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Effect of Gold Nanoparticles Functionalized by *Arthrospira Platensis* on Rats

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Abstract

The influence of unmodified engineered AuNPs versus biofunctionalized by cyanobacterium *Arthrospira platensis* (spirulina) on rats was studied. Au NPs were administered per os in a quantity of 1 $\mu\text{gAu/day}$ per animal for 28 days, followed by a clearance period of the same duration. The accumulation of nanoparticles in different organs, the change in hematological and biochemical parameters in the experimental animals were assessed at the end of the nanoparticle administration and the clearance periods. The amount of gold accumulated in organs was determined by applying neutron activation analysis at the IBR-2 reactor. Biochemical and hematological analyses of the blood were performed using a semi-automated system StarDust MC15. The biofunctionalized nanoparticles were accumulated in larger amounts, and the amount of metal remaining after the clearance period was also higher in the case of the functionalized nanoparticles. Only biofunctionalized nanoparticles accumulated in the ovaries. Both types of nanoparticles possess high biological activity, inclusive of their induced changes in the leukogram, glucose, urea and liver transaminases levels. More pronounced changes being characteristic for unmodified gold nanoparticles. Tested nanoparticles can cause long-term or delayed effects, which include the increase in glucose and urea levels as well as the increase in ALT activity after the clearance period.

Keywords: Arthrospira platensis, spirulina, gold nanoparticles, aurum accumulation, aurum clearance



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