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SYMPOSIUM ON EXTRACTIVES: UTILIZATION PROBLEM OR FINE CHEMICAL RESOURCE?

Introduction

The rapidly increasing cost of energy and recognition of the finiteness of our fossil fuels have greatly increased interest in renewable resources. Of greatest significance among these is the annual growth of biomass—stored solar energy. Much current research is devoted to the use of this biomass either directly as a fuel or indirectly by conversion into liquid or gaseous fuels. There can be little doubt that this will play an important role for the lowest grade biomass residues. The highest grade biomass will continue to provide us with food as well as wood; the latter is the most energy efficient solid material available. Our earth produces about 155 billion tons of biomass yearly, 100 billion on land, two-thirds of which is stored in forests. In the United States, for example, roughly half of the annual forest growth of 800 million tons in commercial forests will end up in wood and paper products. The remainder, together with crop residues and unused biomass, can often be converted into valuable products such as fiber and extractive chemicals.

Extractives are those plant materials extraneous to the plant cell wall that can be expressed or removed by extraction with inert solvents. The extractives can significantly affect the way biomass is used. The extractives contribute to the strength properties of wood, can accelerate the corrosion of metal in contact with wood, inhibit the pulping of wood chips and cause pitch deposition, contribute to the odor and flammability, increase resistance to decay by insects and microorganisms, are responsible for the color and light stability, affect the hydroscopicity, permeability, and glueability of wood, can cause health problems ranging from dermatitis and asthma to cancer, and can inhibit the setting of concrete in contact with wood. The extractives have long been important to the welfare of man furnishing tannins to make leather; natural rubber; essential oils for perfumery, seasoning, and medicinal agents; true gums; resins and waxes; pharmaceutically active compounds ranging from native arrow poisons to drugs; dyestuffs; and edibles such as carbohydrates, oils, proteins, and beverages. Thus, extractives can either inhibit or enhance utilization of biomass, and can also be important commercial products. In the United States alone, silvichemicals derived from wood operations had a value of over a half-billion dollars. It can be confidently predicted that, with the increasing cost of petroleum, the chemical industry will find it increasingly advantageous to turn to biomass as a source of organic chemicals. In many cases, these will be derived from the extractives.

A Natural Products Symposium Featuring Annual Plants, Tropical Woods, and Underutilized Species was held as part of the American Chemical Society/Chemical Society of Japan Chemical Congress in Honolulu, Hawaii, April 1–6, 1979. Part of this symposium was a Symposium on Fiber Components, Properties, and Utilization. The other part was a Symposium on Extractives: Utilization Problem or Fine Chemical Resource sponsored jointly by the Cellulose, Paper and Textile and the Organic Divisions of the American Chemical Society together with the Japanese Wood Research Society

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under the cochairmanship of J. W. Rowe, Forest Service, U.S. Department of Agriculture, and M. Sumimoto, Department of Forest Products, Kyushu University. A total of 31 papers were included in this last symposium, representing research in the United States, Japan, Mexico, New Zealand, Brazil, South Africa, Nigeria, Sri Lanka, and the German Democratic Republic, although the unfortunate airline strike at that time prevented some of the speakers from presenting their papers. Some of the papers are being published elsewhere, and a few represent reports of work in progress, but the seven papers gathered together in this issue do include several of the most significant papers presented.

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