

THE STUDY OF PHYSICAL AND CHEMICAL INTERACTIONS OF FOOD DYES WITH MEDICINAL SUBSTANCES

Materiienko A.S., Grudko V.A., Georgiyants V.A.

The National University of Pharmacy, Kharkiv, Ukraine

anna.materienko@gmail.com

Every manufacturer wants to attract the largest number of consumers to his product in an evolving competitive environment. A lot of attention is paid to the improving of consumption properties and the visual appeal of the goods along with the safe, effective, and high quality drugs. To achieve the similar purpose for the pharmaceutical market is possible by applying of various excipients, such as dyes, aromatic and flavoring additives etc. Food dyes is the one of the widely used groups of excipients in food and pharmaceutical industries. It is believed, that food dyes enter to the body in quite small quantities, but their interaction with each other and with different groups of substances has not been sufficiently studied. Over the past decade the number of allergies and other adverse reactions to the synthetic substances, entering into blood, has significantly increased. Food colors are poorly absorbed from the gastrointestinal tract, but getting into the blood, can bind to proteins and in this way become full antigens.

We have studied the chemical structures of synthetic food azo dyes and suggested, that they may react with organic amines, their salts and quaternary ammonium compounds to form ion associates. A series of experiments was carried out and proved, that the food azo dye carmoisine can form ion associates with some organic amines and such medicinal substances as lidocaine hydrochloride, chlorpheniramine maleate, and myramistin. Physical and chemical properties of formed ion associates are differ from the original dyes; in particular, they are soluble in organic solvents (chloroform, butanol, ethyl acetate etc.) and some fatty oils (peach oil). This fact suggests that the dye in composition of associates can directly absorbed from the gastrointestinal tract in the form of oil solutions or emulsions.

Also, we have studied the properties of formed ion associates - the partition coefficients for different solvents, the stoichiometric ratio of the components in ion associates, the dependence of the extraction of associates from the pH of the aqueous solution, extraction time, the effect of salting-out agents to be complete extraction.

Methods for identification and quantitative determination of carmoisine and tartrazine, contained in medicines, were developed on the basis of the obtained results. It is also planned the development of control methods of completeness cleaning the process equipment after using this group of dyes in the drugs and food production.