

Influence of technological processing on selected parameters of fruit-based baby food

Blanka Tobolková

National Agricultural and Food Centre - Food Research Institute, Department of Chemistry and Food Analysis, Priemysel'na 4, 824 75 Bratislava, Slovakia

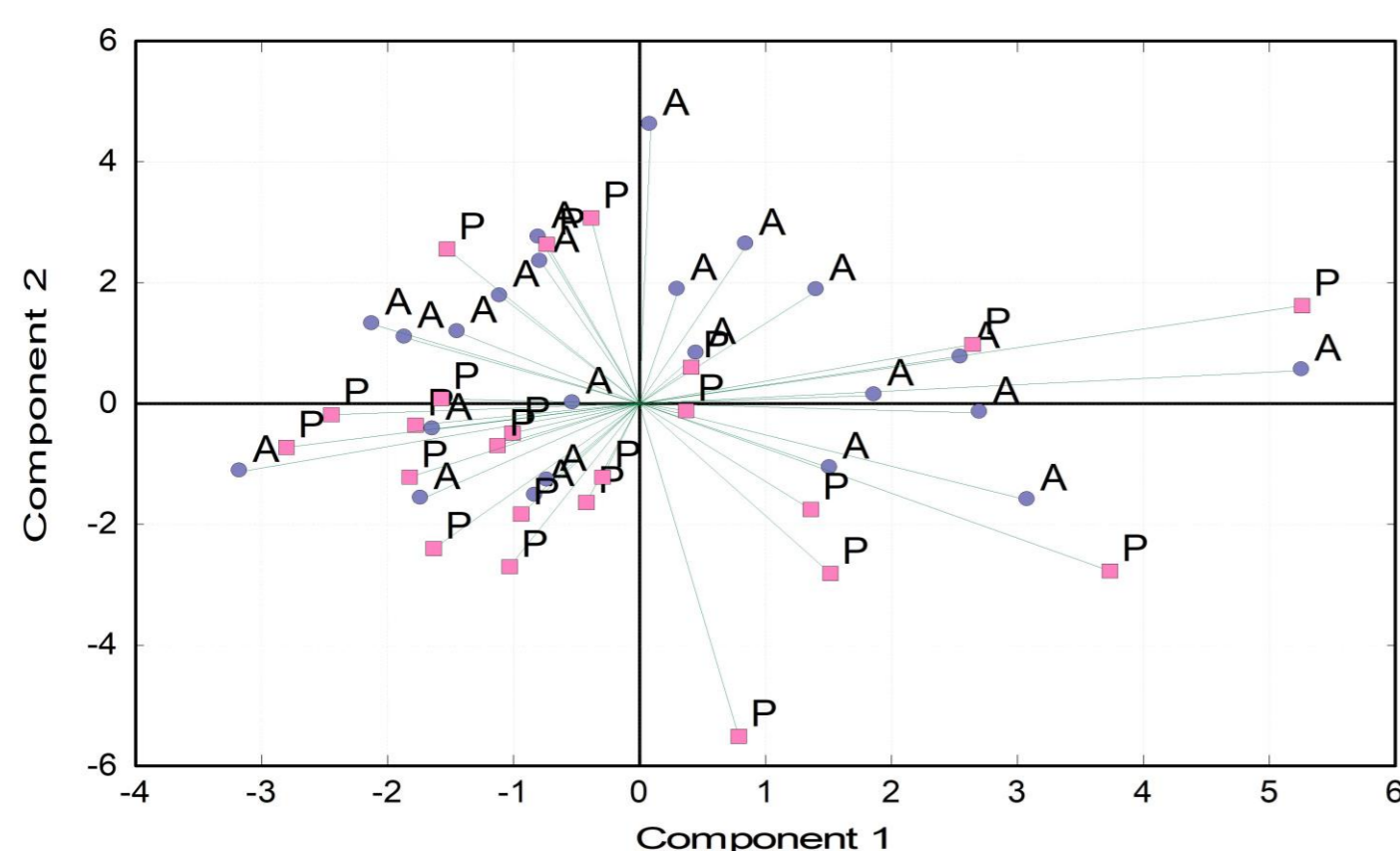
INTRODUCTION & AIM

- Baby foods in „pouches“ are special canned products designed to meet the nutritional needs of infants and young children.
- They are made from fruit and vegetables without the addition of preservatives.
- Raw materials of the highest possible quality should be used for their production.

The aim of this study was to evaluate effect of different sterilisation regimes and long-term storage on the monitored qualitative parameters of apple-carrot-banana baby food.

RESULTS & DISCUSSION

- TEAC and TPC values varied according to the type of puree:
- Sterilisation, irrespective of type, caused minimal changes in the monitored parameters, except for colour.
- Total colour differences after sterilisation were reported as *visible* for both samples ($TCD_A = 4.24 \pm 0.31$; $TCD_P = 3.66 \pm 0.24$).
- Long-term storage resulted in a significant ($p < 0.05$) decrease in ASC, TEAC, TPC and AAE.
- Canonical discriminant analysis discriminated autoclaved and pasteurised samples with 100% accuracy - parameters HMF, TEAC and a^* (intensity of red colour) played dominant role in the discrimination.



