Nutritional Audit of peach and strawberry preparates for dairy applications

Cláudia Lopes, Ana Oliveira, Manuela Pintado, Domingos P.F. Almeida

Introduction

- **Fruit are rich in beneficial phytochemicals.**
- **Industrial process of fruit preparate includes several steps as: thermal treatment, mixing the fruit with other ingredients and storage.**
- **The industrial preparate has several ingredients and may contain additives that may interact with the fruit phytochemicals.**

Objectives

frulact

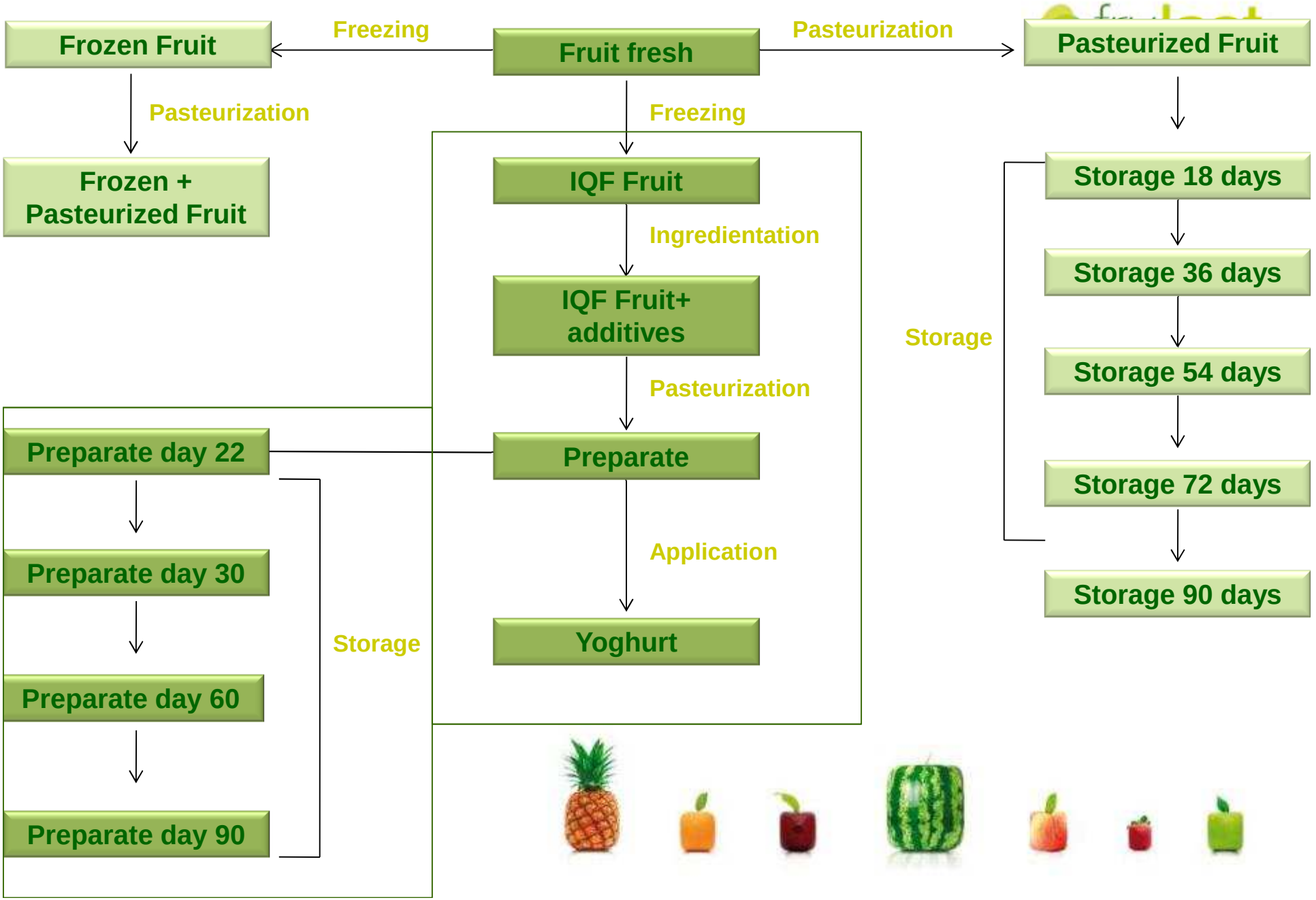
- **Characterization of the effects of unit operations on the extractability of fruit phytochemicals.**

