

Cold Pressed Avocado Oil – To Peel or Not to Peel

Aceite de aguacate prensado-en-frio – Pelar o No pelar

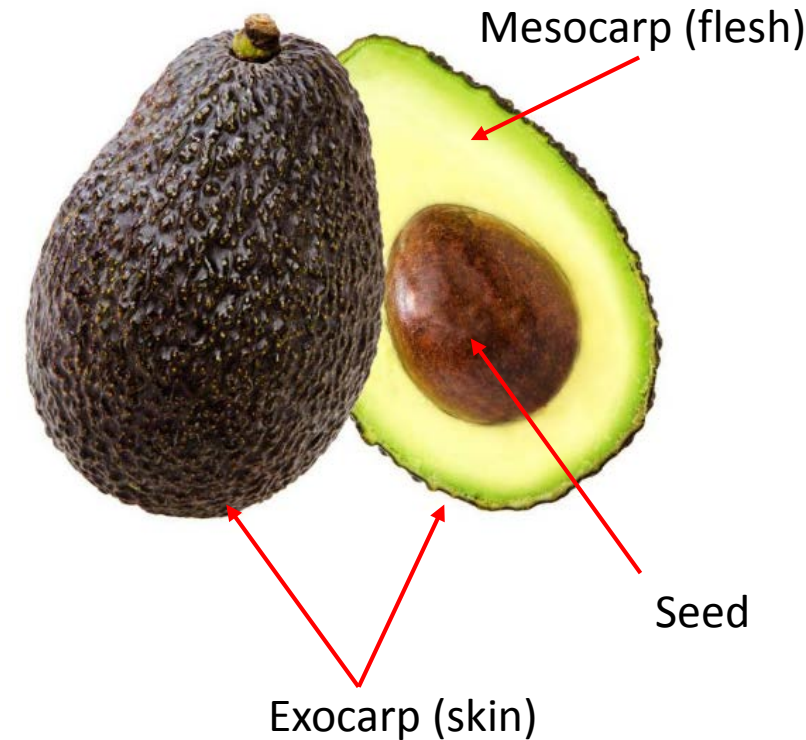
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Avocado Fruit Composition – ‘Hass’

- Avocados (% by fresh weight)
 - Exocarp (skin) 10 – 20%
 - Mesocarp (flesh) 55 – 80%
 - Seed/Pit/Stone 10 – 25%



	Mesocarp %wet weight	Skin %wet weight	Seed/Pit %wet weight
Moisture	65 – 77%	14.5%	54 – 60%
Carbohydrates	8.6%	62%	31 - 34%
Proteins	2%	8.3%	1.5 – 2.4%
Lipids	3 – 32%	9.1%	0.8 - 2.3%
Ash	1.7%	6.1%	1.2 - 1.8%



Avocado Flesh – (mesocarp)

- Oil is contained within parenchyma cells
 - Cytoplasm of parenchyma cells contain many small oil droplets
 - Lipids present are predominantly triacylglycerols (TAGs)

Avocado Skin – (exocarp)

- Oil soluble components present in skin include pigments and polyphenols

Avocado Seed/Pit/Stone

- Seed contains polyphenols and lipids
 - neutral lipids (95 – 99%), glycolipids (2.5 – 3.2%), phospholipids (0.7 – 2.1%)

