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Characterization of fruit sorbet matrices with added value from *Zizyphus jujuba* and *Stevia rebaudiana*

Introduction

Frozen desserts are especially popular and preferred in high temperatures.

Sorbets may act as healthy frozen snacks with numerous taste possibilities depending on the fruit added in the recipe.

Sorbets are a healthier alternative to ice cream, very suitable for vegans, vegetarians, and consumers who would like to lower their daily calory intake.



Aim

- This study focuses on assessing the effects of sorbet recipe alteration through the addition of different percentages of *Zizyphus jujuba* powder. *Stevia rebaudiana* was used as a possible sugar substituent.

Preparation of sorbet matrices

Sorbet variations	peach purée, %	jujube powder, %	sugar, %	stevia, %	water, %	citric acid, %
Control	63,00	-	15,99	-	21,00	0.01
SR5	58,00	5,00	15,99	-	21,00	0.01
SR10	53,00	10,00	15,99	-	21,00	0.01
SR15	48,00	15,00	15,99	-	21,00	0.01
SZJ	63,00	15,99	-	-	21,00	0.01
SSR	68,50	-	-	8,49	23,00	0.01



Studied characteristics



- Ash and moisture content
- Total soluble solids, pH and titratable acidity
- Nutritional data – through calculation
- Overrun, melting rate and melting behavior
- Water-holding capacity
- CIELAB color spectra
- Determination of the vitamin C content
- Determination of total polyphenolic content
- Determination of antioxidant activity
- Microscopic imaging
- Microbial count
- Sensory evaluation

Results

Sorbet variations

Control

SR5

SR10

SR15

SZJ

SSR

TSS, %

26.53±0.25^{bc}

29.00±0.72^b

31.93±0.25^a

33.03±0.98^a

24.84±1.70^c

17.50±1.01^d

ash, %

5.21±3.05^a

3.77±0.18^{ab}

2.22±1.28^{ab}

0.36±0.20^b

1.09±0.47^b

0.51±0.38^b

moisture, %

69.27±1.77^c

64.11±3.45^d

64.92±1.74^{cd}

63.77±0.34^d

74.27±0.32^b

80.21±0.56^a

TTA, %

0.21±0.01^a

0.19±0.01^a

0.19±0.02^a

0.18±0.01^a

0.27±0.11^a

0.18±0.02^a

pH, %

3.37

3.62

3.60

3.64

3.88

3.58

t, °C

- 4.5

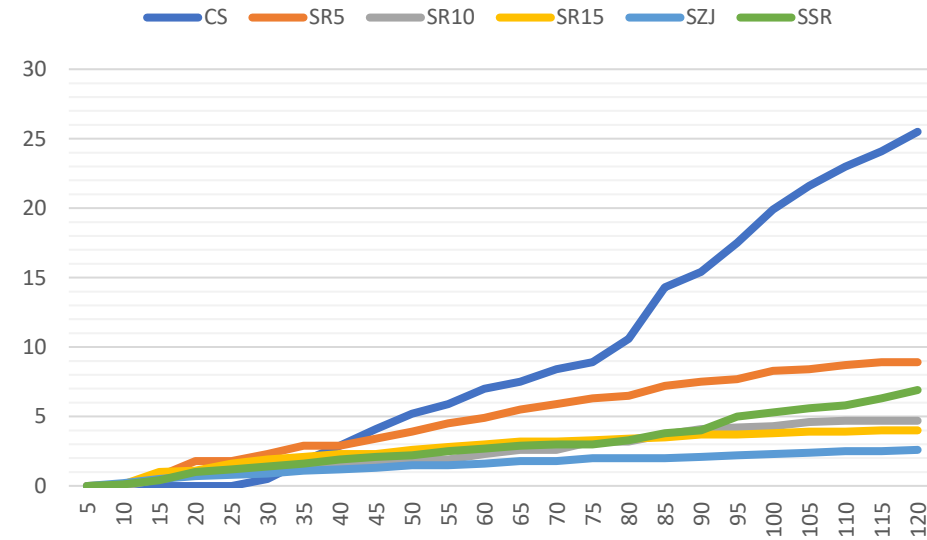
- 4.7

- 5.7

- 6.4

- 4.2

- 3.2

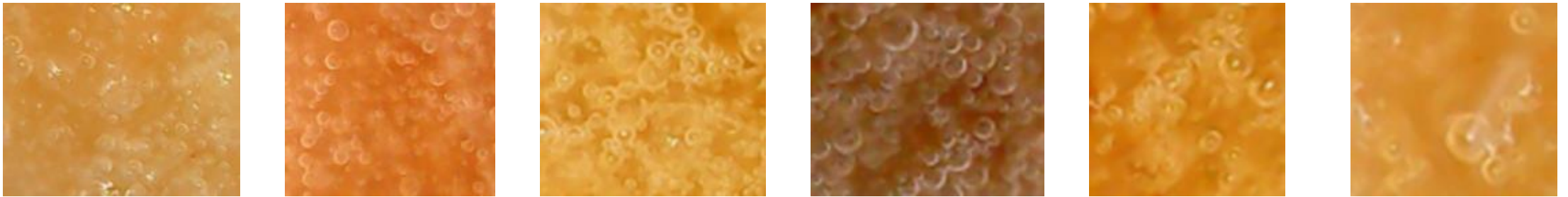


Melting rate of sorbet matrices.