- **Effect of storage time on antioxidant activity, phenolics compounds, anthocyanins and carotenoids on a fruit preparate.**

- **Development of a nutritional audit for fruit preparates.**

- **Identify phytochemicals as markets of process.**

Fruit processing

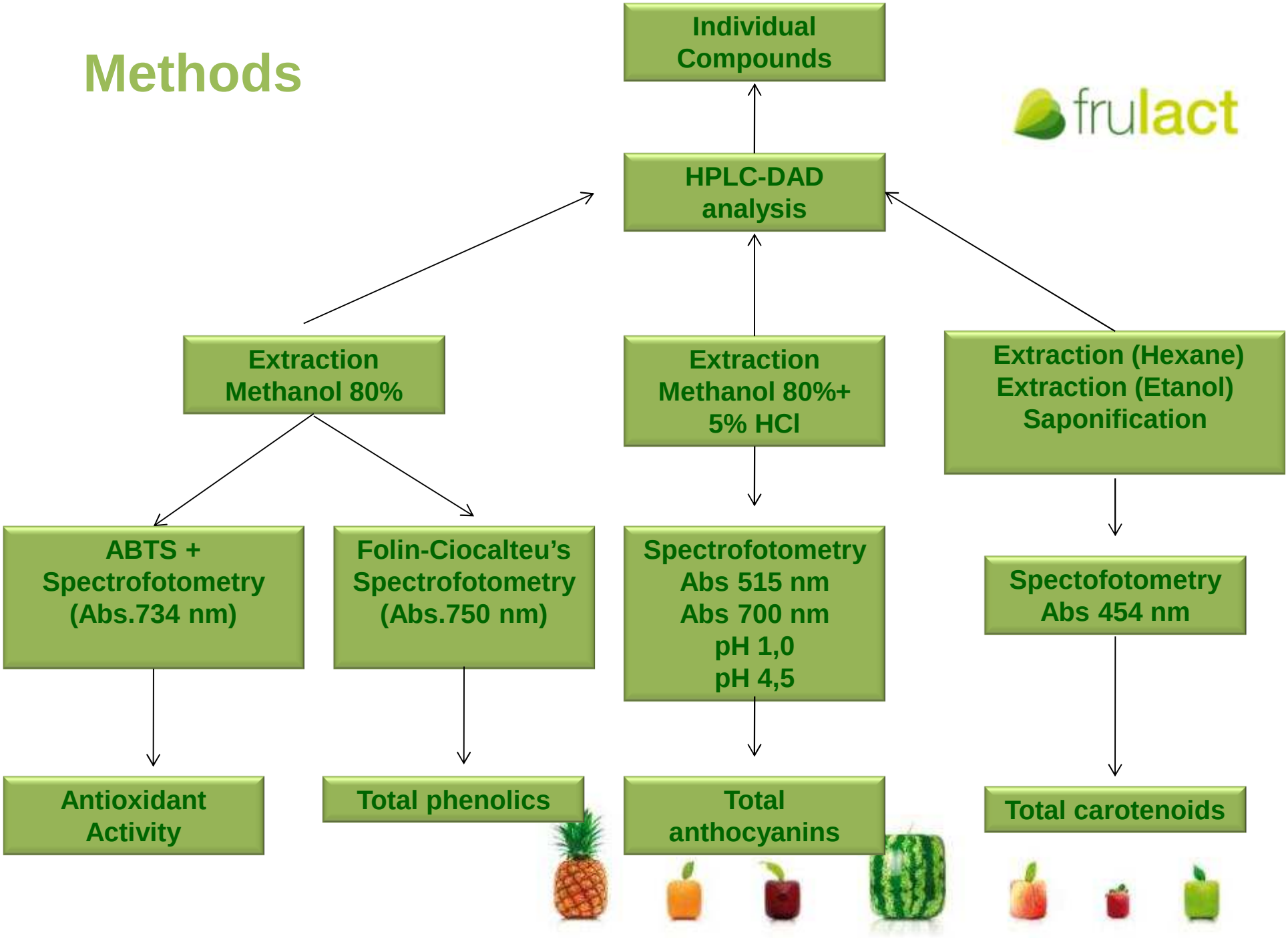


Industrial composition peach and strawberry preparate

Strawberry	Quantities (%)
Strawberry IQF	50
Sucrose	27
Water	11.9
Glucose+fructose+ maltose syrup	8
Starch	2
Strawberry flavour	0.48
Cochineal carmine	0.0095
Other hydrocolloids	0.38

Peach	Quantities (%)
Peach IQF	40
Water	46.9
Peach puree concentrate	10
Flavours	0.19
Carotene colouring agent	0.1
Sweeteners (Sucralose, acessulfame and aspartame)	0.167
Starch	2.3
Other hydrocolloids	0.15
Citric acid	0.07

Methods


Individual Compounds
HPLC-DAD analysis
Extraction Methanol 80%
Extraction Methanol 80%+ 5% HCl
Extraction (Hexane) Extraction (Etanol) Saponification
ABTS + Spectrofotometry (Abs.734 nm)
Folin-Ciocalteu's Spectrofotometry (Abs.750 nm)
