



# Analysis of the phytochemical patterns present in ‘Monty’s Surprise’ heritage apple cultivar: implications for cancer prevention

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# BACKGROUND

## APPLE PHYTOCHEMICALS



### 1. PHENOLIC COMPOUNDS

- Flavonoids

  - Anthocyanidins

  - Flavonols (quercetin)

  - Dihydrochalcones (phloretin, phloridzin)

  - Monomeric flavanols (catechin, epicatechin)

  - Polymeric flavanols (procyanidins)

- Phenolic acids (chlorogenic acid)

### 2. TRITERPENOIDS

 (annurcoic acid, betulinic acid, ursolic acid)

### 3. FATTY ACIDS

### 4. ORGANIC ACIDS



Antioxidant activity

Cancer preventive properties

Lower incidence of chronic conditions



More information: <sup>1</sup> Nežbedová et al., 2021, *Nutrients*.



## BACKGROUND

### WHY IS 'MONTY'S SURPRISE' SPECIAL?

heritage apple cultivar from Whanganui, NZ

unique phenolics patterns

high concentrations of flavanols (procyanidins)


short shelf life




<sup>2</sup> Heritage Food Crops Research Trust, <https://www.heritagefoodcrops.org.nz/>.



## AIMS

 1. To identify the main phytochemicals in the NZ heritage apple cultivar known as 'Monty's Surprise'.

 2. To evaluate the effect of two simple household processing methods (puree and air-dehydration) used for **long term storage of the apple** on phytochemicals composition.

## METHODOLOGY



Skin and flesh separated

1. Puree
2. Air Dehydration
3. Fresh sliced

Extraction with ethanol:water:formic acid

Freeze -20°C

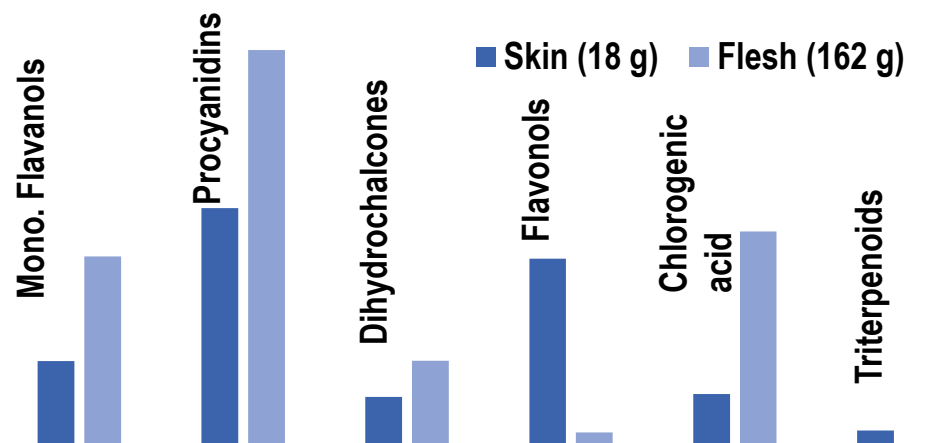
Phytochemical concentrations determined by LC MS



# RESULTS

## 1. Phytochemical concentrations in the MS skin and flesh based on LC MS (mg):

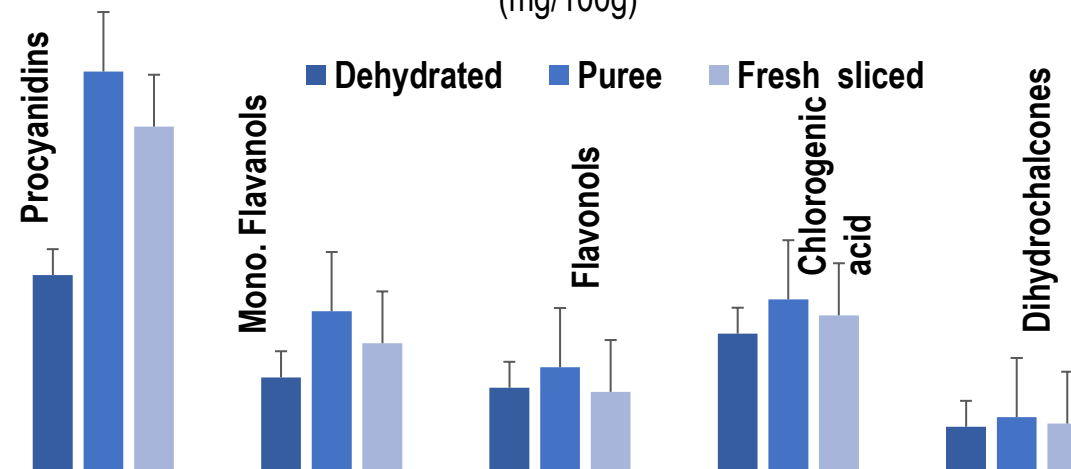
Data were calculated based on the average weight of whole apple (180 g) where apple skin contributed 18 g.



- Procyanidins are the main phenolics of MS.
- Flavonols are present mainly in the skin.
- Apple skin is an important source of phytochemicals.

## 2. The effect of simple household processing method on the MS phytochemical concentrations:

Preliminary data: Processing effect on phytochemicals concentrations DW (mg/100g)



- **Air dehydration appears to be more destructive** to apple phytochemicals compared to puree.
- Further analysis is required to confirm/validate these results.





## CONCLUSION

- This study will identify **simple household processing method for long term storage** of this superfood while **preserving** the apple's phytochemical profile to achieve maximum health benefits.
- Findings from this study will help promote planting and consumption of NZ heritage cultivar with great potential in cancer prevention.

## REFERENCES

<sup>1</sup> Nezbedova et al., 2021, *Nutrients*.

<sup>2</sup> Heritage Food Crops Research Trust,  
<https://www.heritagefoodcrops.org.nz/>.

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## WHAT'S NEXT?

**Evaluation of the cancer preventive properties of Monty's Surprise apple using cell culture model.**