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**CHALLENGES IN
SCIENCE OF NOWADAYS**



WASHINGTON, USA
4-5.04.2021



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LIGHT INDUSTRY AND FOOD INDUSTRY

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OBTAINING A COMPLEX OF CURCUMIN WITH MANNAN

Today, one of the most important directions in the development of the food industry is the development of functional food products and dietary supplements that affect the human body increasing its resistance to disease and improving physiological processes. This physiological active ingredient is curcumin which has a positive effect on the human body but is mainly used in the food industry as a colorant.

Curcumin is a phenolic compound that is primarily derived from turmeric. Modern science has shown the ability of this polyphenol to exhibit antioxidant, anti-inflammatory, antimicrobial, hypoglycemic, wound healing and chemopreventive effects in many diseases. [1, 2].

However curcumin has several limitations such as chemical instability, poor water solubility, low bioavailability, and rapid metabolism under physiological conditions. Due to its chemical properties, curcumin is unstable and susceptible to auto-oxidation upon prolonged exposure to physiological pH. [3].

A large amount of research is aimed at increasing the bioavailability of curcumin. This is achieved through its incorporation into liposomes, solid dispersions, nanogels, and metal complexes. [4].

One of the possible ways to solve this problem can be the use of polysaccharides as potential carriers of active ingredients due to their natural affinity for biological tissues and biodegradability. These polysaccharides include mannans. These polysaccharides are capable of influencing the immune system, activating macrophages and stimulating T-cells. They are potent immunostimulants with significant activity against infectious diseases and tumors, and manooligosaccharides are widely used as prebiotics. [5,6].

Mannans are also considered as promising matrices for conjugation with biologically active substances. Protecting them from degradation mannans help preserve and increase the bioavailability of these biologically active substances [7].

This study focuses on the development of a method for producing a complex of curcumin with a water-soluble mannan. Water-soluble mannan was obtained by treating coffee sludge with β -endo-mannanase [8]. It was characterized by a low molecular weight (20 kDa), which, according to the authors of [9], determines an increase in its biological activity in comparison with high molecular weight analogues.

The complex was obtained by combining alkaline curcumin and mannan solutions. The concentrations of mannan and curcumin solutions, the ratio of their volumes, and the duration of exposure were varied.

The alkaline solution was neutralized to pH 7, after which a precipitate formed, which was dissolved in methanol, ethanol and hexane. The maximum absorption of an ethanol solution of this precipitate is 425 ± 2 nm, which corresponds to the wavelength of a curcumin solution in ethanol [10]. The supernatant was concentrated and then dried. A dark colored product was obtained which did not dissolve in methanol, ethanol and hexane, but did dissolve in water.

Based on the information on the solubility of curcumin (curcumin is soluble in ethanol, methanol, isopropanol, and practically insoluble in diethyl ether, hexane, as well as in water at pH = 7 [11]) and comparing them with the results of the studies carried out, it can be assumed that what:

1. The sediment that forms when neutralizing an alkaline solution of curcumin with mannan is curcumin not included in the complex;

2. The supernatant contains a mannan-curcumin complex. The degree of inclusion of the latter in this complex is 78-80%.

Thus the obtained information can be considered as one of the evidence of the formation of a complex of mannan with curcumin and the basis for the development of further research on the characterization of its physicochemical properties and physiological effectiveness.

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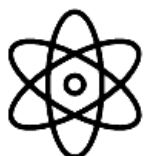
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