Spectrofotometry Abs 515 nm Abs 700 nm pH 1,0 pH 4,5
Spectofotometry Abs 454 nm
Antioxidant Activity
Total phenolics
Total anthocyanins
Total carotenoids

Results and Discussion

Effect of processing on peach preparate

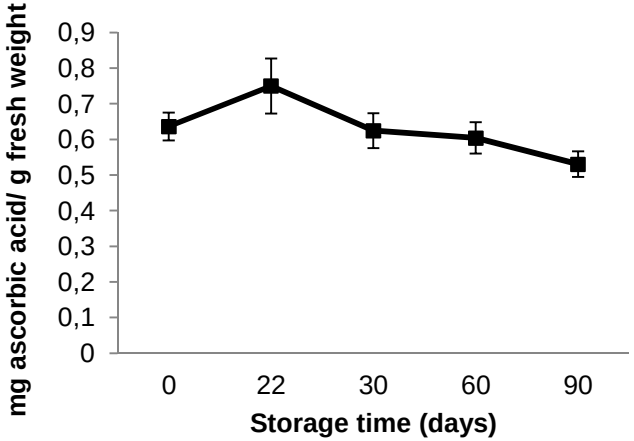
Peach	Total antioxidant activity (ABTS$^{\bullet+}$) (mg ascorbic acid/ g fresh weight)	Total phenolic (mg gallic acid/ g fresh weight)	Total carotenoids (µg β-caroteno/ g fresh weight)
Frozen IQF	0.28± 0.03 ^{b}	0.29±0.01 ^{b}	4,09±0.69 ^{b}
After Ingredientation	0.62±0.06 ^{a}	0.56±0.04 ^{a}	14,1±1,00 ^{a}
After Pasteurization	0.64±0.03 ^{a}	0.50±0.02 ^{a}	14,56±2,08 ^{a}

Identification	IQF+Puree (µg/g fw)	After Ingredientation (µg/g fw)	After Pasteurization (µg/g fw)
Procyanidin B1	8,16±1,3 ^{b}	16,6±4,1 ^{a}	21,0±3,0 ^{a}
(+)-Catechin	10,4±0,14 ^{b}	21,1±2,8 ^{a}	22,9±2,5 ^{a}
Chlorogenic acid	27,3±1,5 ^{b}	55,4±5,2 ^{a}	59,0±5,3 ^{a}
Rutin	4,28±0,14 ^{c}	13,1±1,8 ^{a}	10,0±2,3 ^{b}
Zeaxanthin	1,62±0,28 ^{b}	5,1±1,3 ^{a}	5,4±2,0 ^{a}
β-Carotene	6,59±0,4 ^{b}	148,6±13,3 ^{a}	145,4±13,9 ^{a}

