



Evaluation of the accelerated stability and quality of grape and tomato pomace during storage

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Introduction

Tomato pomace and grape pomace are two important agri-food byproducts generated in considerable quantities as a result of tomato and grape processing in the food industry. They have high potential for value-added use due to their rich composition of bioactive compounds.

Materials and methods

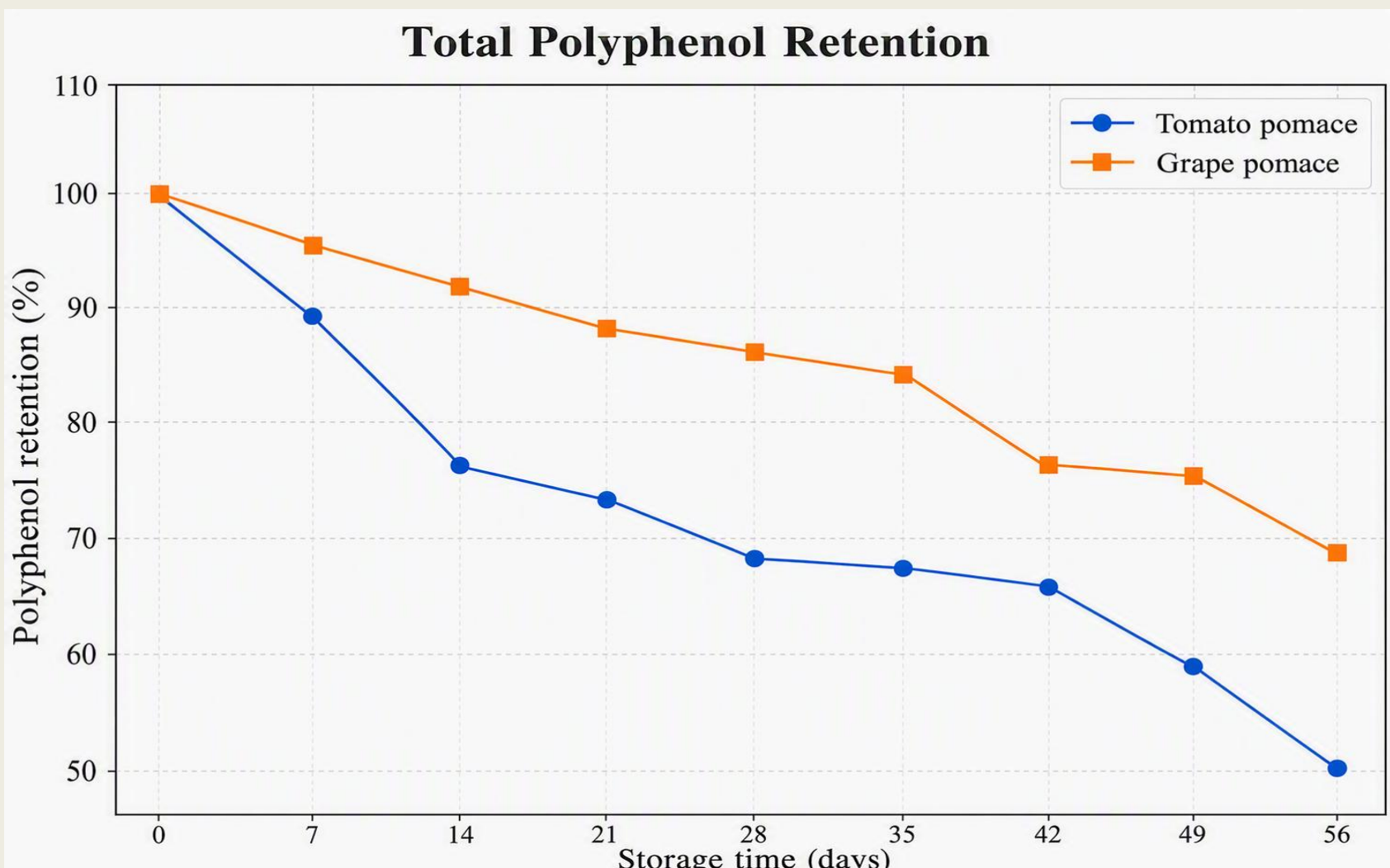
Tomato and grape pomace were used in the form of dried powder and stored under accelerated storage conditions at 40 °C and 75% relative humidity.

