

# Impact of processing on the phytochemical profile of NZ heritage apple cultivar ‘Monty’s Surprise’ and their cancer management properties.

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HERITAGE FOOD CROPS  
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## Background

Apples consumption is associated with improved health and reduced risk of cancer which is attributed to their **phytochemicals** content. The most well-studied group of apple phytochemicals for their health benefits are phenolic compounds, mainly flavonoids.

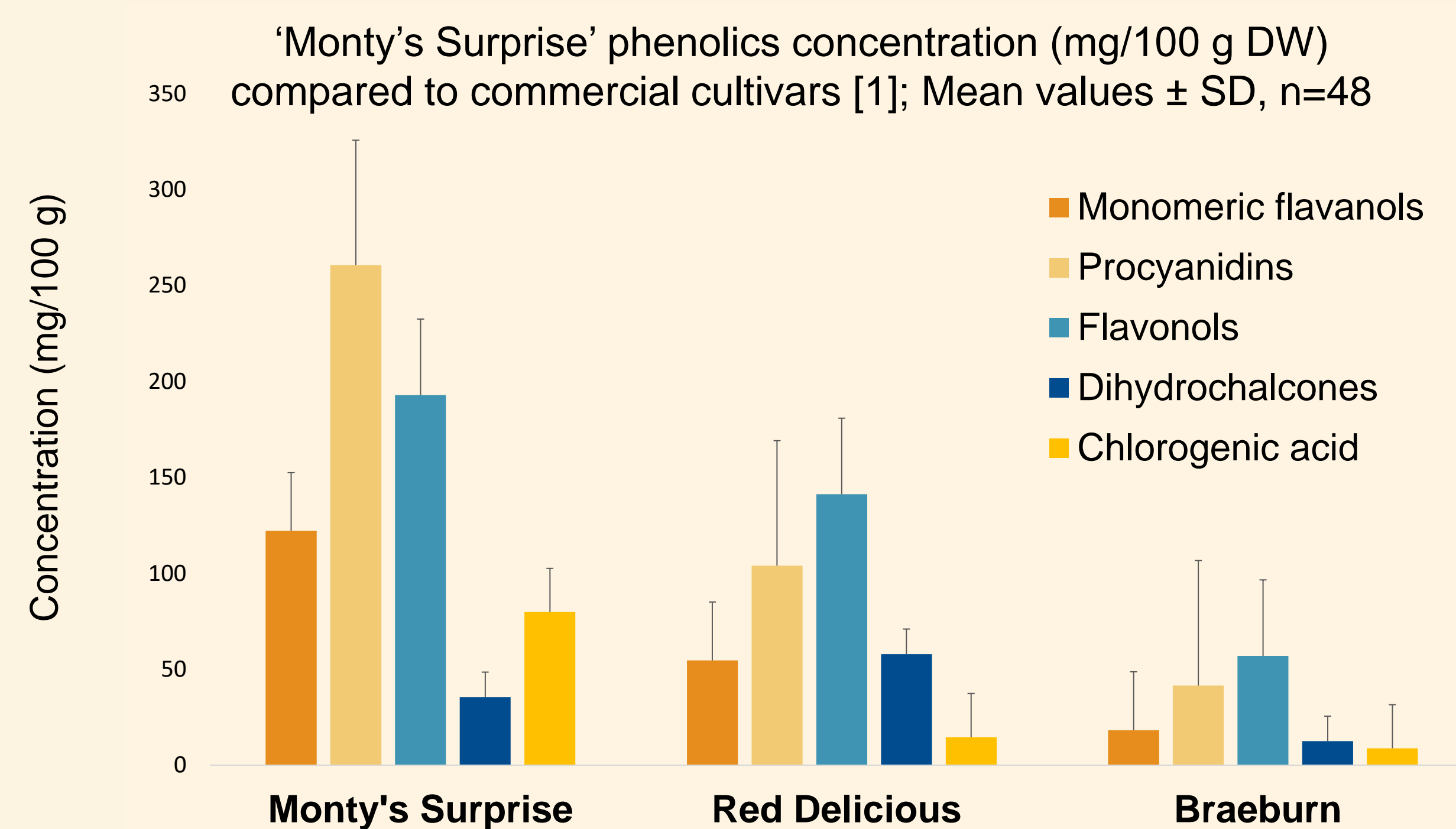
It has been difficult to study health benefits of apple phytochemicals as their **concentration and composition** vary across apple tissue type and is **affected by cultivar and processing**.