Research Objective

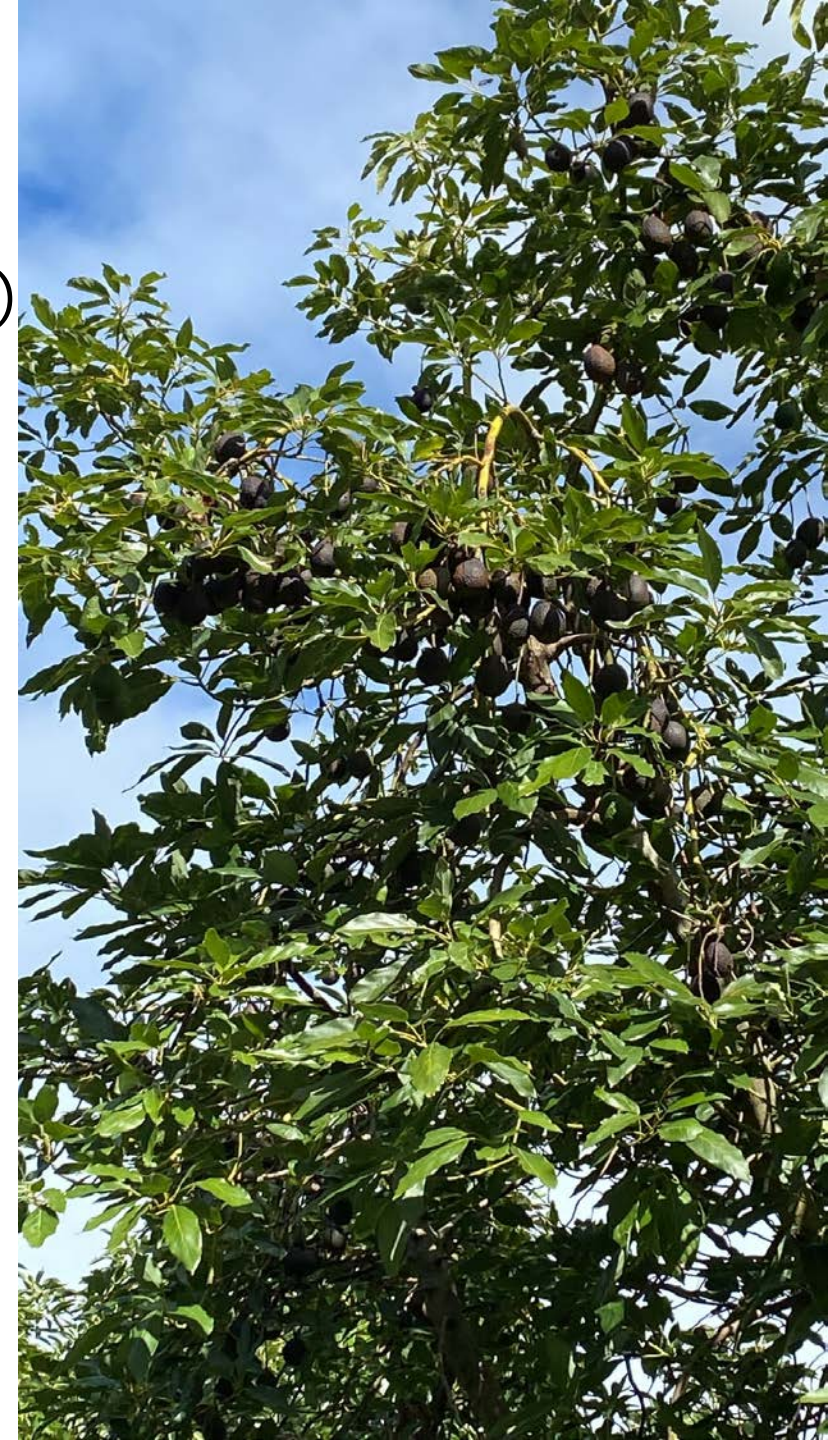
To determine the effect of including skin and seed with pulp, during malaxing, on extra virgin avocado oil storage stability

Treatments

Early season (September, NZ)



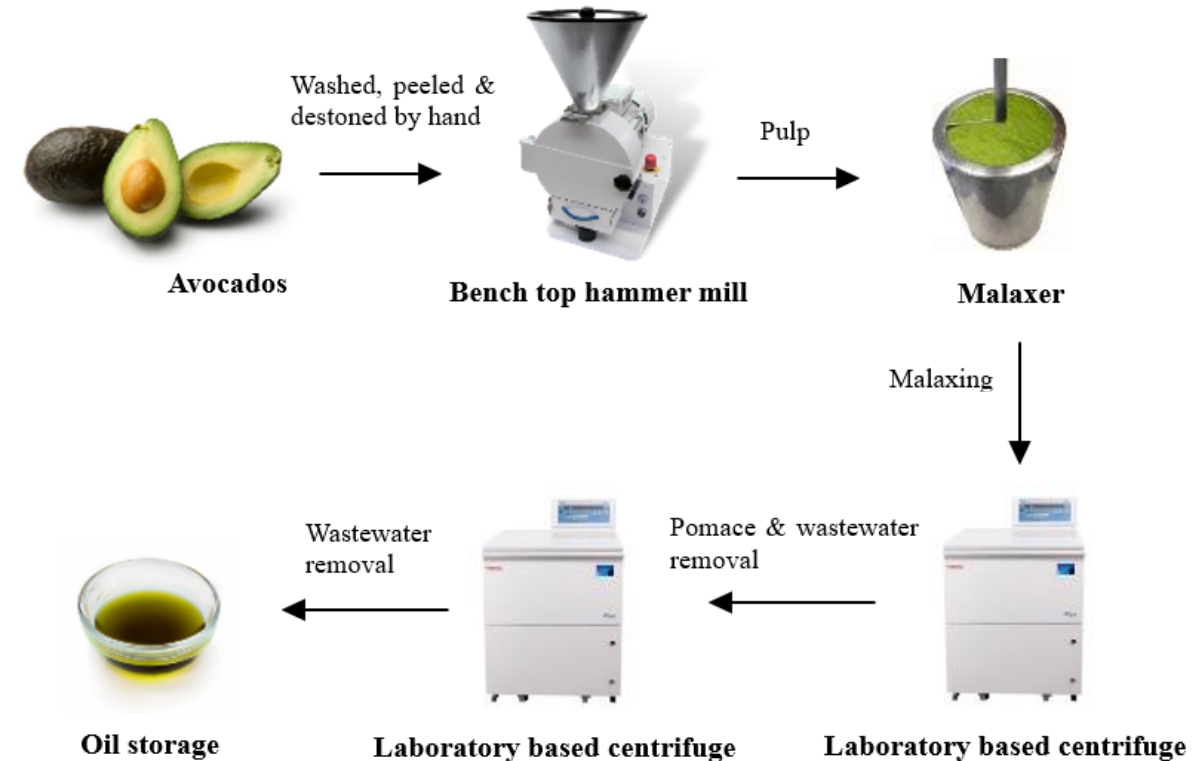
Late season (May, NZ)



