

Increasing iron oxide nanoparticles bioavailability using probiotics

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1 in 10 Europeans has iron deficiency. Iron deficiency leads to anemia, tiredness, and reduced productivity. 1 in 5 European women is anemic. Vegetarians are two times more likely to have iron deficiency. Iron needs to be absorbed from our food, but only 10% of iron is absorbed. Iron supplements cause gastrointestinal cramps and constipation because iron generates free oxygen radicals that cause inflammation and disturb the microbiome. Our study aims to find an iron formulation delivered with better efficacy and fewer side effects. A superior form of bioavailable iron-iron oxide nanoparticles are combined with probiotics that enhance iron absorption and reduce gastrointestinal side effects. Green synthesis of the iron oxide nanoparticles was used. The obtained nanoparticles were characterized using:

- i) X-ray diffraction (XRD) to determine the crystal structures and lattice parameters of nanoparticles
- ii) FT-IR spectroscopy to assign characteristic frequencies to molecular groups and, therefore, the correlation of IR absorption bands with different structural units
- iii) Transmission electron microscopy (TEM)
- iv) BET analysis for the study of surface porosity and particle size;
- v) XPS techniques will be used to evaluate the actual stoichiometry of the samples.

The dependence of the structure, morphology-shape and size of the chemical composition of iron oxide nanoparticles will also be studied. Further probiotic ability to enhance the reduction of Fe³⁺ to Fe²⁺ and enhance transport by the production of lactic acid and p hydroxyphenyl acetic acid was evaluated. The evaluation of cellular uptake of the nanoparticles was done using Caco2 cell line model.

Biography

Pop Oana Lelia is currently an assistant professor at the Food Science Department of the University of Agricultural Sciences and Veterinary Medicine, Cluj-Napoca. She has more than 10 years of experience in encapsulation and biotechnology (spray drying, in vitro simulated gastrointestinal passage, and microbiology), working with pro and prebiotics and different biopolymers. The intense and ever-growing interest she had regarding active cells as probiotics and their correlation with human prevention and amelioration of degenerative diseases, especially intestinal ones, led her to be a promising researcher with excellent and valuable results for the science community.

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