Principal component analysis of autoclaved and pasteurised apple-carrot-banana baby food samples. All the experimental data were used as variables

Decrease (%) of individual parameters at 12 months (M12), 18 months (M18, end of expiration period) and 24 months (M24, end of monitoring period)

Sterilisation regime	AAE			Ascorbic acid			TEAC			TPC		
	M12	M18	M24	M12	M18	M24	M12	M18	M24	M12	M18	M24
Autoclave	63%	83%	95%	53%	77%	87%	33%	42%	42%	9%	10%	14%
Pasteurisation	54%	73%	94%	60%	79%	84%	24%	39%	42%	10%	11%	12%

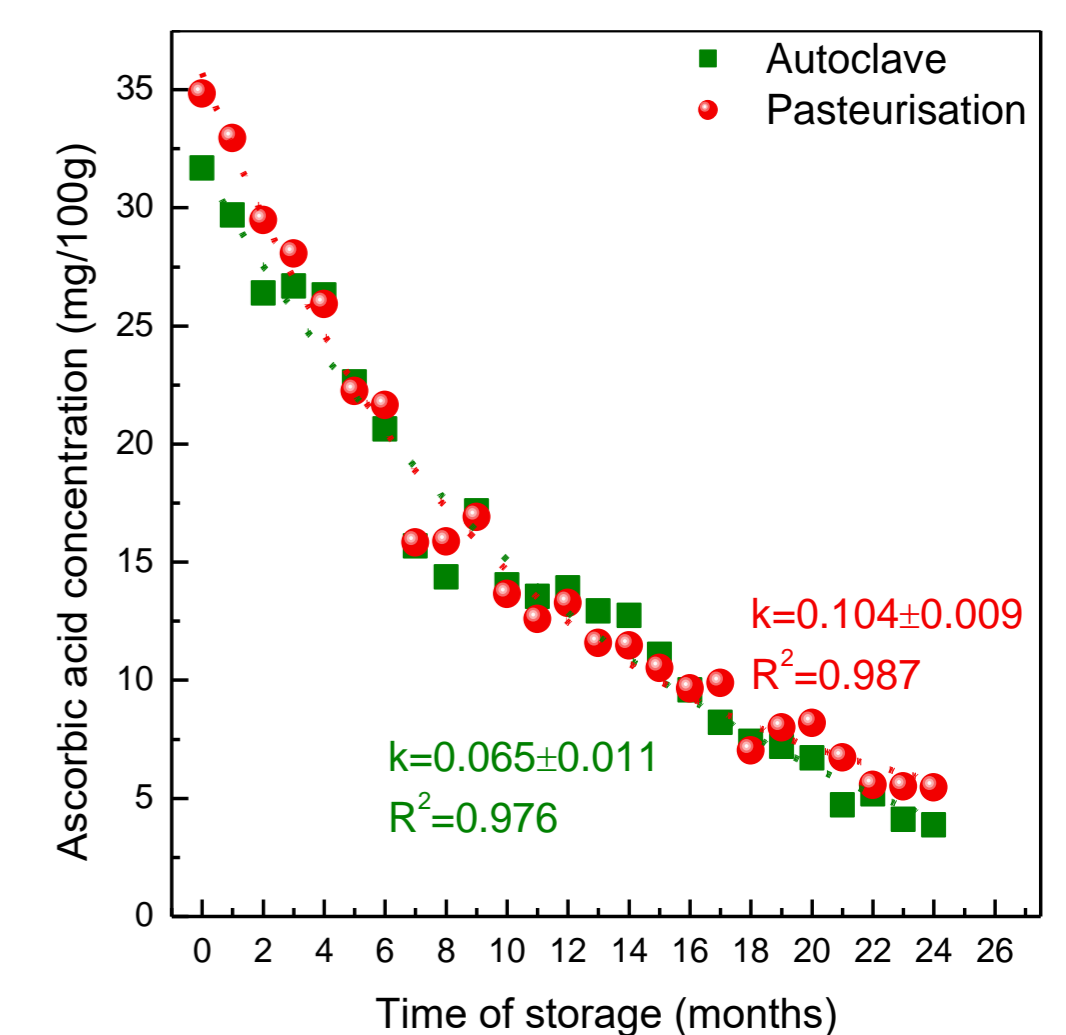
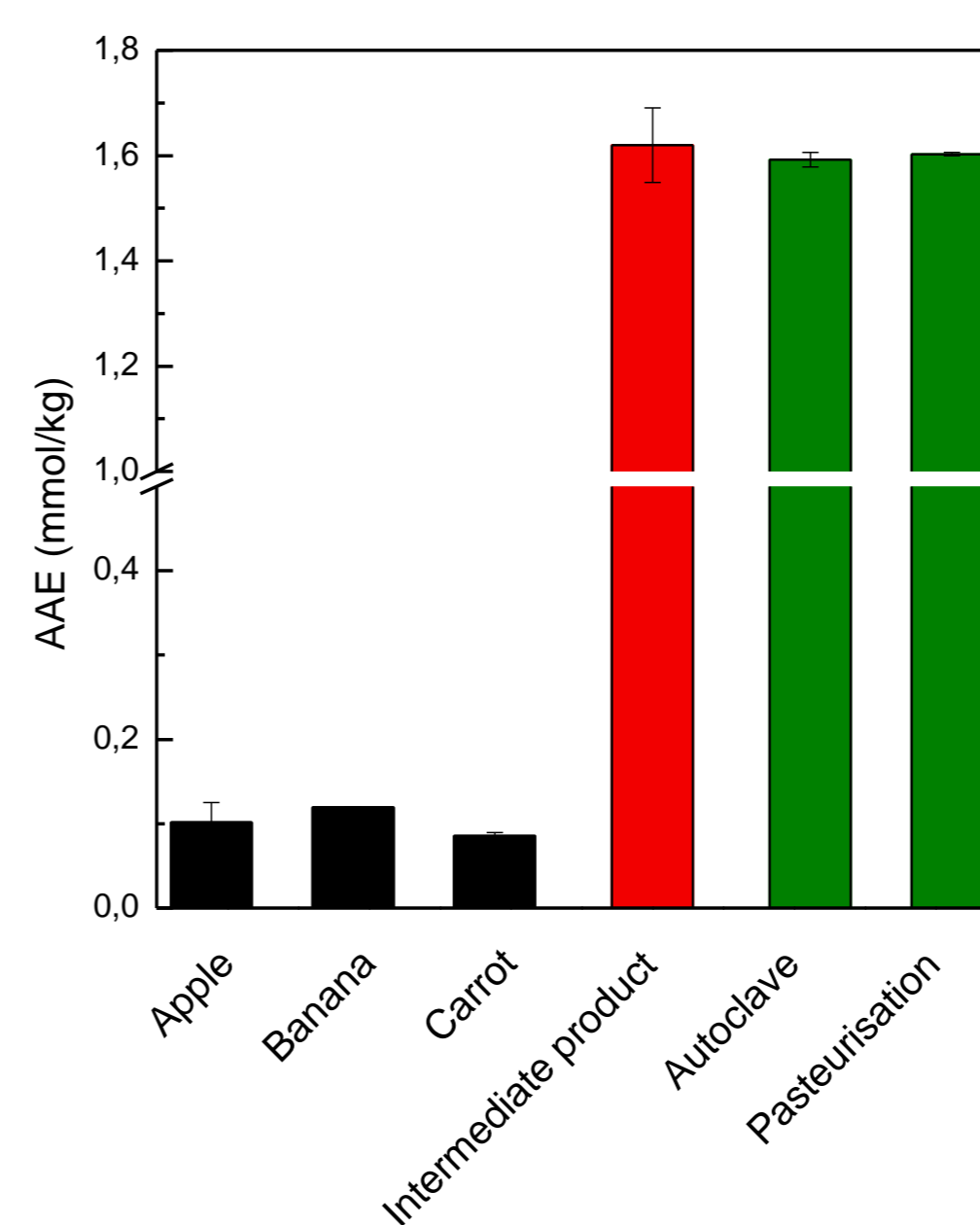
Changes in TCD and HMF after sterilisation and after the 12th, 18th and 24th month of storage of the apple-carrot-banana baby food.

