

AN APPLICATION OF MOSSBAUER SPECTROSCOPY ON THE INVESTIGATION
OF SOME PHARMACOLOGICAL PREPARATIONS AGAINST ANEMIA

J. Slivka, L. Marinkov, Faculty of Science and Mathematics, University of Novi Sad
D. Cvetković, B. Pekić, Faculty of Chemical Engineering, University of Novi Sad

Mössbauer spectroscopy applied to pharmacological preparations containing Fe has some important advantages over usual analytical methods, among which are the possibility for non-destructive and independent evaluation of the Fe(II) and the Fe(III) content, evaluation of some features of the electronic configuration (high-spin, low-spin) of the Fe atoms and, in certain circumstances, coordination symmetry of ligands [1].

In this work an attempt was made, applying the Mössbauer spectroscopy, to contribute to the understanding of the Fe atom state and its binding in the preparations against anemia as a function of their pharmacological efficiency which largely depends on the conditions of preparation [2] in spite of the constant chemical composition. These conditions for commercial remedies are hardly known being often some kind of industrial secret.

The main group examined in this work consists of preparations based on colloidal iron-dextran complexes. Some measurements were performed on samples of commercial remedies but the results were used only for qualitative comparisons with the main group. A set of iron dextran-complexes as a product of syntheses and gel precipitations under controlled conditions was recorded by standard Mössbauer technique in transmission geometry at room and at liquid nitrogen temperature. The basic parameters of Mössbauer spectra were evaluated: the line width, the isomer shift, the quadrupole splitting and the magnetic field. Comparing these results with the data for various modifications of Fe oxides and oxyhydroxides one could formulate the following conclusions which at this time have only qualitative features:

The core of the gel particles consists of β -FeOOH, the real iron-dextran complex could be located only on their surface so that the small contribution of such atoms does not allow the inspection to the change of their configuration. The spectra point out to superparamagnetic behaviour of the gel particles, what could be used to follow indirectly their size. It can be shown that the preparations with better pharmacological efficiency have larger particles with spectra mostly similar to the β -FeOOH bulk spectra.

[1] S.L. Ali, F.J. Litterst, F.M. Wagner: *Fresenius Z. Anal. Chem.* **302** (1980) 52

[2] A. Müller: *Arzneim. Forsch.* **17** (1967) 921