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EQUIPMENT FOR CAPILLARY ELECTROPHORESIS (CEF) FOR THE PRODUCTION OF SOFT DRINKS IN THE FOOD INDUSTRY CONTROL METHOD USING

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Abstract
The approved technique capillary electrophoresis at the analysis of food dyes allows to identify and quantitatively to define maintenances of dyes in the structure of soft drinks.

Keywords: Food industry, capillary, soft drinks, electrophoresis (CEF), physicochemical.

Introduction

In quality control and certification of soft drinks produced in the country and imported from abroad, heavy and toxic elements are mainly used: lead, arsenic, cadmium, mercury; radionuclides: caesium-137, strontium-90 and caffeine are quantitatively determined.

In the current era of economic development based on a market economy, these methods are unlikely to meet modern requirements. This is due to the fact that in the production of soft drinks, which are becoming more popular, the addition of various synthetic compounds is increasing, which gives them dozens of colours, aromatic aromas and pleasant tastes. Therefore, insufficient attention is paid to the normative amounts of synthetic compounds in soft drinks and simple and convenient physicochemical methods for their determination based on new technologies, which indicates the relevance of studying this issue [1-4].

One of the modern physicochemical methods is capillary electrophoresis (CEF), which is an effective method for studying and composing complex mixtures of components, providing high-precision results, complete separation of substances

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into ions (the number of theoretical plates reaches 2,000,000). This method is widely used not only for determining the composition of substances with a similar structure but also for identification, technological control and quality control of food and pharmaceutical products [2-7].

In the laboratory, the Capillary Electrophoresis Equipment (KEF) series includes: red Aqua Strawberry, Yellow Aqua Pineapple, Fire Aqua Orange, Light Yellow Sibur Fiesta, Yellow Sibur Pineapple, Green Sibur Apple, Yellow Arctica Pineapple, Fire Color Composition of soft drinks such as Arctic Fansy, red Arctika Zemlyanica, green Arctica Apple, got into the category of "Dyesn.M" style.

During the test, a small amount of a beverage sample was transferred to a KEF quartz capillary injector filled with electrolytes. Capillary tube size 50 μm. I am. etc., I = 8.5 cm, L = 64.5, temperature – 30 ℃, negative pressure - 20 kV, the amount of sample transferred to the injector - 300 mbar [8-11].

A calibrated linear table of synthetic dyes tartrazine E-102, carmoisine E 122, bright red E-129 and patented blue E 131 was prepared for control under Texas conditions or colour determination of colour The following 200 of the above dye synthetic dyes were obtained for control to prepare a calibrated line; 133.4; Solutions were prepared with concentrations of 66.6 and 33.3 mkg/ml.

In order to shorten the analysis period and obtain a high-precision result, a beverage sample was sent from the reverse pole of the capillary. Then electrolytes were added to the capillary tube to a power of 5 to 30 kW. Under the influence of the electric field created by this additive, the compounds in the tested beverage began to move. The speed of movement of ions depends on structure, charge and molecular weight, and it has been observed that they reach the detector at different times [12-14]. The UV detector recorded the signals of ions of substances in the test drink, mainly in the wavelength range of 190-600 nm. Some of the electrophoresis results obtained from the analysis are shown below Figure-1.

