

INTERACTION OF SYNTHETIC FOOD DYES WITH CATION SURFACES

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Sulfonated synthetic food dyes (SFC) E102, E110, E124, E129, E133 are determined in beverages and food extracts using ion-selective electrodes (ISE), to create which ion exchangers are obtained by the interaction of SFC with cationic surfactants. The nature of the interaction in such systems depends on the initial concentration of substances, their ratios and can proceed in different ways. This report describes the specifics of this interaction. By the example of the E129-cetylpyridinium chloride (CP) system, three different disperse states of the system are established. When mixing solutions of dye E133 and CP 1×10^{-4} M in a ratio of 1:2, a colloidal solution is formed with a particle radius of 95 nm, after an hour the particles aggregate and their radius increases to 222 nm. When mixing the E133 solution (1×10^{-4} M) with the CP solution (1×10^{-2} M), dissolution of the ionic associate was observed. The electrostatic factor determines the stoichiometry of the formation of ion exchangers. The electrostatic factor determines the stoichiometry of the formation of ion exchangers. By the method of potentiometric titration with a CP-selective electrode, it was shown that associates are formed with the molar ratio SFC:CP=1:2. The presence of electrostatic interactions in the ion exchanger is proved by IR and NMR spectroscopy. In the IR spectrum of E129 dye, characteristic absorption bands of conjugated aromatic rings with azo group (fragment of aromatic azo compound) are observed at $1580-1600 \text{ cm}^{-1}$, azo group at 1550 cm^{-1} , OH enol hydroxyl at 3420 cm^{-1} , a wide band indicates the formation intermolecular hydrogen bond (associate), $\text{CH}_3\text{-O-}$ (methoxy group) absorption band at $\nu 1200-1230 \text{ cm}^{-1}$, dye sulfo groups at 1100 cm^{-1} . The IR spectrum of cetylpyridinium chloride contains valence asymmetric and symmetric vibrations of C-H bonds of the aliphatic part of the CH_2 and CH_3 groups as a series of bands in the region of $2820-2900 \text{ cm}^{-1}$, =C-H bonds of the pyridinium fragment of CP chloride, at 3020 cm^{-1} and stretching vibrations of the cyclic quaternary ammonium salt-pyridinium fragment. The IR spectrum of the ion exchanger contains all the characteristic bands characteristic of E129 and CPC, which confirms the presence of electrostatic interaction.