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SOME BIOLOGICAL PROPERTIES OF Fe(III) COMPLEXES

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The biological properties of some coordination compounds of Fe(III) with organic ligands from different classes of chemical compounds: $FeCl_3$ Digsemi·$2H_2O$ (Digsem - dihydrazide of semicarbazidediacetic acid) (**I**); $Fe(N_3)LSO_4$ (L-sulfadiazine) (**II**); $[FeL^1(H_2O)_2](NO_3)_3 \cdot H_2O$ (L^1 - condensation product of 2,6-diacetilpyridine with nicotinic acid hydrazide) (**III**), $[FeL^2(H_2O)_2](NO_3)_3 \cdot H_2O$ (L^2 - condensation product of 2,6-diacetilpyridine with isonicotinic acid hydrazide) (**IV**), were studied.

The structure of the compounds III and IV was determined by X-ray diffraction method and represents a pentagonal bipyramid, in which L^1 and L^2 act as neutral pentadentate ligands that coordinate to the iron atoms with the electron donor atom set N_3O_2, and two water molecules in the apical positions. The iron atoms are heptacoordinated. NO_3-anions are located in the external coordination sphere and equilibrate the charge of the metal atoms. In the IR spectra of compounds III and IV can be seen the bands of high and medium intensity at 1313 and 820 cm^{-1} (III), and 1299 and 826 cm^{-1} (IV), which attribute to the NO_3^- oscillations as feature of the free ions.

The assay was performed by evaluation of the influence of the compounds on biosynthesis of cellulase (cellobiohydrolase, endoglucanase, β-glucosidase) and xylanase complex by *Aspergillus niger* CNMN FD 10 fungal strain, during submerged cultivation under continuous agitation. The sampling of cultural liquid for enzyme activities determination during the 6th - 9th day of cultivation was performed; in this period the studied enzymes give the maximal biosynthesis. The coordination compounds were added in growth medium in the concentrations of 5, 10, 15 mg/L simultaneously with the inoculum. The variants cultivated without metal complexes served as control.

The results showed that the compounds have inhibitory action on xylanases and cellulases biosynthesis of the micromycete. The degree of inhibition depended on the composition of the coordination compound and on the profile of the enzyme, and increased with the increasing of the concentration from 5 to 15 mg/L. The chloro-derivative compound I - $FeCl_3$ Digsemi·$2H_2O$ demonstrated the highest inhibitory effect. This complex in the concentration of 15 mg/L reduced to zero the biosynthesis of the cellobiohydrolases - enzymes which attack the crystalline structure of cellulose, having the major role in the hydrolysis of the polymer. The compound III - $Fe(NO_3)L_1$ $3H_2O$, whose structure contains the acid radical NO_3, showed the lowest inhibitory effect.

Regarding the specificity of action of the enzymes, the coordination compounds largely inhibited the biosynthesis of the cellobiohydrolases and lesser inhibited the β-glucosidases. The degree of inhibition for endoglucanases and xylanases was approximately equally.

The observed capacity of the coordination compounds Fe(III) with various ligands to inhibit the biosynthesis of cellulases and xylanases by micromycete *Aspergillus niger* CNMN FD 10, opens the future perspective of their use in phytotechny as control agents for diseases caused by microscopic fungi of the genus *Aspergillus*.