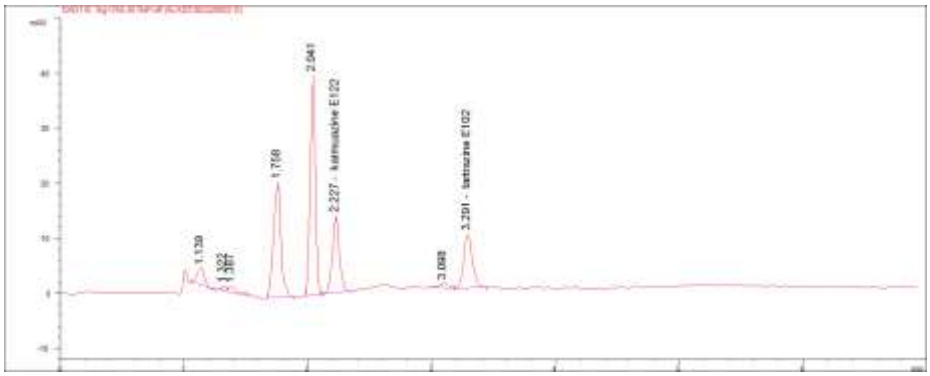

Figure 1. Electrogram of Aqua Orange soft drink produced in Uzbekistan

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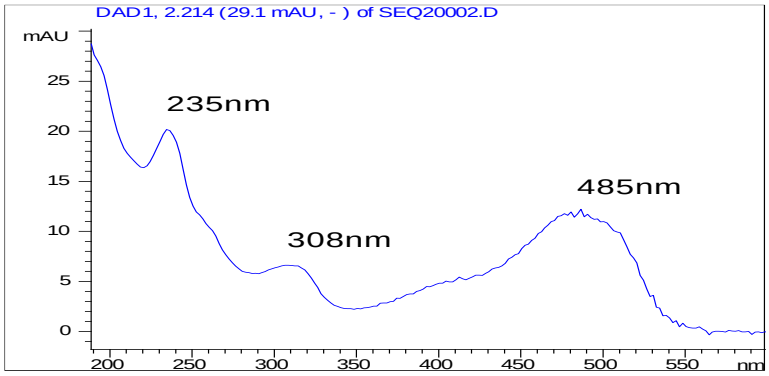

Figure 2.

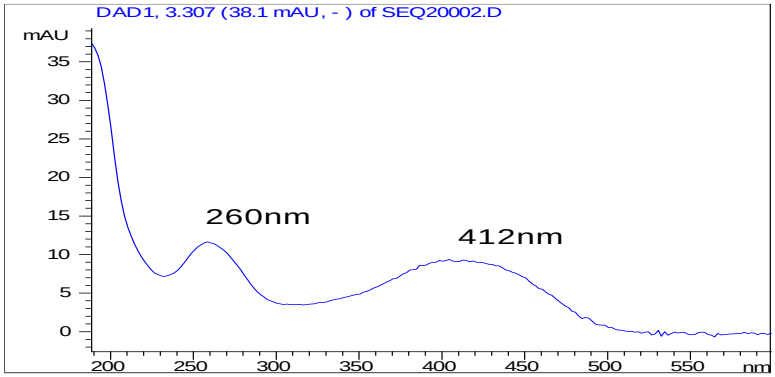

Figure 3.

The spectrum of the synthetic colouring dye carmoisine E-122 in the UV detector mode with a maximum wavelength of 235, 308 and 485 nm, contained in the Aqua Orange Uzbek soft drink. Synthetic dye Tartrazine E-102 in UV detector 260 and 412 nm of cold drink Aqua Orange produced in Uzbekistan.

As seen in Figures 1-2, the Aqua Orange soft drink was found to contain the synthetic colourants Carmoisine E-122 and Tartrazine E-102. To calculate the number of synthetic dyes in soft drinks, the following calibre table was used as a result of calculating the spectral area of the control samples.

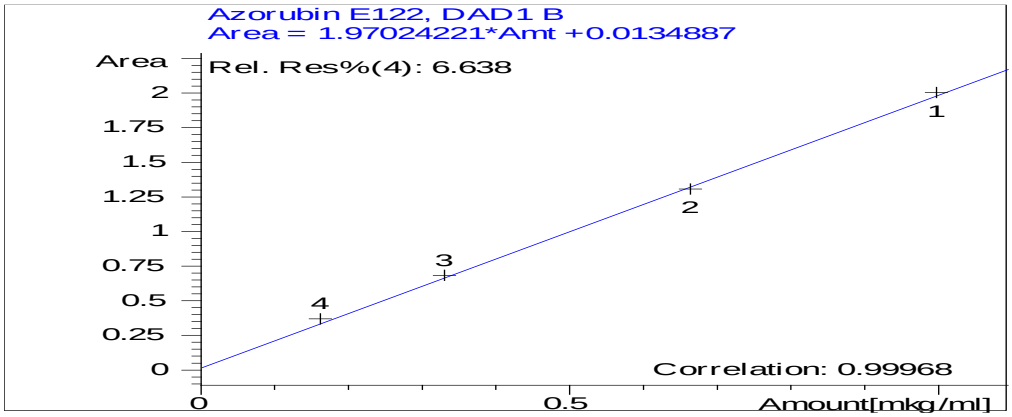

Figure 4.

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Based on the results of the studies, it was recommended to use the method of capillary electrophoresis in the production of soft drinks for quality control and product certification.

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