1. **Flesh only** - 100% flesh with 10% skin
2. **Flesh+Skin** - 100 % flesh with All skin
3. **Flesh+Skin+Seed** - 100% flesh with All skin and seed

Lab scale - Cold pressed extraction

Malaxing time 90 mins, 45 - 50°C





Flesh

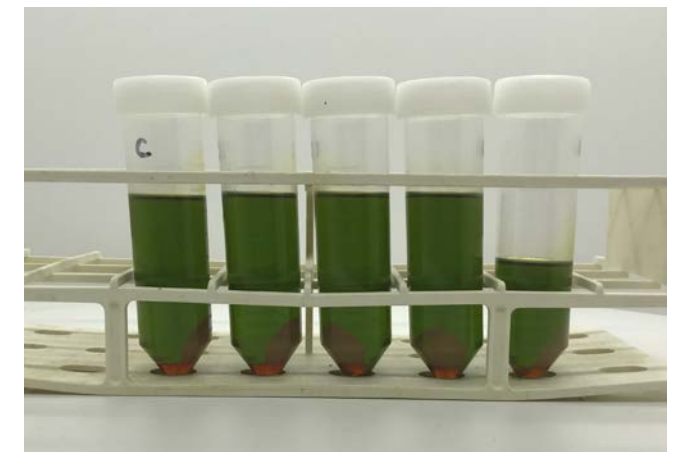
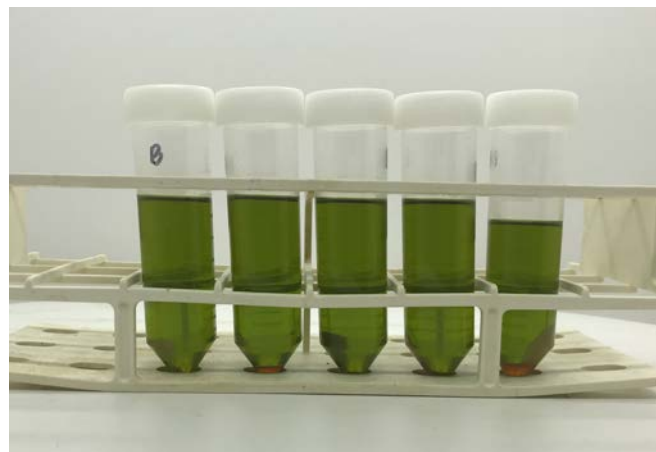
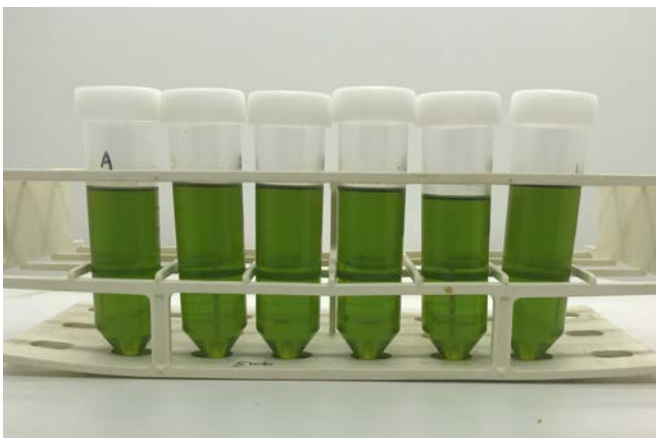


Flesh + Skin



Flesh + Skin + Seed

Each malaxer contained approximately 1kg of tissue
Flesh:Skin:Seed ratio maintained at 68:14:18



