Studies on the tincture of candied fruits with natural colorants and the analytic method of synthetic colors in candied

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ABSTRACT

In this study, the replacement of synthetic colorants with natural colorants to tincture candied fruits was investigated first, and then the analytic method of synthetic colorant was studied. In the replacement of synthetic colorants with natural colorants, the candied mei and olive fruits, tinctured with a 0.25% Carmine plus 0.5% Monasco Red solution and a 2.0% Carmine plus 1.0% Monasco Red solution, respectively, had higher color sensory evaluation scores. The candied plum and mango fruits, tinctured with a 0.5% Carmine plus 0.5% Monasco Red solution and a 0.25% Melon B plus 0.5% Chlorophyll solution, respectively, also had higher color sensory evaluation scores. These mixed solutions of natural colorants showed stable to heat and light stability test. Moreover, the color of the candied mei, plum, olive, and mango fruits, tinctured with suitable colorants and then packed in OPP/CPP and stored at room temperature for 240 days, changed slightly in the beginning period (about 60 days) and kept steadily thereafter. The color sensory evaluation score of the candied olive fruit after 240-day storage was equivalent to that of marketing product, while the color sensory evaluation scores of the candied p lum and mango fruits were higher than those of marketing products. In the analysis of synthetic colorants, thin-layer chromatography (TLC) was first conducted to qualitatively analyze the colorants. The results showed that the solvent mixture of n- butanol, acetic acid, and water with a ratio of 10: 5: 6 and the other solvent mixture of ethyl acetate, methanol, and ammonia with a ratio of 3: 1: 1 were two better solvents for developing the tested colorants in thin-layer chromatogram. Then, in the analysis of synthetic colorants using visible chromatography, the results showed that the number of the peaks appeared in the absorption spectrum of visible range was the same as that of the components in the tested synthetic colorant mixture. The maximum absorption wavelengths of these peaks were the same as those of the components, and the absorbance of each peak also had a positive proportion to the concentration of the component. Therefore, the content of the component in the colorant mixtu re can be determined from the its absorbance of visible spectrophotometry. However, some colorant mixtures showed only one broad peak in the visible spectrum. In this situation, The content of the component in the colorant mixture could be determined using regression analysis between the mixing ratio of the component in the colorant mixture and the maximum absorption wavelength of the mixture. According to the above results, the identification of the components in a synthetic colorant mixture can be achieve d using TLC, and the contents of the components can be determined using visible spectrophotometry. Finally, the analysis of synthetic colorants using TLC, visible spectrophotometry, and high performance liquid chromatography (HPLC) was compared. It was found that TLC was a rapid and convenient method, but it had a larger deviation, and the sample should be concentrated before testing. HPLC was a rapid and high-precision method. However, two different mobile phases should be used to minimize the interference of the solvents used in the extraction of colorant samples. Visible spectrophotometry was a high-precision and feasible method, although its analytic procedure was complicated when the maximum wavelengths of the components in colorant mixture were close to each other and resulted in only one broad peak in the visible spectrum.

Keywords : Nature colorants ; tincture candied fruits

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