



## Rheological evaluation of natural sweetener-based caramel formulations

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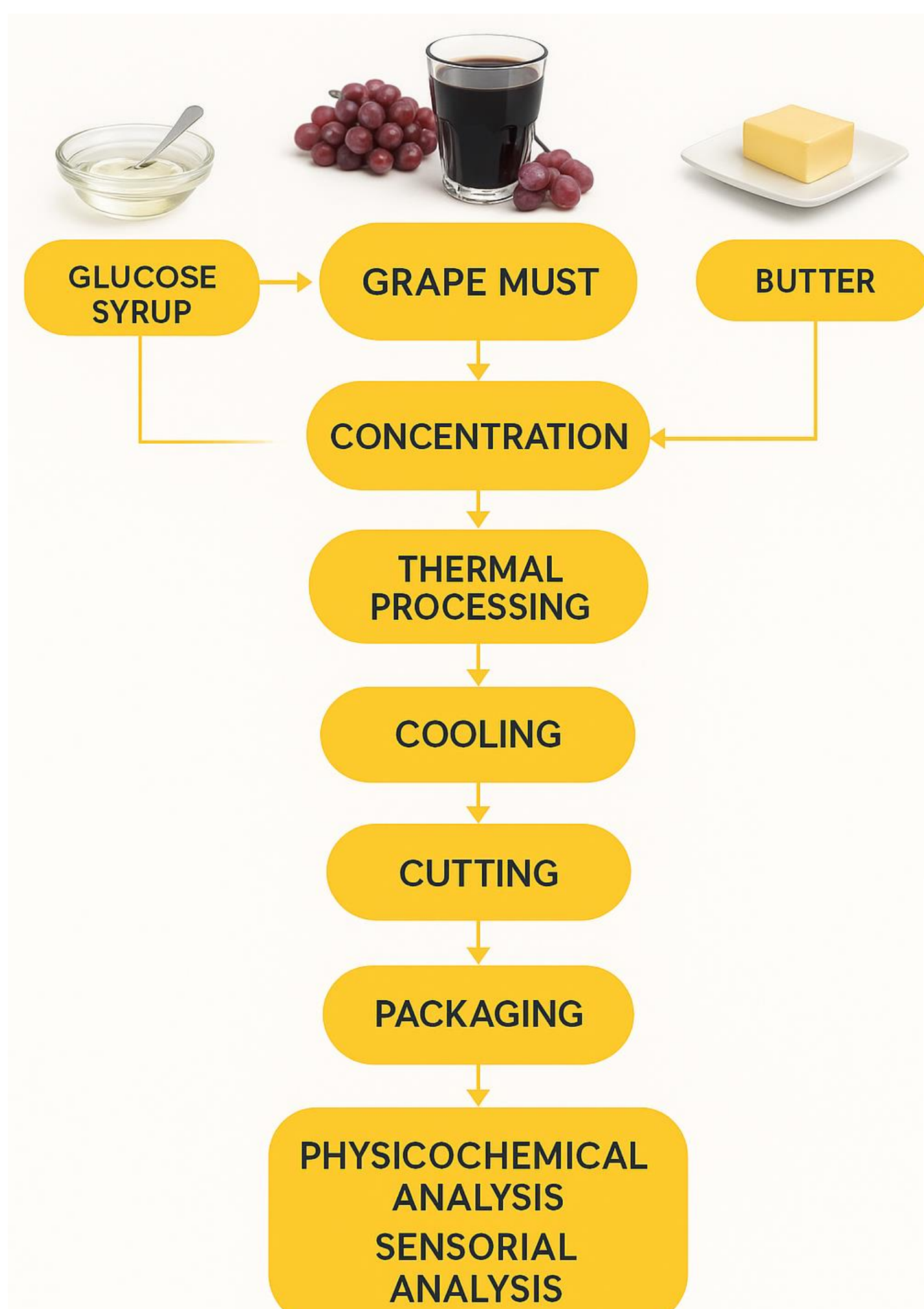
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**Abstract:** This study investigates the formulation and rheological characterization of caramel candies produced using concentrated grape juice as a natural sweetener, with the objective of developing a healthier alternative to conventional caramels. The technological process involved the concentration of grape juice, followed by mixing with auxiliary ingredients such as glucose syrup, butter, and citric acid, followed by pouring into molds, cooling, cutting, and packaging. The experimental research was conducted on red grape juice, juice after the first concentration, juice after the second concentration, and caramel candies. Comprehensive physicochemical and rheological analyses were conducted, including measurements of viscosity, moisture content, pH, polyphenol concentration, acidity, and dry matter. Mechanical tests for compressive and cutting resistance were performed using the Zwick Roell system.

### • Introduction

Caramels are widely consumed confectionery products characterized by their distinct texture, flavor, and extended shelf life. However, the high sugar content of conventional caramels limits their consumption among health-conscious consumers. To address this, this study explores the use of concentrated grape must as a natural sweetener and functional ingredient, leveraging its rich polyphenol content and distinct flavor profile (Oprean, 2020).. The grape must used in this study serves as a primary raw material, offering natural sweetness and bioactive compounds, including antioxidants, which contribute to the overall nutritional value of the final product

### • Material and method



Spectrophotometer



Acidity



Moisture



Rheologic properties

### Conclusions

The findings indicated a progressive increase in viscosity and dry matter content with each concentration stage, and a corresponding decrease in total polyphenols due to thermal degradation. The caramels exhibited adequate structural integrity and consistent mechanical resistance. Sensory analysis yielded high scores for appearance, texture, and aroma, though lower scores were recorded for taste and colour.