	TCD		HMF (mg/kg)	
	Autoclave	Pasteurisation	Autoclave	Pasteurisation
Intermediate product	-	-	4.9±0.3	
After sterilisation	4.24±0.31	3.66±0.24	12.2±1.8	6.5±0.1
After 12 th month	4.17±0.19	3.25±0.21	12.2±0.6	9.5±0.4
After 18 th month	4.87±0.33	4.20±0.36	12.9±2.1	10.1±0.1
After 24 th month	5.69±0.64	4.46±0.28	16.4±0.6	12.2±0.2

MATERIALS & METHODS

- Model apple-carrot-banana baby foods were produced by local Slovak producer and stored for 24 months.
- During baby food processing – two different sterilisation regimes were utilized:
 - autoclave (A, 90 °C for 30 min),
 - pasteurisation (P, 92 °C for 4 min).
- UV/VIS spectroscopy was used to determine total polyphenol content (TPC) and CIE $L^*a^*b^*$ colour characteristics, which were used to calculate total colour difference (TCD).
- EPR spectroscopy was involved to evaluate radical-scavenging ability against ABTS^{•+} cation radical (TEAC) and TEMPOL radical (AAE).
- Concentrations of L-ascorbic acid (ASC) and 5-hydroxymethylfurfural (HMF) were determined by HPLC-DAD
- All the data were processed by statistical methods.

Differences of AAE of fruit and vegetable puree, intermediate products and apple-carrot-banana baby food after sterilisation



Changes of ASC concentration in apple-carrot-banana baby foods in dependence on sterilisation regime during long-term storage

CONCLUSION

- Long-term storage had a significant ($p < 0.05$) effect on all monitored parameters.
- Differences between sterilisation regimes were not significant ($p > 0.05$), except for TCD and HMF.
- Pasteurisation was more gentle for the preservation of antioxidant compounds and colour of apple-carrot-banana baby food.