



## **Bioprospecting of food-grade anti-inflammatory, anti-oxidant, and cardio-protective ingredients in APPLE by-products**

### **Overview**

Oxidative stress and thrombotic and inflammatory complications are connected to numerous chronic disorders, such as cardiovascular disease (CVD), diabetes, and cancer. There is extensive research in the medical and pharmaceutical fields for producing drugs against these pathways. Besides, the search for natural bioactive compounds has become a sought subject for their health benefits. Among them, bioactive lipid compounds, phenolic compounds, and bio-functional dietary polar lipids (PLs) found in some natural foods and beverages have shown a significant impact in preventing/reducing the effects of oxidative and inflammatory processes.

The worldwide apple industry produces several products such as juice, cider, and vinegar, however, this production leads to 70 million tons of waste in the form of apple pomace. Particularly, this waste product is composed mainly of carbohydrates, fibre, protein, lipids, and ash. These nutrients are primarily attributed to the skin and flesh (95%). A study conducted at UL has shown that food-grade extracted from apple pomace can be used as a functional product. The resultant bioactive product has phenolics and PL with strong anti-inflammatory and anti-platelet properties. This valorised product can be used for producing functional foods like i.e., whole grain bread, food supplements, and nutraceuticals.

### **Technology**

Lipid extracts are prone to oxidation and other compounds with antioxidant effects (i.e., tocopherols, phenolics) are usually added to supply antioxidant protection and enhance potency. Researchers at UL have developed a method to ease the co-extraction and co-isolation of dietary phenolics and bioactive polar lipids (PLs) within the same extract from apple pomace wastes. Consequently, the resultant revalorized extract has strong antioxidant protection, anti-inflammatory, and anti-platelet properties, with several health benefits according to EFSA (European food safety authority) guidelines. Ref. Tsoupras et al (2019) In Vitro Antithrombotic Properties of Salmon (*Salmo salar*) Phospholipids in a Novel Food-Grade Extract. *Marine Drugs* 17(1) 62. DOI: <https://doi.org/10.3390/md17010062>

### **Benefits**

The food grade method elaborated in UL also eases the safe use and consumption of the apple pomace extract which is rich in both phenolics and PL bioactive of different polarity. The production of novel functional foods infused with the UL extract and/or food supplements/nutraceuticals promotes cardiovascular health and reduces the risk of inflammation and oxidative stress related chronic disorders.

Particularly, a functional bread prepared using the extract as an added ingredient has both stronger antioxidant protection and anti-inflammatory and anti-platelet properties.

## Applications

Potential use of apple pomace extracts to prepare novel functional bread products rich in dietary phenolics and PL bioactive. The presence of the revalorized extract in the bread supplies strong antioxidant, anti-inflammatory and anti-platelet properties for the improvement of cardiovascular health.

## Commercial Opportunity

The University of Limerick is interested in seeking partners to exploit the commercial potential of these technology by entering into licensing agreements.

- Development partner
- Commercial partner
- Licensing
- University spin-out
- Seeking investment

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