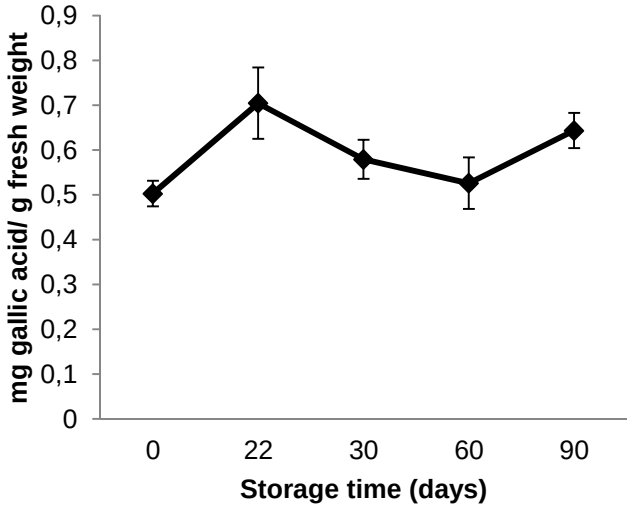
Results and Discussion

Effect of storage time on phytochemicals of peach preparate

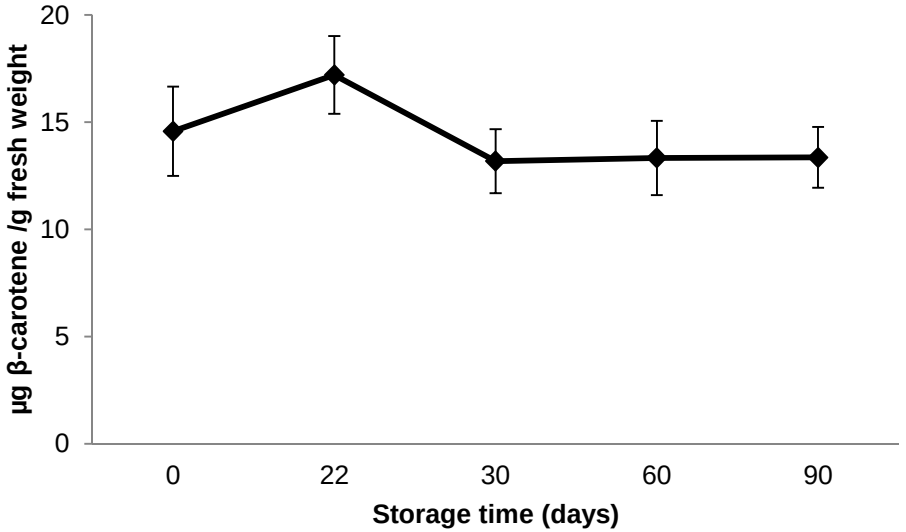
Antioxidant Activity



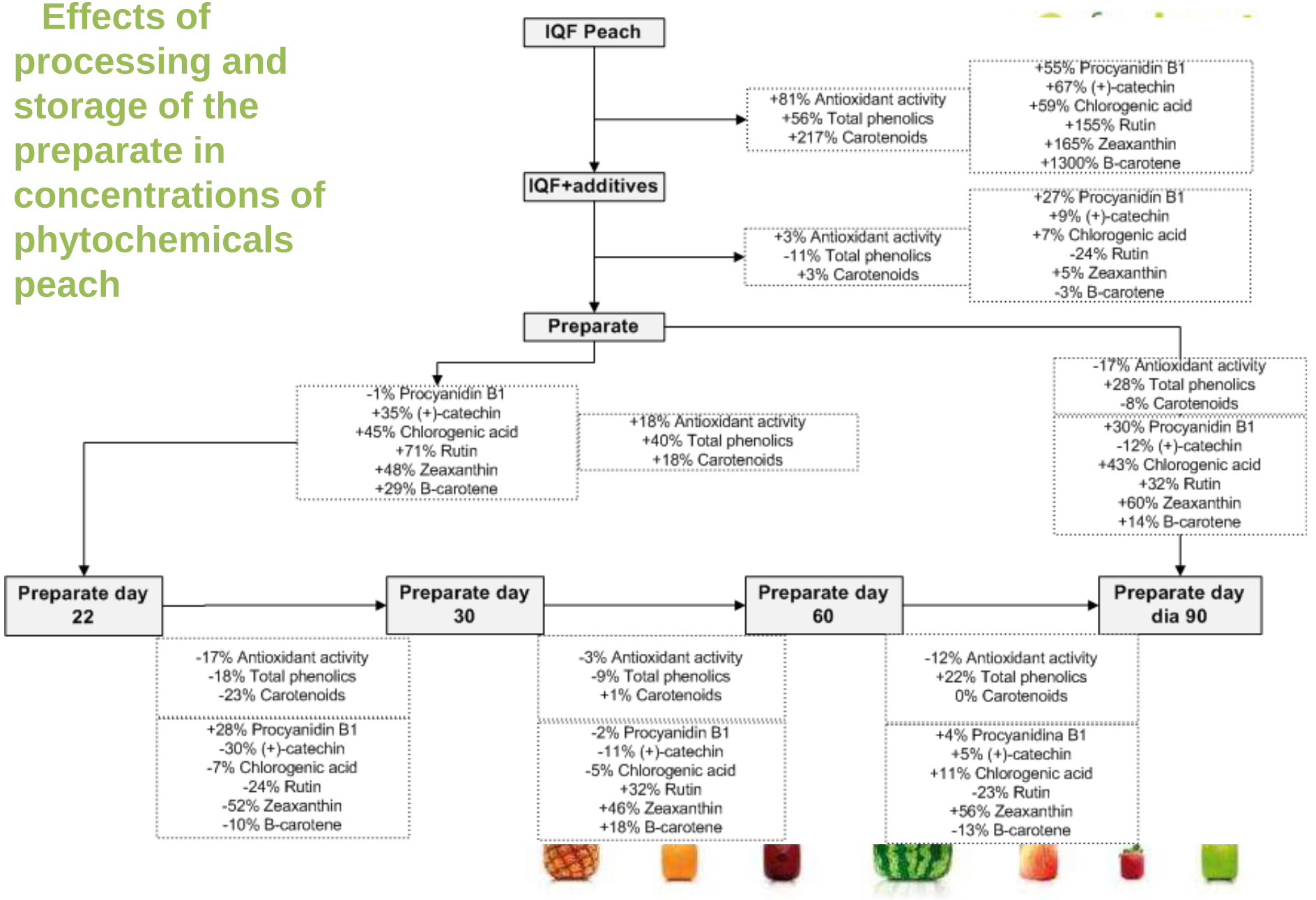
Total Phenolics



Total Carotenoids



Effects of processing and storage of the preparate in concentrations of phytochemicals peach



Results and Discussion

Effect of processing on strawberry preparate