Flesh

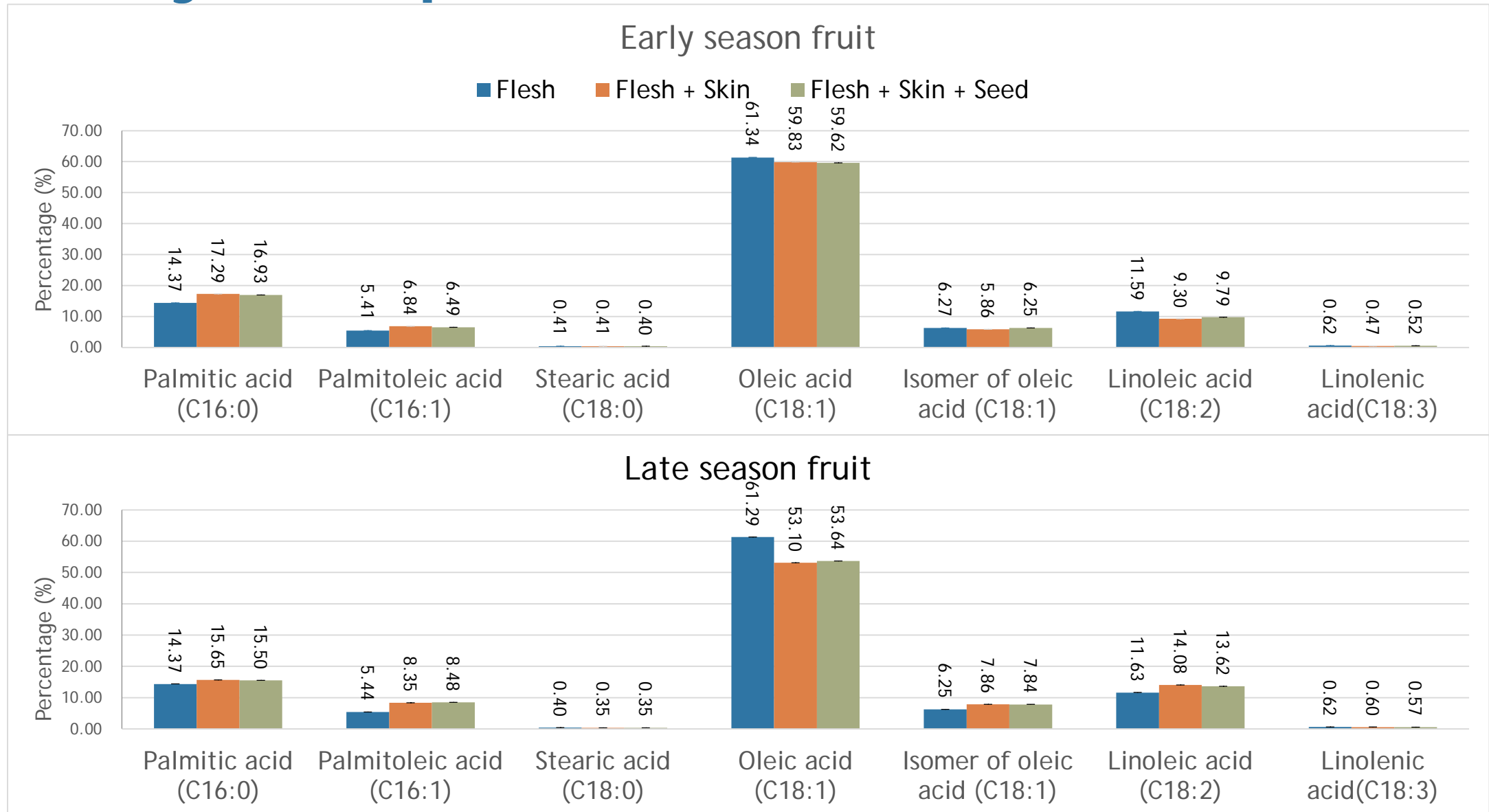
Flesh + Skin

Flesh + Skin + Seed

Dry Matter and Oil Yield

	Dry matter % (g/g wet flesh)	Oil Yield % (oil g/g wet tissue)		
		Flesh only	Flesh+Skin	Flesh+Skin+Seed
Early Season (September, NZ)	31.4	11.18	5.50	3.82
Late Season (May, NZ)	32.0	16.69	14.60	10.90

Fatty acid profile of extracted oil



Storage Trial

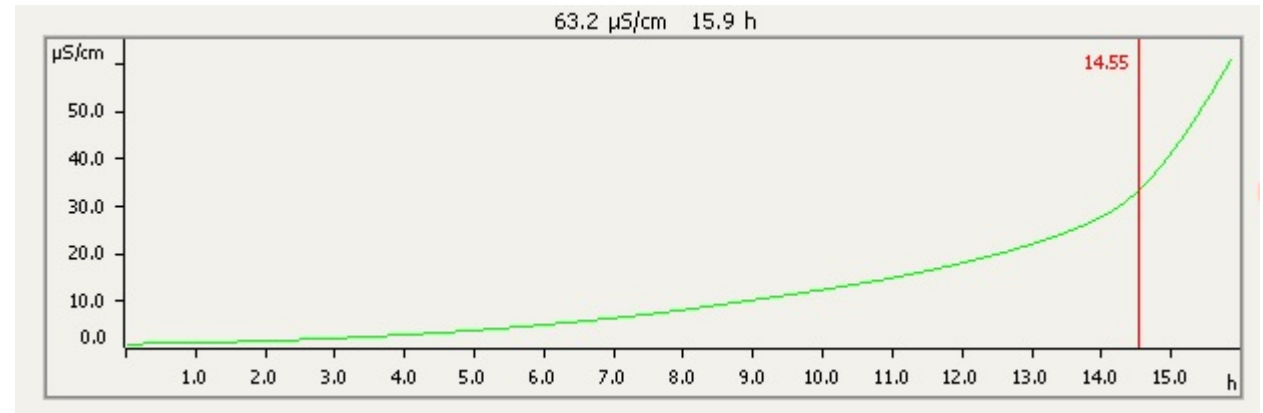
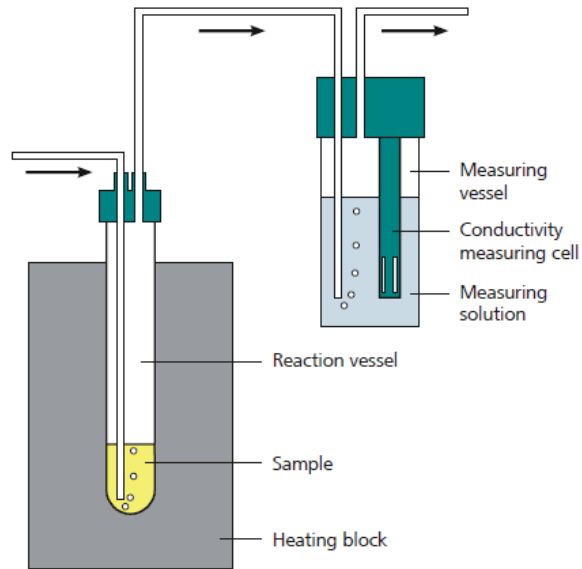
Extracted oils were stored in the dark brown glass bottles in the dark, nitrogen sparged before sealing.

