Assessment of Potato Products Treated with PEF

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Introduction

- PEF in food processing
- Sweet potato chips
- Mashed potatoes
- Measurement of reducing sugars
- Acrylamide reduction
- Product quality

Problem: Acrylamide = Probable Carcinogen and Neurotoxin (Fig 1)

Fig 1. CA warning label

Hypothesis: PEF to lower reducing sugar content in sweet potato chips and potato flakes

Objectives

- Lower reducing sugars
- Effect of rinse water temperature and time on reducing sugar content
- PEF vs non-PEF
- Sensory evaluation

Fig 2. PEF treated left, non-PEF right

Methods

- Sweet Potato Slice Rinse (Fig. 2)
  - PEF treatment of whole sweet potato
  - Sliced and washed (30, 60, 120 sec)
  - Wash water temp (cold, warm, hot)
  - Water analysis by HPLC-CAD
  - Glucose and fructose quantitation
- Instant Mashed Potato Triangle Test (Fig. 3)
  - 4 samples: 2 PEF + 2 non-PEF
  - Each person tasted 3 samples
  - Statistical analysis of results

Fig 3. Triangle Test

Results

- Sweet Potato Slice Rinse
  - Data showed consistent correlation between rinse time and sugar content
  - Blue is fructose, orange is glucose (Fig. 4)
- Instant Mashed Potato Triangle Test
  - Participants rated samples, calculated average ratings (Table 1)

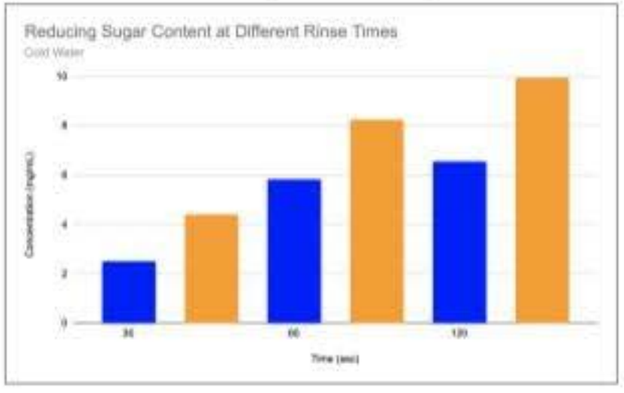

Fig 4. Both glucose and fructose content increased with wash time

	Control Sample 1	PEF Sample 2	Control Sample 3	PEF Sample 4
Texture Rating	3.6	3.9	3.8	3.7
Taste Rating	3.1	3.8	3.1	3.5
Smell rating	3.1	3.6	3.4	3.7
Average	3.3	3.8	3.4	3.6

Table 1. Calculated average ratings out of 5.0 possible points

Conclusions

- Sweet Potato Slice Rinse
  - Increase in wash time increases the amount of reducing sugar removed.
  - The temperature of water does not matter.
  - The non-PEF treated potatoes did not have as much reducing sugar removed.
- Instant Mashed Potato Triangle Test
  - No statistical difference PEF vs non-PEF instant mashed potatoes

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