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Determination of carrageenan by means of photometric titration with Methylene Blue and Toluidine Blue dyes

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Highlights:

- Interaction of thiazine dye with carrageenan results in the dye spectrum change.
- Shape of photometric titration plot is dependent on carrageenan concentration.
- Inflection point of titration plot is not sharp enough to be recognized as end-point.
- The most convenient titration mode is titration until a certain voltage.
- The proposed method is applicable with any automatic titrator.

Abstract

A new approach to carrageenan quantitation was described. The method consists in titration of carrageenan solution by Methylene Blue dye or Toluidine Blue dye solution until a certain absorbance value. The optimal wavelengths are 660 nm and 640 nm when titrating with Methylene Blue dye and Toluidine Blue dye, respectively. Rectilinear calibration plots ($R^2 > 0.996$) provide carrageenan determination in the concentration range from 2 to 60 mg/L with relative standard deviation from 1 to 5%. The proposed method is simple and feasible in use due to optical dip probe providing *in situ* absorbance measurements. The proposed way of end-point recognition as pre-set voltage is applicable with any automatic titrator. The method was tested on model jelly dessert sachet. No interference was registered from typical ingredients of jellies such as sucrose, citric acid, sodium citrate, malic acid, potassium sorbate as well as blue colorant. The neutral polysaccharides such as guar gum and locust bean gum have insignificant interference when their content is fivefold as compared to that of carrageenan.

Key-words: carrageenan; anionic polysaccharide; metachromasia; automatic titration

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