Striving to diversify energy sources gives an impulse to the development of methods of obtaining energy from renewable sources. The use of plant biomass for the production of so-called biofuels, especially the production of second-generation ethanol from lignocellulose, is in line with these trends. The effective use of lignocellulosic biomass requires the development of an effective pretreatment method that would reduce the crystalline areas of the cellulose and lower the content of hemicellulose and lignin in order to increase the susceptibility of the biomass to enzymatic hydrolysis. An effective pretreatment of lignocellulose creates real opportunities for a more complete use of plant biomass as a carbon source in microbial synthesis processes, such as alcoholic fermentation. The development of an effective method of pretreatment requires basic research, the task of which will be to determine the effect of the applied method on the structure of lignocellulose and the susceptibility of structural polysaccharides to biotransformation processes. Currently, one of the intensively developing directions of research on lignocellulose pretreatment methods is the use of "green solvents". This group includes deep eutectic solvents used in the processes of removing hydrophobic substances, i.e. lignins. According to the concept of "green chemistry", efforts should be made to eliminate conventional, environmentally harmful solvents and replace them with environmentally friendly substitutes, such as deep eutectic solvents. Decomposition of biomass with deep eutectic solvents is intensified under conditions of elevated temperature and pressure, which can be obtained by means of microwave radiation. In addition to thermal effects, microwaves cause changes in the structure of cellulose by breaking hydrogen bonds by electromagnetic radiation and the movement of dipoles. The use of deep eutectic solvents in a microwave environment should therefore intensify the process of delignification of plant biomass and contribute to changes in the structure of polysaccharides. It should be expected that this will have a direct impact on the efficiency of biomass use in bioconversion processes. The project is aimed at understanding the impact of deep eutectic solvents applied in a microwave environment on the structure of lignocellulose and its susceptibility to enzymatic hydrolysis with cellulolytic and lignolytic enzymes. Determination of changes in the structure of plant biomass caused by the proposed method of pretreatment will contribute to a more complete use of structural polysaccharides in the processes of microbial synthesis. There is very little information in the scientific literature on how the structure of lignocellulose (biomass crystallinity, the share of individual functional groups) changes after initial microwave treatment with deep eutectic solvents. There is also no exhaustive answer to the question whether such a treatment increases the efficiency of the use of biomass components in bioconversion processes. There is also limited knowledge on the effect of deep eutectic solvents applied in the microwave environment on the susceptibility of lignins to hydrolysis with the use of microbial laccase. It is expected that the project will show changes in the structure of lignocellulose and assess the susceptibility of biomass to biotransformation processes after pretreatment. The usefulness of the processed biomass for bioconversion will also be analyzed on the example of alcoholic fermentation with *Saccharomyces cerevisiae* and *Mucor indicus*. The project will be implemented in modern biotechnology laboratories equipped with the necessary research equipment. The devices will be used to analyze the composition and structure of lignocellulose (automatic system for the determination of lignocellulose components, FTIR spectrometer, X-ray diffractometer, nuclear magnetic resonance, scanning electron microscope), and to examine the composition of biomass hydrolysates after pretreatment (high-performance liquid chromatographs with RID and DAD detection). The essence of the project is to gain new knowledge on the influence of deep eutectic solvents in a microwave environment on the composition and structure of lignocellulose and its susceptibility to hydrolytic processes. It should be noted that the problems underlying the project are important not only in the context of basic research. This project may contribute to a more effective use of structural carbohydrates contained in plant biomass in the production of energy carriers such as cellulosic ethanol.