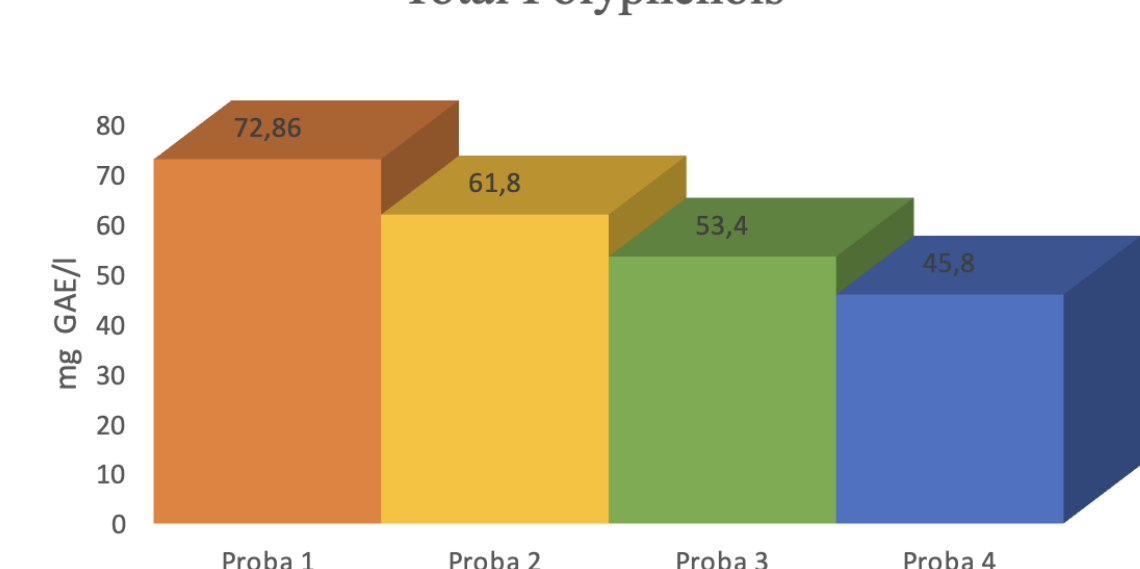
The incorporation of grape juice concentrate as a natural sweetener has been demonstrated to enhance both the nutritional profile and shelf life of the final product.

### • Results and discussions

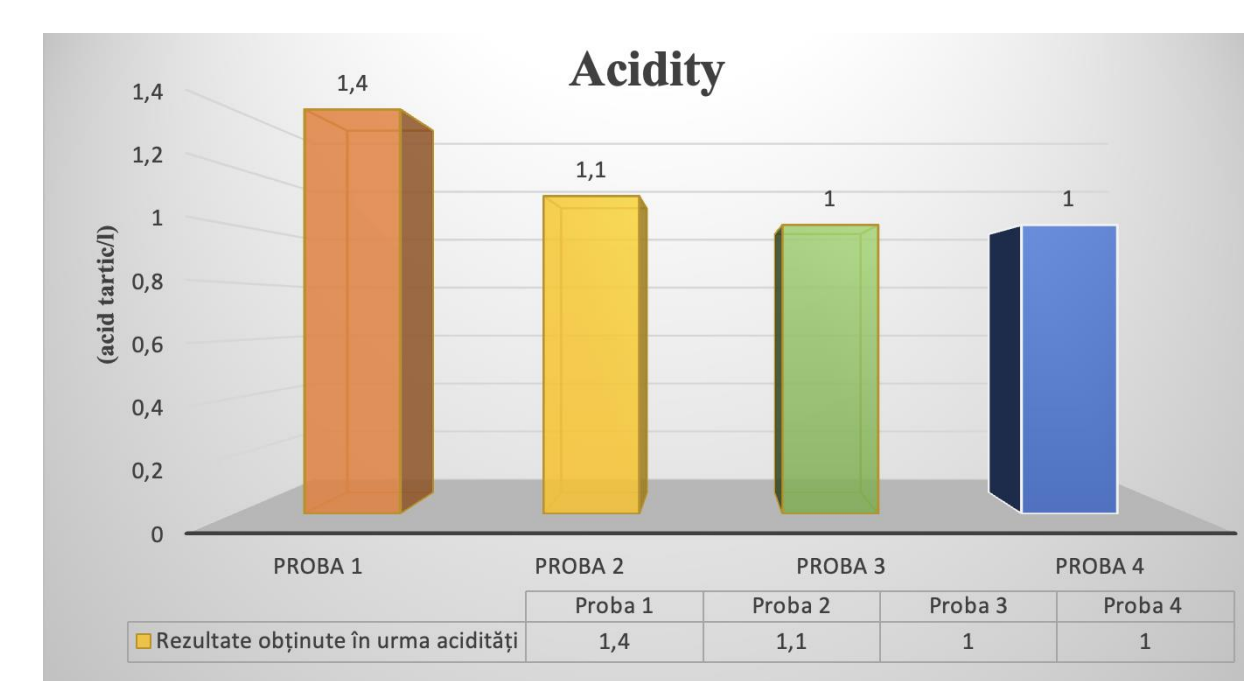
Sample\_Descriptions

Sample	Description
Sample 1	Grape Must
Sample 2	Must after First Concentration
Sample 3	Must after Second Concentration
Sample 4	Caramels

Total Polyphenols



Acidity



Viscosity, cP