Storage temperatures 20, 30 and 40°C

Initial quality values

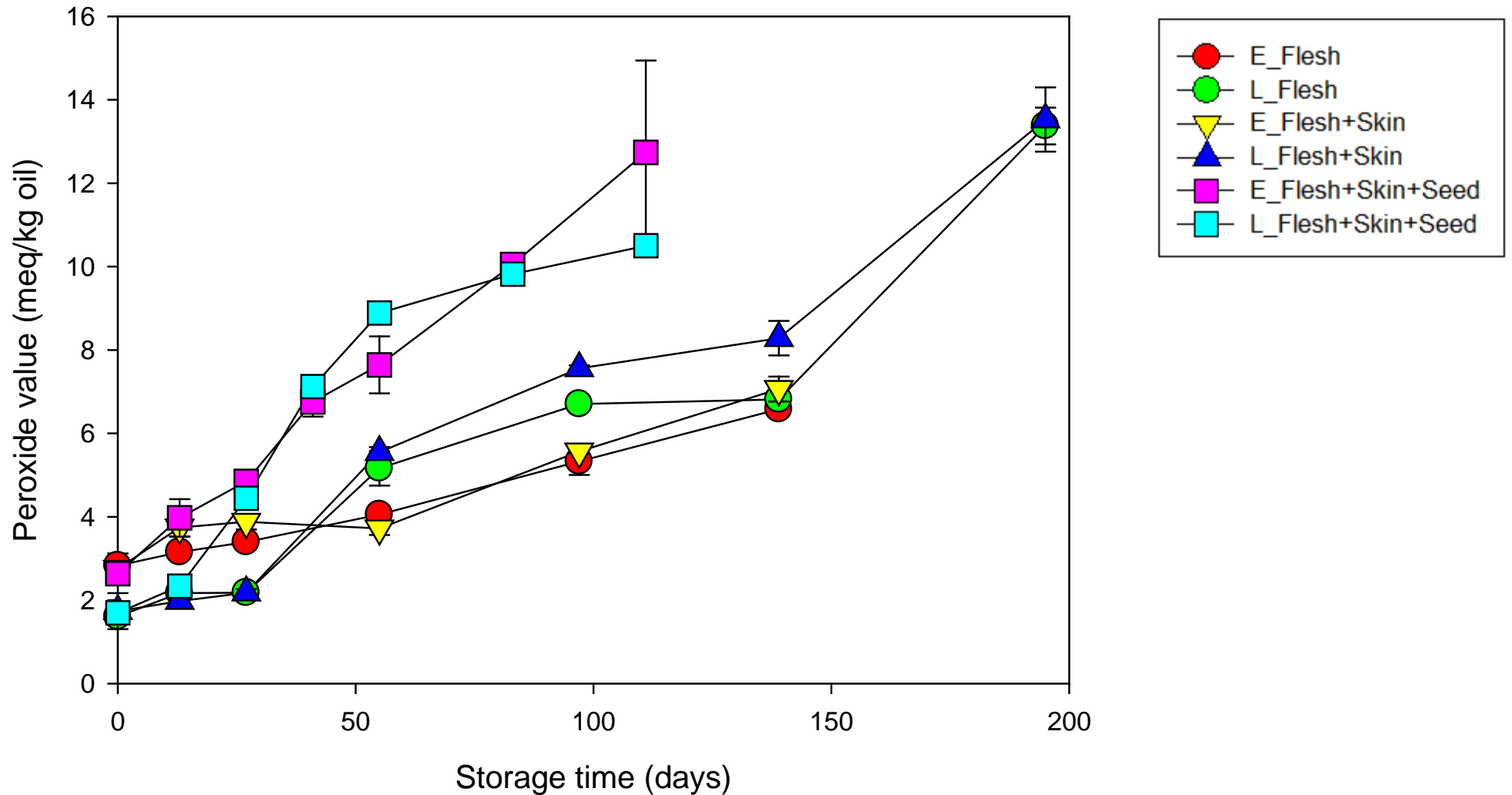
Season	Flesh only		Flesh + Skin		Flesh + Skin + Seed	
	Early	Late	Early	Late	Early	Late
% Free fatty acids (as oleic acid)	0.30 ± 0.01	0.29 ± 0.02	0.23 ± 0.02	0.26 ± 0.02	0.24 ± 0.01	0.26 ± 0.02
Peroxide Value (meq/kg oil)	2.8 ± 0.3	1.6 ± 0.1	2.7 ± 0.1	1.7 ± 0.4	2.6 ± 0.1	1.7 ± 0.1
Total Chlorophyll (mg/kg oil)		13.25 ± 0.03		14.74 ± 0.12		21.19 ± 0.03
Total Phenolics (mg/kg oil)		79.2 ± 1.5		182.5 ± 1.1		259.4 ± 1.7

