

## NEW COLLOIDAL CHELATED HIGHLY DIGESTIBLE FORM OF ZINC ESSENTIAL TRACE ELEMENT

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### Abstract

Within the framework of the presented study, a synthesis method of the new colloidal chelate form of zinc - zinc lysinate-riboflavinate (LRZn) has been developed. Medical-biological and physicochemical properties of zinc lysinate-riboflavinate have been studied in order to enrich dairy products with zinc-containing compounds.

LRZn was obtained in an aqueous medium as a result of a reaction between L-lysine, B2 vitamin (riboflavin) and a zinc-containing precursor. The phase and dispersion composition of zinc lysinate-riboflavinate was studied by the XRD and photon-correlation spectroscopy methods respectively. The morphology of LRZn was studied by scanning electron microscopy. The elemental composition was investigated using energy dispersive spectroscopy. The paper also presents the results of quantum mechanical modeling of the compound in HyperChem 8.0 and ChemBio3D Ultra 12 software. The acute toxicity of LRZn was investigated in laboratory animals. To determine the acute toxicity of zinc lysinate-riboflavinate, six groups of laboratory white mice of 10 animals in each were formed. The first group served as a control; laboratory animals of others groups were orally administered the developed form of the essential trace element zinc at different doses. The data on the effect of milk, enriched with the essential zinc trace element, on the growth, development and blood biochemical parameters of laboratory animals was obtained. For this purpose, males of white Wistar rats were used as laboratory animals; 3 groups of laboratory animals were formed, all animals were fed on a zinc-deficient diet, once a day animals were fed: the 1st group - milk; the 2nd group - milk enriched with zinc sulfate, and the 3rd group - milk enriched with LRZn. The body weight of laboratory animals was measured daily.

It was found that zinc lysinate-riboflavinate is a monophasic compound with a monoclinic crystal lattice. Investigation of microstructure showed that the samples consist of needle-shaped crystals with a length from hundreds of nanometers to several microns. It was established that zinc lysinate-riboflavinate does not have toxic properties and is a non-toxic compound.

It was determined that the consumption of milk, containing LRZn chelate form has a positive effect on the weight gain of laboratory animals. A decrease in the concentration of urea, total cholesterol and an increase in the concentration of the Alanine aminotransferase and Aspartate transaminase enzymes in the blood of laboratory animals as a result of a higher digestibility of the chelate form of the essential trace element zinc were found.

**Key words:** Zinc lysinate-riboflavinate, Zinc chelate, Zinc trace element, X-ray diffraction, Scanning electron spectroscopy, Acute toxicity, Blood biochemical parameters.