The total polyphenol content was determined using the Folin–Ciocalteu method, while the carbohydrate, protein, and lipid contents were determined by Fourier-transform near-infrared (FT-NIR).

The sensory characteristics were evaluated by assigning scores from 1 to 5 based on the samples' deterioration in terms of smell, appearance, and color. All measurements were taken at 7-day intervals (over an 8-week period) at T0, T7, T14, T21, T28, T35, T42, T49, and T56. T0 was considered the initial time point, and subsequent results were reported relative to the values recorded at T0.

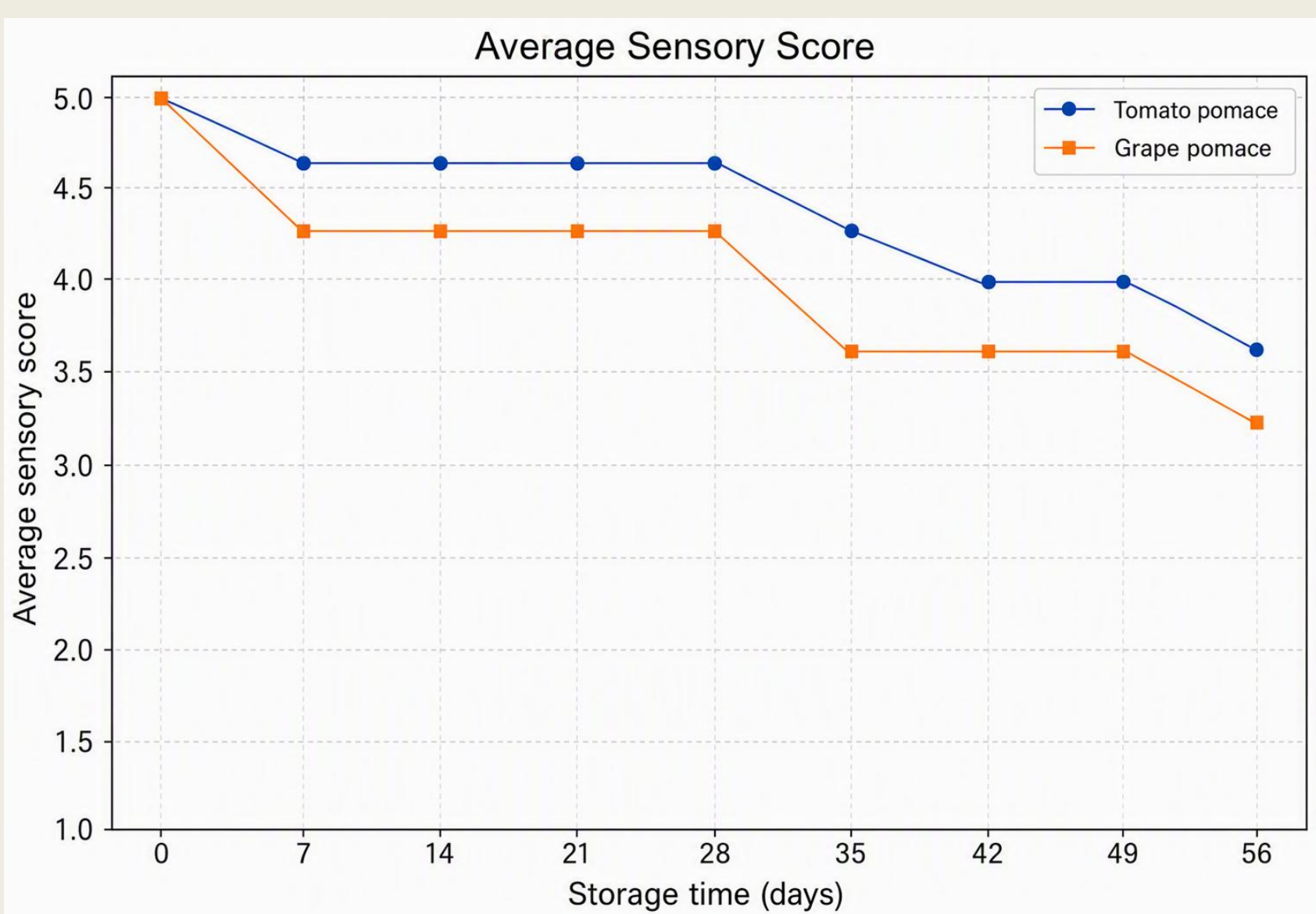
Results: total polyphenol content

Under accelerated test conditions over 56 days, grape pomace demonstrated superior polyphenol stability (31.1% loss) compared to tomato pomace (49.4% loss), although the latter started with an initial content approximately 5.7 times lower.



