

# *Pouteria lucuma*, the Chemical Profile of Pulp and Skin: A Comprehensive Analysis of Antioxidant Activity

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## Introduction

*Pouteria lucuma* Ruiz and Pav, sometimes referred to as "Lucuma" or "Gold of the Incas," is a subtropical fruit with a particularly sweet flavour that is used in the baking and dairy sectors as well as to make cakes and ice cream. Although the composition of main metabolites is now understood, there is little information available on the composition of specialised metabolites. Furthermore, because of the great demand for lucuma, no research has been published on skin, which is a significant agricultural waste. The samples of pulp and skin were analysed by LC-ESI/LTQOrbitrap/MS/MS in negative ion mode to provide a preliminary metabolite profile of *Pouteria lucuma*.

## Description

The identification of specialised metabolites from the phenolic, flavonoid, and polar lipid classes was made possible by a comprehensive examination of the precise weights, molecular formulae, and ESI/MS spectra. Spectroscopic techniques, such as 1D- and 2D-NMR studies and ESI-MS analysis, and LC-MS/MS analysis served as the guides for the extraction of chemicals found in the pulp extract. Additionally, both the antioxidant activity of extracts and isolated compounds, as well as the phenol content of the extracts, were assessed [1].

A pan-tropical genus with 325 species, *Pouteria* is very valuable economically since many of its members produce wood of exceptional quality and delicious fruit. Due to its biological activity, which include antioxidant, anti-inflammatory, antibacterial, and antifungal qualities, various species have been utilised in folk medicine for a variety of purposes in addition to their economic relevance. Ruiz and Pav of *Pouteria Lucuma* (Sapotaceae) is a subtropical fruit that is indigenous to the Andes and may be found in Peru, Chile, and Ecuador. It is also known as "Lucuma" or "Gold of the Incas." *P. lucuma* was cultivated in antiquity, as evidenced by pottery depictions of the plant from the pre-Incan civilizations of Nazca and Moche.

Here, 2,2-diphenyl-1-picrylhydrazyl (DPPH•) and trolox equivalent antioxidant capacity (TEAC) tests were used to measure the total phenolic content of the pulp and skin extracts and to assess the antioxidant activity. Liquid chromatography linked to high resolution mass spectrometry (ESI-Orbitrap-MS) in negative ion mode was first used to analyse the n-BuOH extract of the pulp and the methanol extract of the skin of *P. lucuma* fruits. Although high resolution mass spectrometry (HR-LC-MS) has been used to profile the metabolites in plant extracts, it has not yet been utilised to study

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Received: 28 April, 2022, Manuscript No. JMT-22-68004; Editor Assigned: 30 April, 2022, Pre QC No. P-68004; Reviewed: 10 May, 2022, QC No. Q-68004; Revised: 15 May, 2022, Manuscript No. R-68004; Published: 22 May, 2022, DOI: 10.37421/2471271X.2022.08.214

the chemical composition of lucuma pulp. In order to recycle trash from the agricultural business, LC-MS/MS recently investigated lucuma seeds [2,3].

Using an LC-ESI/LTQOrbitrap/MS/MS analysis in the current work, a total of 36 chemicals was found in the *P. lucuma* pulp n-BuOH extract. The phenolic compounds were extracted, and NMR measurements clearly determined their structures. This is the first accurate examination revealing the structures of the components found in the extract. Until now, the fruits have mostly been investigated for their concentration of sugars, organic acids, total phenolics, and total carotenoids. Numerous articles on food plant metabolomics have been published, frequently detailing the poor characterisation of plant components or speculative structures. It is obvious that the putative structure assignment by the single MS analysis has to be verified by chemical isolation and structure elucidation using NMR investigations [4].

16 lipid molecules from the oxylipin, glycolipid, and phospholipid classes—all of which were initially characterised in lucuma—were putatively identified by analysis of the LC-ESI/LTQOrbitrap profile, precise mass measurements, fragmentation pattern studies, and comparison with literature data. Notably, the extract also included phenolic chemicals and a variety of polar lipids. The use of lucuma in human nutrition as a food rich in various classes of bioactive and healthy lipids with positive effects is supported by these facts when taking into account the biological activities documented for lipid classes and their impact on human health [5].

## Conclusion

The total phenolic content of the skin extract (560.69 mg GAE/g extract) was first assessed to promote the reuse and utilisation of lucuma by-products. *P. lucuma* skin extract was subjected to an LC-ESI/LTQOrbitrap/MS/MS analysis in order to link the total phenolic content of the extract with its chemical make-up. The two main substances are eriodictyol and taxifolin. Taxifolin also demonstrated high radical scavenging abilities, with a TEAC value of 3.53. This research established the potential of lucuma skins, a byproduct of the lucuma processing industry, to be used in the production of dietary supplements.

## Acknowledgement

None.

## Conflict of Interest

No potential conflict of interest was reported by the authors.

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**How to cite this article:** Melville, James. "Pouterieria lucuma, the Chemical Profile of Pulp and Skin: A Comprehensive Analysis of Antioxidant Activity." *J Ment Disord Treat* 8 (2022): 214.