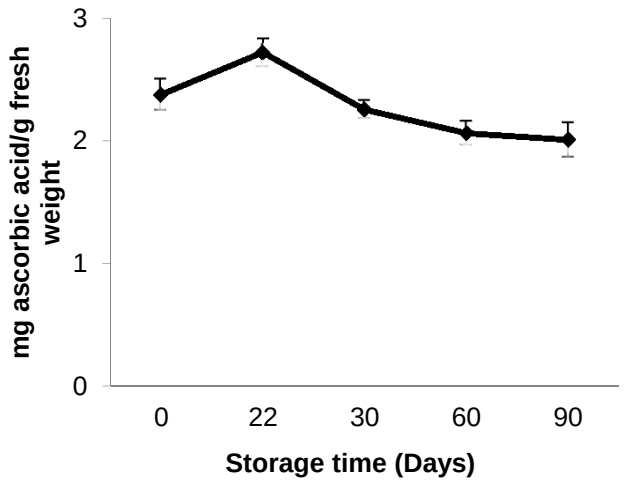
Strawberry	Total antioxidant activity (ABTS●+) (mg ascorbic acid/ g fresh weight)	Total phenolic (mg gallic acid/ g fresh weight)	Total anthocyanins (mg pelargonidin-3-glucoside/ g fresh weight)
Frozen IQF	1.94±0.23 c	1.67±0.25 b	0.26±0.02 b
After Ingredientation	3.01±0.25 a	2.44±0.14 a	0.33±0.03 a
After Pasteurization	2.38±0.12 b	1.80±0.13 b	0.23±0.04 b