Oxidative Stability - Rancimat test



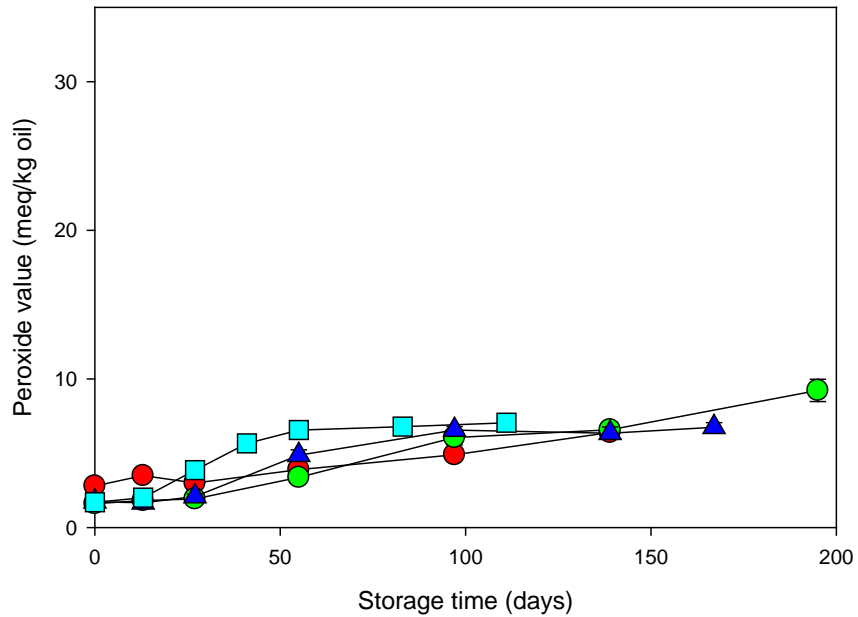
	Induction time (hours)		
	Flesh only	Flesh + Skin	Flesh + Skin + Seed
Early season oil	8.74	14.55	14.22
Late season oil	8.08	13.82	12.78

