



OBTAINING OF CITRUS PECTIN-BASED POLYMETALLIC COMPOUNDS

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Citrus plants are one of the most perspective kind of raw materials for pectin production. Main consumers of pectin are medical and food industry as well as agriculture.

One of the most typical features of pectin is its ability to combine with ions of metal. On the basis of pectin samples obtained from “Yalongoch” local variety of lemon we synthesized metallic complexes with Co^{2+} , Cu^{2+} , Ni^{2+} and Mn^{2+} ions.

These complexes were educed in solid state and presented powders with typical color for each complex: lilac – for Co^{2+} , light-blue for Cu^{2+} , light-green for Ni^{2+} and beige – for Mn^{2+} . Forming complexes are insoluble in water and can be extracted from the metal solutions. Obtained samples have been examined with such techniques as Infrared spectroscopy, sorption measurement, Electron Spin Resonance (ESP) methods and elemental analysis.

On the basis of obtained data specific surface (S_s), volume of interstice (ω_0) and average effective radius of capillary (r_c) were estimated. Sorption characteristics of pectin samples proves that metallic complex of pectin with Co^{2+} has high sorption ability which can be explained by big specific surface and volume of interstice. It can be supposed that in complexes pectin + Cu^{2+} cross-link occurs more efficiently which is proved by growth of sample density and reduction of sorption ability.

Formation of complexes have been also confirmed by elemental analyses. Concentration of Me^{2+} in complexes was close to theoretically calculated figures.

Pectin complexes were tested by the EPR in significant dilutions. This is individual compounds of regular oxygen surroundings. Copper is included into polysaccharides chain roughly statistically.

Pectin complex is basically dissolved and partly cross-linkable under increase of concentration of



copper ions. Surface “effective” concentration of copper ions is much higher than the volume one. This fact leads to appearance of $(L)_n - CuX - XCu - (L)_n$ bridges. It is likely that X-water poorly coordinated into axial positions is easily lost in drying. When water solvates polysaccharide chains it becomes very efficient for division of chains and magnetic division of copper ions.

From the point of view of formation of correcting biocomplexes ‘pectin – metal’ systems are inter-complementary systems. Combination of pectin layers containing copper is suitable for prolongation of polymetallic supplements effect particularly in media with different pH levels.

Thus modification of citrus pectin has been conducted by introduction of biogenic metals Co^{2+} , Cu^{2+} , Ni^{2+} and Mn^{2+} into its molecule. Concentration of Me^{2+} in complexes is close to the theoretically calculated value and varies in range of 75-95%.

Pectin-based metallic complexes can be used as test models for investigation of immune activity chemicals.