase our profile.

Stefano Tonzani

Editor-in-Chief
Journal of Applied Polymer Science

References

1. Huneault, M. A.; Li, H. J. Appl. Polym. Sci., 2012, DOI: 10.1002/app.36724.
2. Bulota, M.; Kreitsmann, K.; Hughes, M.; Paltakari, J. J. Appl. Polym. Sci., 2012, DOI: 10.1002/app.36787.
3. Bülichen, D.; Plank, J. J. Appl. Polym. Sci., 2012, DOI: 10.1002/app.36529.
4. Avramoff, A.; Khan, W.; Mizrahi, B.; Domb, A. J. J. Appl. Polym. Sci., 2012, DOI: 10.1002/app.36755.
5. Torelli-Souza, R. R.; Bastos, L.A. C.; Nunes, H. G. L.; Camara, C. A.; Amorim, R. V. S. J. Appl. Polym. Sci., 2012, DOI: 10.1002/app.36928.
6. Tan, H.; Hu, X. J. Appl. Polym. Sci., 2012, DOI: 10.1002/app.36737.

Journal of Applied Polymer Science, Vol. 126, E1 (2012)

DOI 10.1002/app.38120
Published online in Wiley Online Library (wileyonlinelibrary.com).