

Vertical structure and pH as factors for chitinolytic and pectinolytic microbial community of soils and terrestrial ecosystems of different climatic zones

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Chitin is a naturally occurring fibre-forming polymer that plays a protective role in many lower animals similar to that of cellulose in plants. Also it's a compound of cell walls of fungi. Chemically it is a long-chain unbranched polysaccharide made of N-acetylglucosamine residues; it is the second most abundant organic compound in nature, after cellulose. Pectin is a structural heteropolysaccharide contained in the primary cell walls of terrestrial plants. Roots of the plants and root crops contain pectin. Chitin and pectin are widely distributed throughout the natural world.

Structural and functional features of the complex microbial degradation of biopolymers one of the most important direction in microbial ecology. But there is no a lot of data concerns degradation in vertical structure of terrestrial ecosystems and detailed studies concerning certain abiotic features as pH. Microbial complexes of natural areas were analyzed only as humus horizons (A1) of the soil profile. Only small part of microbial community could be studied with this approach. It is known that ecosystems have their own structure. It is possible to allocate some vertical tiers: phylloplane, litter (soil covering), soil. We investigated chitinolytic and pectinolytic microbial communities dedicated to different layers of the ecosystems. Also it was described depending on pH dominated in certain ecosystem with certain conditions.

Quantity of eukaryote and prokaryote organisms increased in the test samples with chitin and pectin. Increasing of eukaryote in samples with pectin was more then in samples with chitin. Also should be noted the significant increasing of actinomycet's quantity in the samples with chitin in comparison with samples with pectin. The variety and abundance of bacteria in the litter samples increased an order of magnitude as compared to other probes. Further prokaryote community was investigated by method FISH (fluorescence in situ hybridization). FISH is a cytogenetic technique developed that is used to detect and localize the presence or absence of specific DNA sequences on chromosomes.

pH as one of the factors which can have influence on degradation of biopolymers was studied for chitinolytic communities of different zones. And results were compared with direct studyings by method of "sowing" on a Petri dishes.

Thus, we compared old classical methods with modern molecular studies. The difference between climatic zones was studied and the mathematical model was created. The mathematic model could be use in different aims, such as prognosis of microbial community composition and their classification.