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Fulvic acids in Fiuggi mineral water and their role in degrading kidney stones

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Urolithiasis is one of the most common diseases in the world [1]. The leading cause of kidney stones formation is a lack of water in the body. Water therapy is the most useful and efficient method for complex treatment and prevention of kidney stones. Here, we report the medicinal effect of Fiuggi water in patients with urolithiasis and offer a probable model of interaction of fulvic acids in Fiuggi water with stone-forming metal ions (e.g., Ca²⁺) in urine. Fiuggi water is low-mineralized natural oligomineral water with a very strong diuretic effect. Its composition comes from the volcanic soil enriched of humic substances in Anticolana Valley. The presence of humic and fulvic acids in Fiuggi water has been established and confirmed by chromatography and other analytical methods, nuclear magnetic resonance, and infrared spectroscopy [2-4]. Humic substances are natural polymers with complex and disordered molecular structures. One of the most important characteristics of humic substances is their ability to form water-soluble complexes with metal ions [5]. Fulvic acids in Fiuggi water demolish the crystal lattice of the calcium salts (oxalates, phosphates, etc) in kidney stones and form soluble calcium complexes. As a result, the stones are naturally dissolved and eliminated from the human body.



Figure : Scheme of the interaction of humus acid fragment with calcium oxalate [6]

Biography

Nadejda Davydova is Senior Research Scientist at A.N. Nesmeyanov Institute of Organoelement Compounds Russian Academy of Sciences (INEOS RAS) in Moscow with the following research interests: organic chemistry; research in bioactive polymers; drug design and relationship of functional groups to pharmacologic activity; search for new drugs. Nadejda Davydova is a graduate of the Moscow Institute of Fine Chemical Technology. She obtained her PhD in Organic Chemistry from the All-Union Chemical Pharmaceutical Research Institute in Moscow. Before joining INEOS RAS, Nadejda Davydova held position as a Senior Research Scientist at the Centre of Chemistry of Drugs - All Russian Chemical Pharmaceutical Research Institute. Dr. Nadejda Davydova is the author of many inventions, e.g., discovery of original chemical substances for Russian antiarrhythmic drugs: Nibentan and Niferidyl (Refralon).

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