Peroxide value - at 30°C

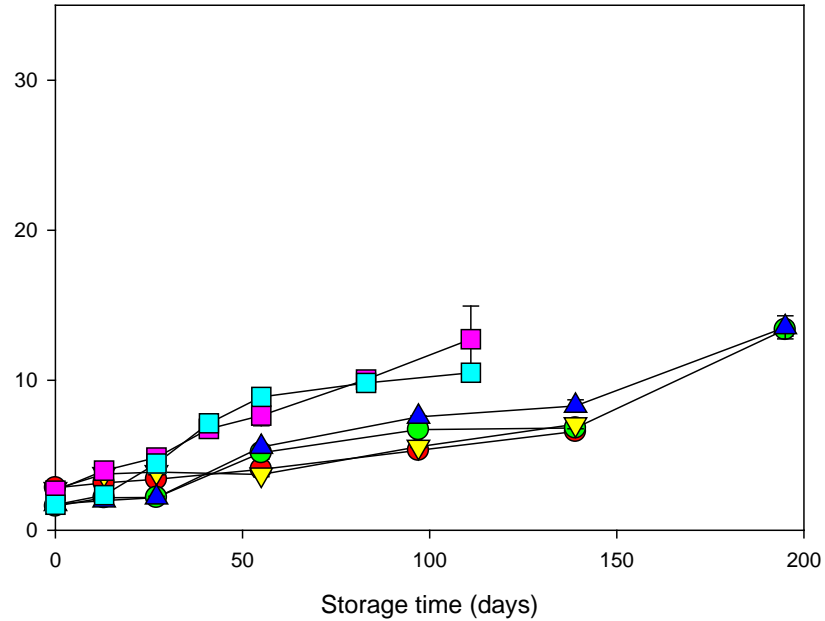


Peroxide value - at 20,30 and 40°C

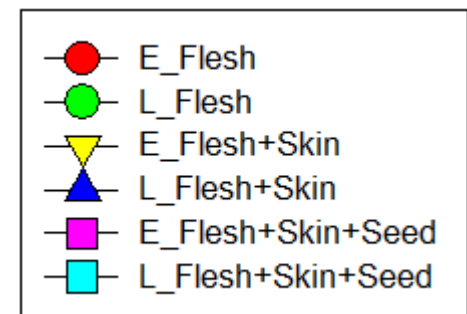
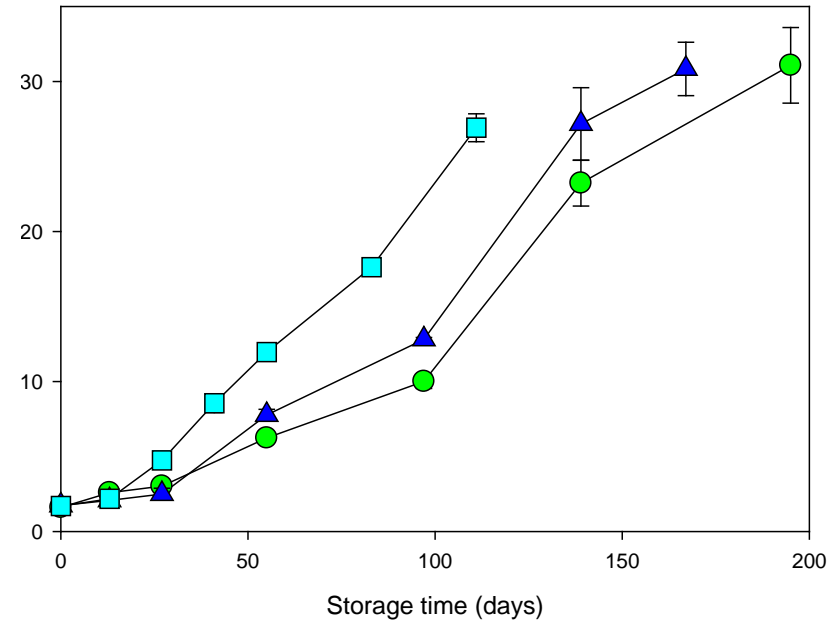
20°C