Identification	Frozen IQF (10X10 mm) (µg/g fw)	After Ingredientation (µg/g fw)	After Pasteurization (µg/g fw)
Chlorogenic acid	65,0± 0,54 a	60,0± 4,24 a	62,3± 5,48 a
(-)-Epicatechin	79,5± 23,5 c	122,0± 21,7 b	194,2± 34,6 a
Ellagic acid	71,2± 9,0 a	87,7± 9,4 a	35,9± 7,9 b
Kaempferol	41,2± 5,1 b	55,6± 8,6 a	19,6± 3,7 c
Pelargonidin-3-glucoside	157,8± 15,4 c	334,5± 13,0 a	223,7± 14,6 b

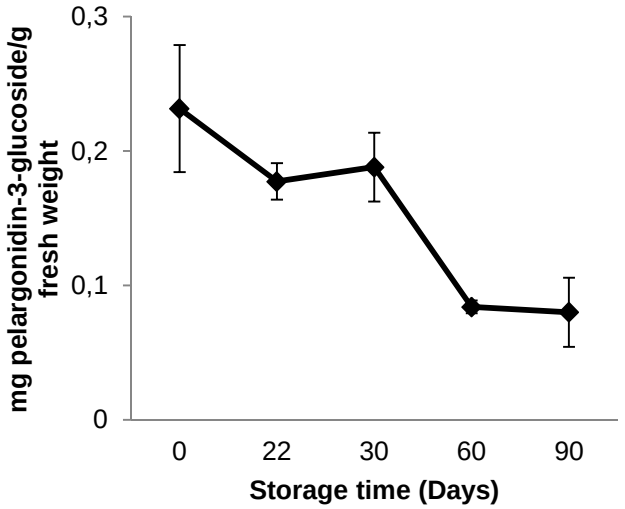
Results and Discussion

Effect of storage on phytochemicals of strawberry preparate

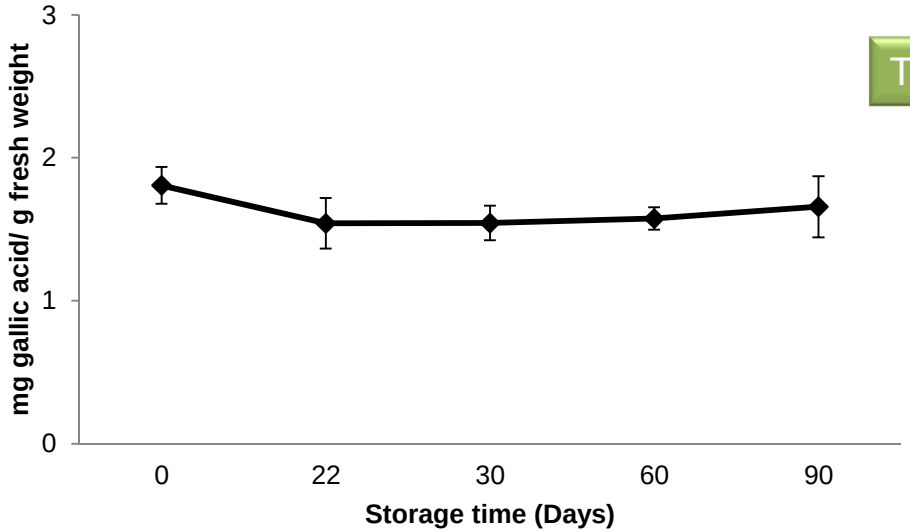
Antioxidant Activity



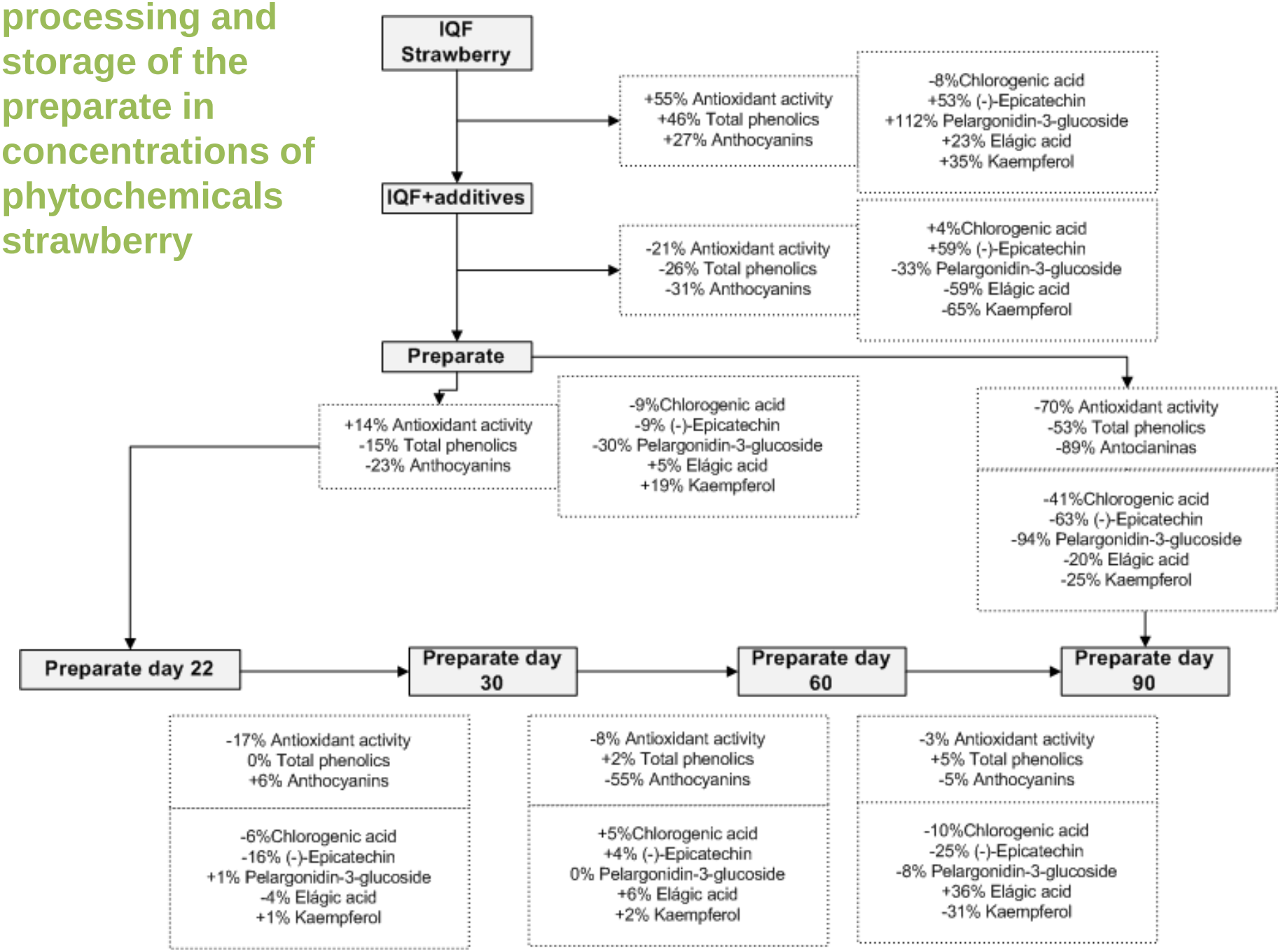
Total Anthocyanins



Total Phenolics



Effects of processing and storage of the preparate in concentrations of phytochemicals strawberry



Conclusion

- **Fruit preparates have higher extractability of phytochemicals more in peach**
- **The heat treatment reduced the antioxidant activity in the strawberry preparate but not in peach.**
- **The storage time reduced the levels of anthocyanins in strawberry, that will be a process market.**

frulact

Innovation

Acknowledgments

ADI, QREN, through project Frutamais – Preservation of functional, nutritional and organoleptic characteristic of fruits and derived food (QREN-ADI 3436)

Ph.D. scholarship SFRH/BD/75041/2010 to A. Oliveira