Results: sensory characteristics

The sensory changes in tomato and grape pomace were mild to moderate, remaining above the acceptability threshold until the end of the experiment.

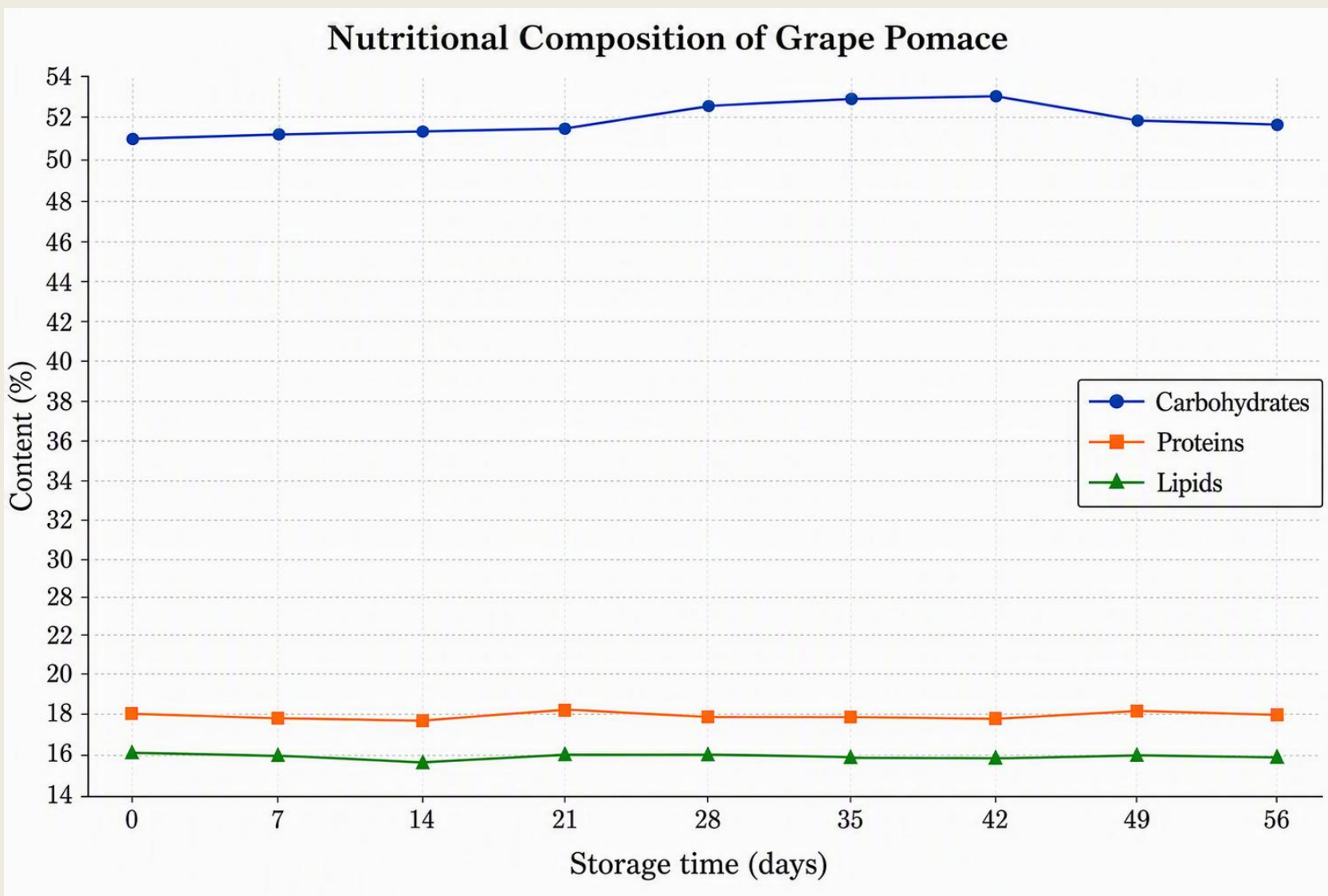
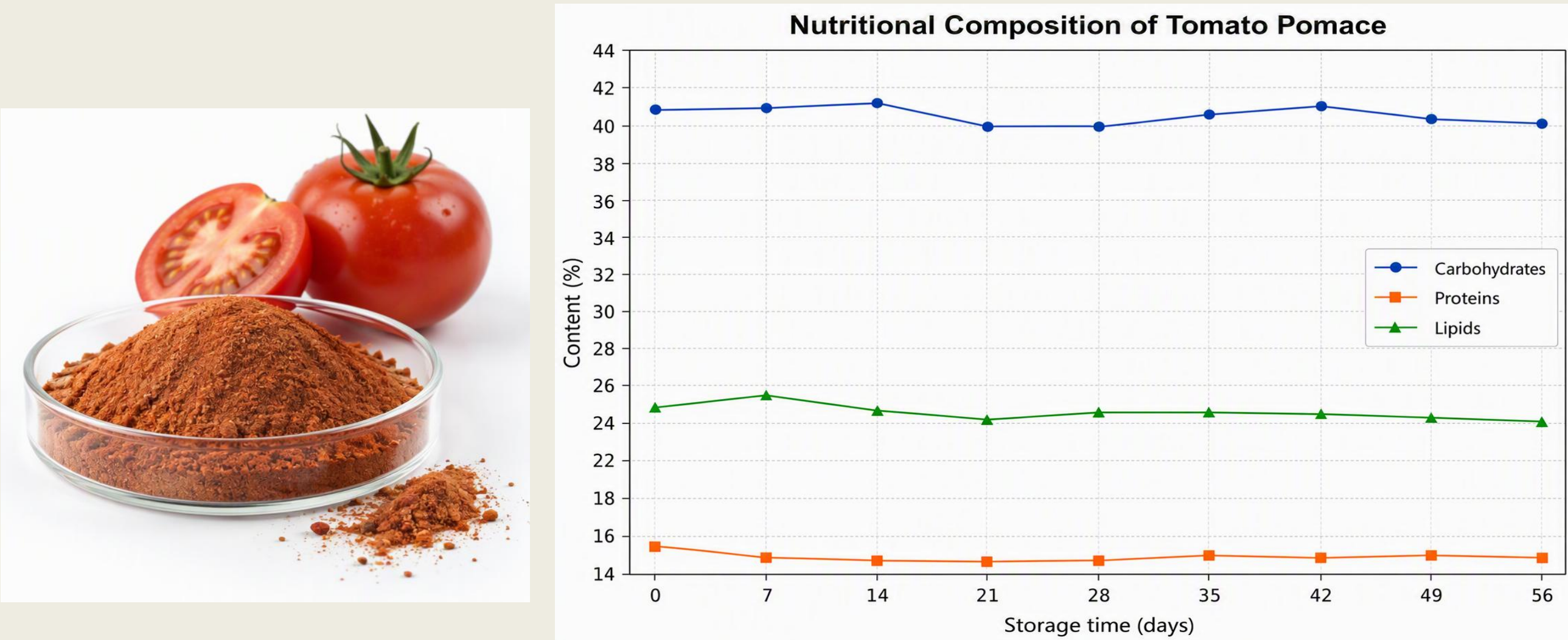


Purpose

The purpose of the study was to evaluate the stability of grape pomace and tomato pomace under severe accelerated conditions, at a temperature of 40°C and a relative humidity of 75%, for eight weeks. The stability of the samples was monitored by determining the total polyphenol content and the main nutritional constituents, as well as by periodically evaluating their appearance, color, and smell.

Results: nutritional value

The results confirm that exposure for 56 days at 40°C and 75% relative humidity did not cause significant changes in the estimated carbohydrate, protein, and lipid contents, which remained relatively constant throughout the experiment



Conclusions

The accelerated stability study revealed that total polyphenol content was the main parameter affected by storage, while carbohydrates, proteins, and lipids remained relatively stable throughout the 56-day testing period.

Grape pomace showed higher chemical stability than tomato pomace, retaining 68.9% of its initial total polyphenol content after 56 days, compared with 50.6% for tomato pomace.

Both products remained sensorially acceptable throughout the testing period, with no relevant changes leading to sensory rejection.

Based on kinetic modelling and Q10 predictive analysis, the proposed shelf life at temperatures up to 25°C is 3 months for tomato pomace and 5 months for grape pomace.