The slower the melting rate the better the melting behavior.

Results

- The amount of air incorporated during freezing, affects the size of the ice crystals, with larger ice crystals and bubbles detected at lower overrun.



Pudding formulations

control

SR5

SR10

SR15

SZJ

SSR

L

55.73±3.74^a

41.65±4.25^b

57.91±4.27^a

46.98±6.63^{ab}

42.13±3.18^b

42.13±3.81^b

a

15.04±1.40^a

13.41±0.46^a

15.09±1.63^a

13.38±1.28^a

14.72±0.75^a

12.28±1.02^a

b

29.56±1.55^a

26.97±3.01^a

32.16±6.66^a

27.08±2.91^a

29.95±2.26^a

28.78±3.35^a

c

33.17±1.94^a

30.13±2.83^a

35.55±6.68^a

30.22±3.03^a

33.37±2.35^a

31.10±3.18^a

h

63.07±1.34^a

63.40±2.15^a

54.45±2.78^a

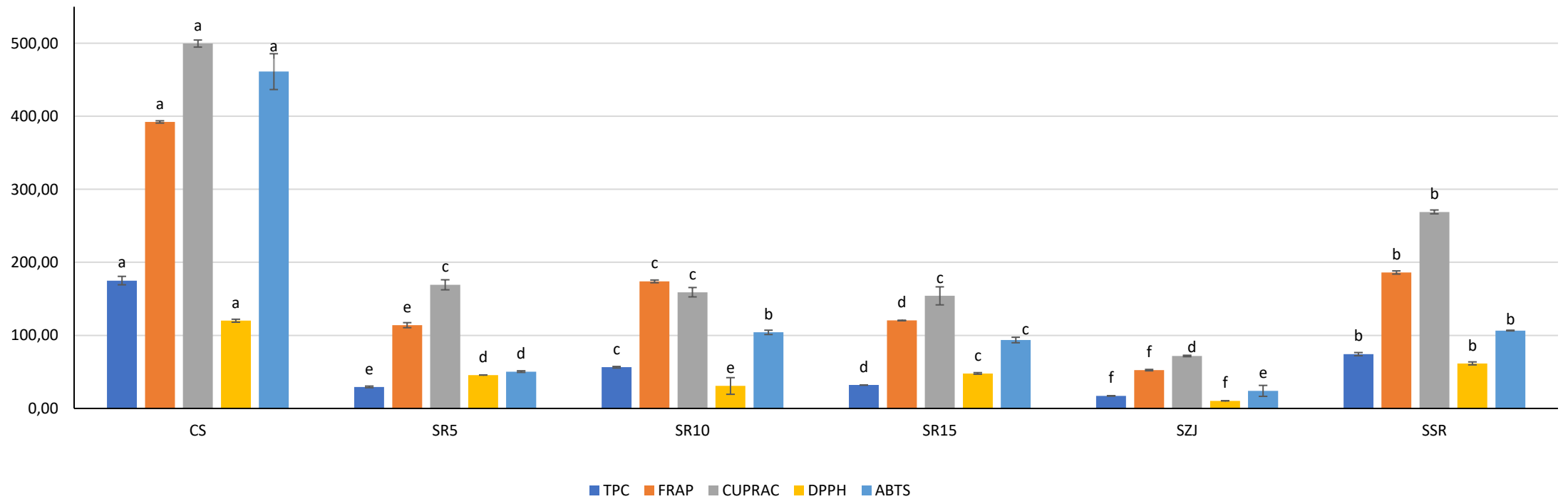
63.65±1.85^a

63.79±0.58^a

66.82±1.03^a

CIELAB color spectra of sorbet matrices.

Results



Total polyphenolic content (TPC) (mgGAE/100 g product) and antioxidant properties ($\mu\text{M}/100\text{g}$ product) of sorbet matrices.



Conclusion

- Different peach sorbet matrices with added value from jujube fruit powder and stevia were characterized.
- Although physicochemical and chemical results showed potency, not all developed variations were with acceptable sensory characteristics. The replacement of sugar with stevia has significantly affected the acceptance of the finished product.
- The current results provide reference for future frozen dessert development.

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