Pathways and Perspectives of the Use of Arabinogalactane and Its Derivatives

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During the last years the Siberian larch (*L. sibirica*) wood has fallen again into the focus of scientific interest. This is due to the possibility of complete using of its extractive compounds, in particular, arabinogalactane (AG) polysaccharide whose content of larch wood approaches 10-15%. However, AG has not been a commercial product in Russia until the present time. We have developed an economically profitable technology for AG production in fairly high yield, well compatible with a sequence for the preparation of dihydroquercetin, which allows AG to be regarded as a promising commercial product.

AG has a wide spectrum of possible uses. It can be employed, for example, as an adhesion-promoting agent in cardboard production, binding agent for gouache and watercolor, thickener in textile industry. AG has also been proposed for use in pharmaceutical industry as a binder in pill production, emulsifying agent for stabilizing oil emulsions.

Recently much attention has been given to polysaccharides including AG due to the fact that new areas and possibilities for their application and modification had been revealed.

One of the most interesting approaches is the use of polysaccharides as synthons for the preparation of compounds having diverse properties of practical value. Thus, for example, cellulose phosphorus derivatives act as inhibitors of exothermic reactions; ethylated hemicelluloses show dielectric properties, hemicellulose isocyanates are good thermosetting plastics. Being a polyfunctional compound containing hydroxy, aldehyde, and carboxy groups, AG can also serve as potent reagent for the synthesis of biologically active compounds.

Whereas the structure and properties of *L. sibirica* AG are fairly well understood, its pharmacological properties have just come under examination. Only in the recent years gastro- and hepatoprotective effects, anti-inflammatory and antimicrobial properties of AG have been established. It has also been found that AG can be used as a matrix in developing medicines of prolonged action characterized by increased activity, reduced toxicity, lower side effects, and improved stability. A prominent pharmacological effect is also expected from some AG derivatives taking into account that a 1,3-β-D-glucane sulfo-substituted derivative has been proposed for use in AID-patients, and xylofuranosylnucleosides synthesized from xylose and nucleotide bases show a clearly defined anti-viral, anti-bacterial and anti-tumoral activity.

This list of possible AG- and hemicellulose-based products is far from being complete. Today polysaccharides are regarded as polymers of new type, their chemistry and technology being in their starting point. In contrast to many hemicelluloses, AG is a «young» synthon possessing a remarkable property of being capable to participate in receptor endocytosis and, consequently, adequate for increasing the absorbability of other drugs characterizing by low bioaccessibility.

Many of these approaches lack in experience, their chemistry, reaction mechanisms and pharmacology are not well-understood yet, but what is quite clear for the present time is that the research is this directions can lead to interesting results of great practical value.