## Objective

This project systematically investigates the phytochemical patterns, **health benefits and cancer preventative effects** of a New Zealand (NZ) heritage apple cultivar known as ‘Monty’s Surprise’.

## ‘Monty’s Surprise’ apple

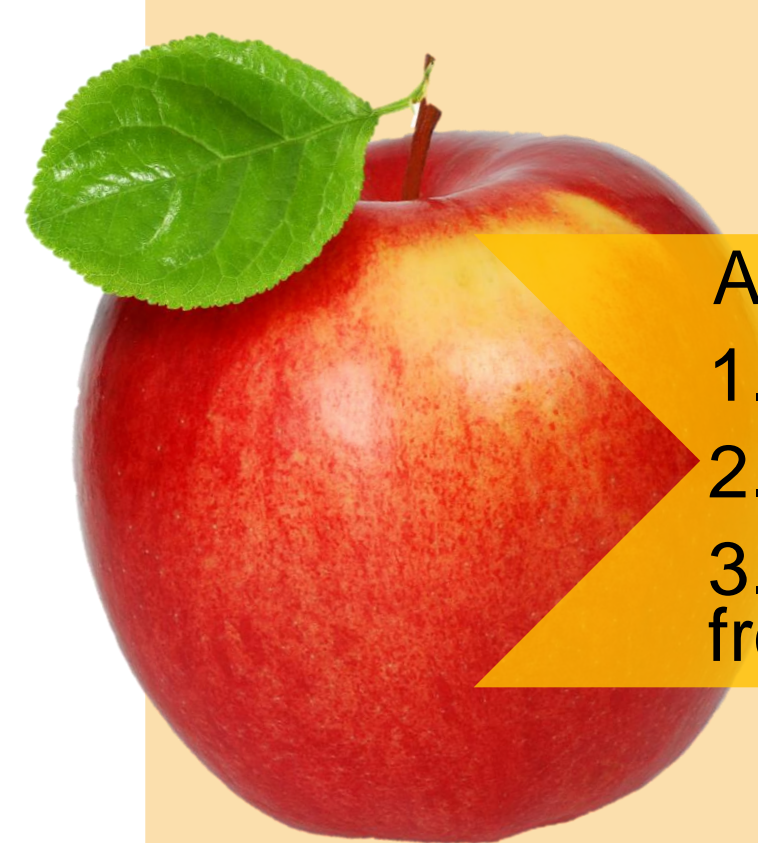
‘Monty’s Surprise’ is a **heritage apple** cultivar from Whanganui, New Zealand. This apple cultivar has a unique phytochemical pattern with high concentrations of procyanidins and monomeric flavanols: catechin and epicatechin.



## Aim

Aim of this study was to develop a standardized ‘Monty’s Surprise’ apple product using simple household processing techniques (puree and air-dehydration) for apple storage with minimal effect on the composition of apple phytochemicals.

## Methodology



Apple processing:  
1. Pureeing  
2. Air Dehydration  
3. Slicing (sliced-frozen)

