USE OF DIGITAL IMAGES OBTAINED BY SCAN FOR DETERMINING ACIDITY OF COLA REFRIGERANT

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RESUMO

Soda is a type of non-alcoholic beverage, usually with high amounts of dyes and preservatives. Most soft drinks, especially those based on glue, are extremely acidic, as they have a very low pH of around 2.5. The acidity of food indicates its conservation status and in the case of soft drinks, the low pH still disadvantages the growth of microorganisms. The methods commonly used for the determination of acidity evaluate the titratable acidity or the concentration of free hydrogen ions by means of pH. In this work, a titration based on digital images obtained by scanning was used to determine the acidity of soft drinks. For sample preparation, a dilution of 1 mL of the soft drink was made in 100 mL of distilled water followed by the addition of 3 drops of phenolphthalein (indicator) according to the IAF methodology. From the different brands, samples were prepared in triplicates called A, B and C. To capture the digital images, a system composed of a scanner, a 96-well microplate, a pHmeter and a computer with Windows system was set up to treat the data collected by the scanner. As a titrant, a solution of NaOH 0.1 mol.L^{-1} was used. To determine the total acidity of the refrigerant, the equation $A_t=(V*F_C*M*100)/A$ was used, where A_t is the total acidity, V is the spent volume of NaOH, F is the correction factor, M molarity of the solution. The value of A is the sample volume in mL. The determination of the acidity of soft drinks using the method based on digital image obtained by a scanner was made similarly to the potentiometric titration procedure. After each addition of the titrant, an aliquot of the titrant was removed and placed on a microplate, being digitized by the scanner. The images were captured and treated with software from the scanner manufacturer (HP). The images captured by a scanner were opened by the ImageJ software to obtain the RGB values. The most homogeneous region of the desired image was selected. The software checks all pixels (column by column) to extract the RGB components from each pixel. The results are displayed in a window and then stored on the computer. With the RGB values, a curve of the product $2^R.2^G.2^B$ was constructed versus the volume of titrant added. Then the first derivative of the curve was made, where the maximum point in the graph gave the volume of the titrant needed to neutralize the acids. The results of total acidity were: Sample A (3.5 g.100 mL^{-1}), Sample B (1.75 g.100 mL^{-1}) and Sample C (3.50 g.100 mL^{-1}), with standard deviations of 0.5, 0.2 and 0.4 for each sample, respectively. The procedure used showed that the scanner can be used as an instrument in determining the acidity of cola-type soft drinks, as well as in the analysis of other products in which this parameter is an indicator of quality, it appears that the method used is applicable for this determination type and shows its analytical potential.

PALAVRAS-CHAVE: digital images, scanner, total acidity, titration

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