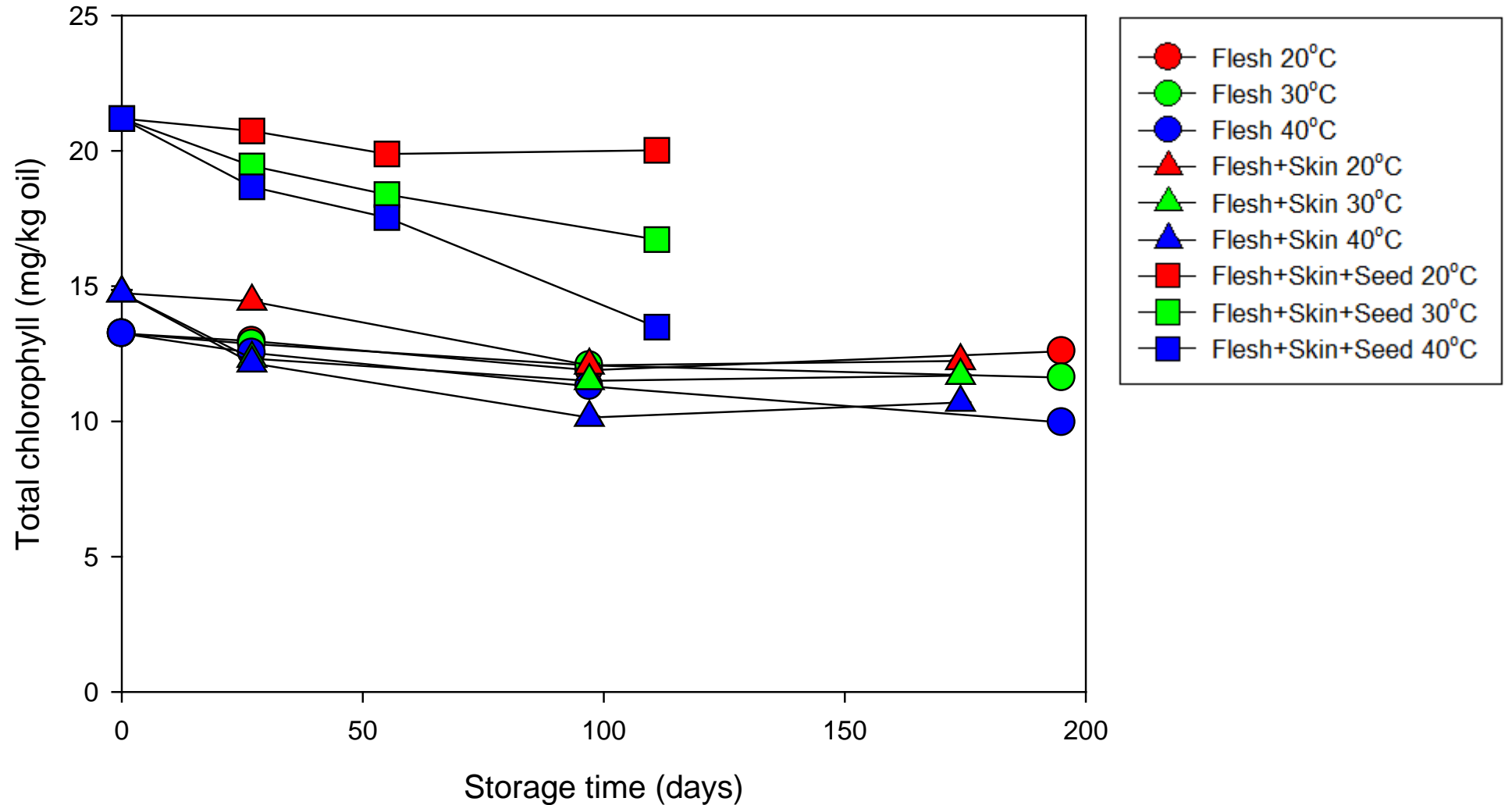
30°C



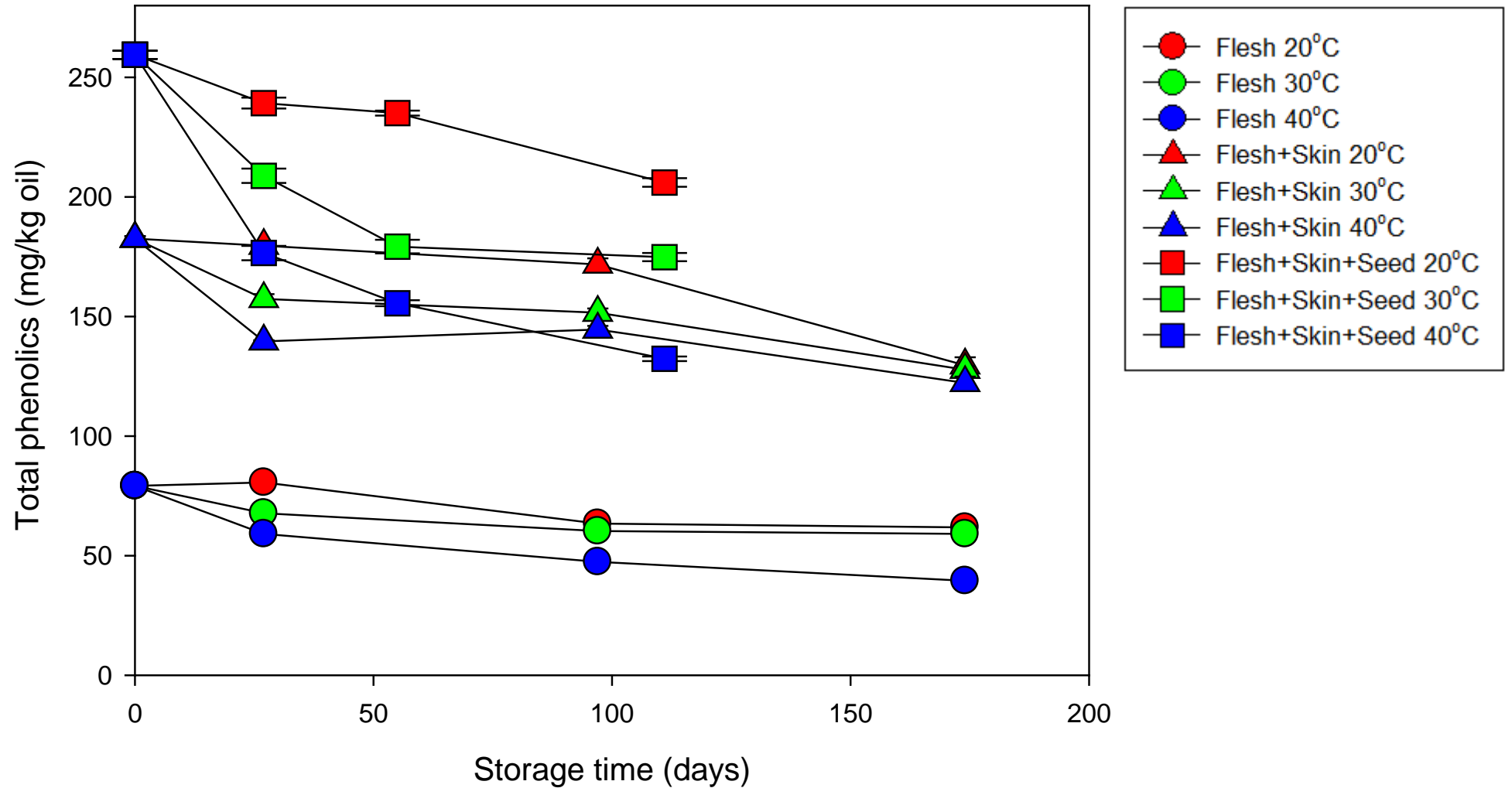
40°C



Total Chlorophyll - at 20,30 and 40°C



Total Phenolics - at 20,30 and 40°C



Conclusions

- Addition of skin and seeds to malaxer will result in lower overall oil yield per malaxer
- Fatty acid profile not affected by addition of skin and seed
- Oxidative stability by Rancimat gives a result that implies the stability is better with added skin and seed
- Storage found Flesh+Skin+Seed oil oxidised faster especially at higher temperatures
 - more rapid increase in Peroxide value
 - more rapid decline in phenolics and chlorophyll
- For Extra Virgin Avocado Oil, to ensure good oil stability, remove peel and seed/pit/stone

Future work

- Composition of oils with and without skin and seed
- Sensory analysis of oils with and without skin and seed

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