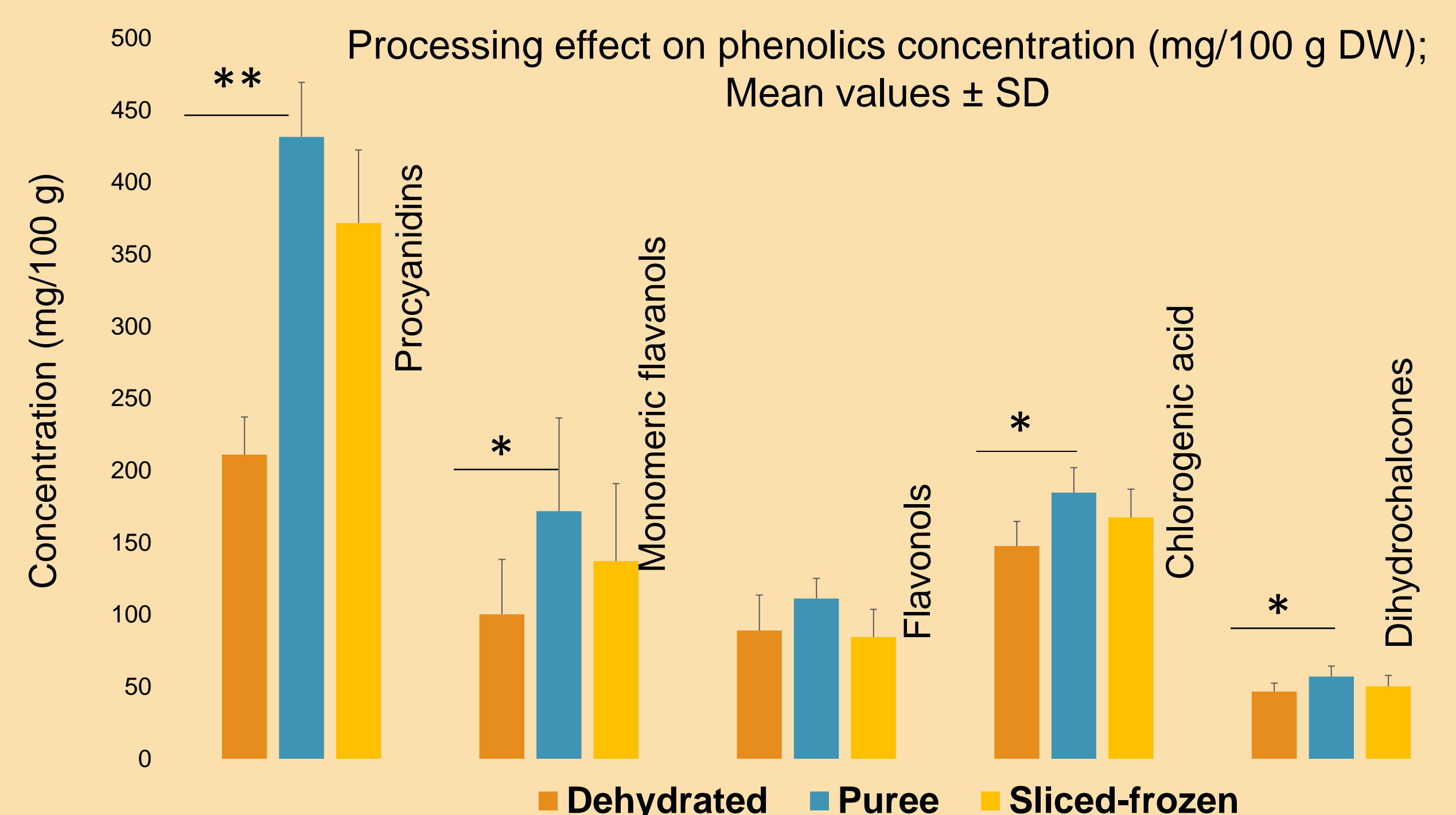
Extraction with ethanol:water:formic acid

Targeted analysis by UPLC-QTOF-MS

Freeze -20 °C

## Results

Air-dehydration reduces phytochemical content of ‘Monty’s Surprise’ apple compared to pureeing. Additionally, **pureeing** appears to be a suitable technique to preserve this apple while retaining its phytochemical content and composition.



n=72, significantly different at  $p \leq 0.05$  (ANOVA, Tukey’s HSD test)

## Conclusion

- Findings from this study identify simple household processing technique for storage and consumption of ‘Monty’s Surprise’ apple.
- From this work, we have developed a uniform apple product which will be used for the human bioavailability study and inform cell culture studies in the subsequent phases of this project.
- In the future, this project has the potential to include ‘Monty’s Surprise’ apple to **improve long term strategies for cancer management**.



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**References:** Nezbedova et al., 2021, Nutrients.; [1] Heritage Food Crops Research Trust, 2003, Monty’s Surprise Apple, <https://www.heritagefoodcrops.org.nz/>.

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