EFFECT OF EXTRUSION ON THE POLYPHENOL PROFILE IN AQUAFEEDS SUPPLEMENTED WITH GRAPE MARC EXTRACT

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European Congress of Marine Biotechnology
21-24 November
Málaga
2023
ESMB
European Society for Marine Biotechnology

Horizon 2020
European Union Funding
for Research & Innovation

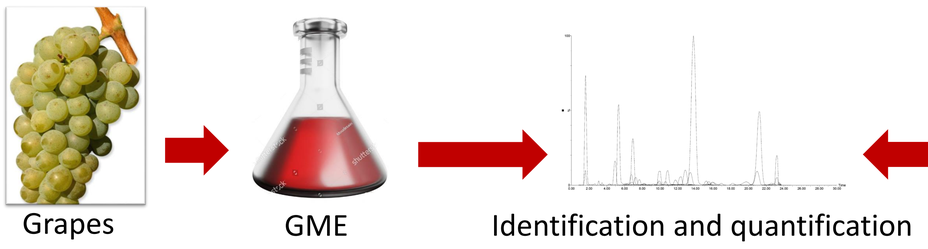
INTRODUCTION

The use of polyphenols in aquafeeds is interesting for managing the fish health and preventing the lipid oxidation and oxidative stress in aquaculture without causing any negative impact on the environment. Vineyard by-products are potential source of polyphenols, whose recuperation is highly sought in view to the circular economy strategy. However, their practical application may be hindered by the lost in their bioactivity during feed manufacture due to processing conditions, such as temperature in extrusion. Taking that into account, the goal of this study was to determine the effect of extrusion on the stability of grape marc extract (GME) polyphenols in aquafeeds.

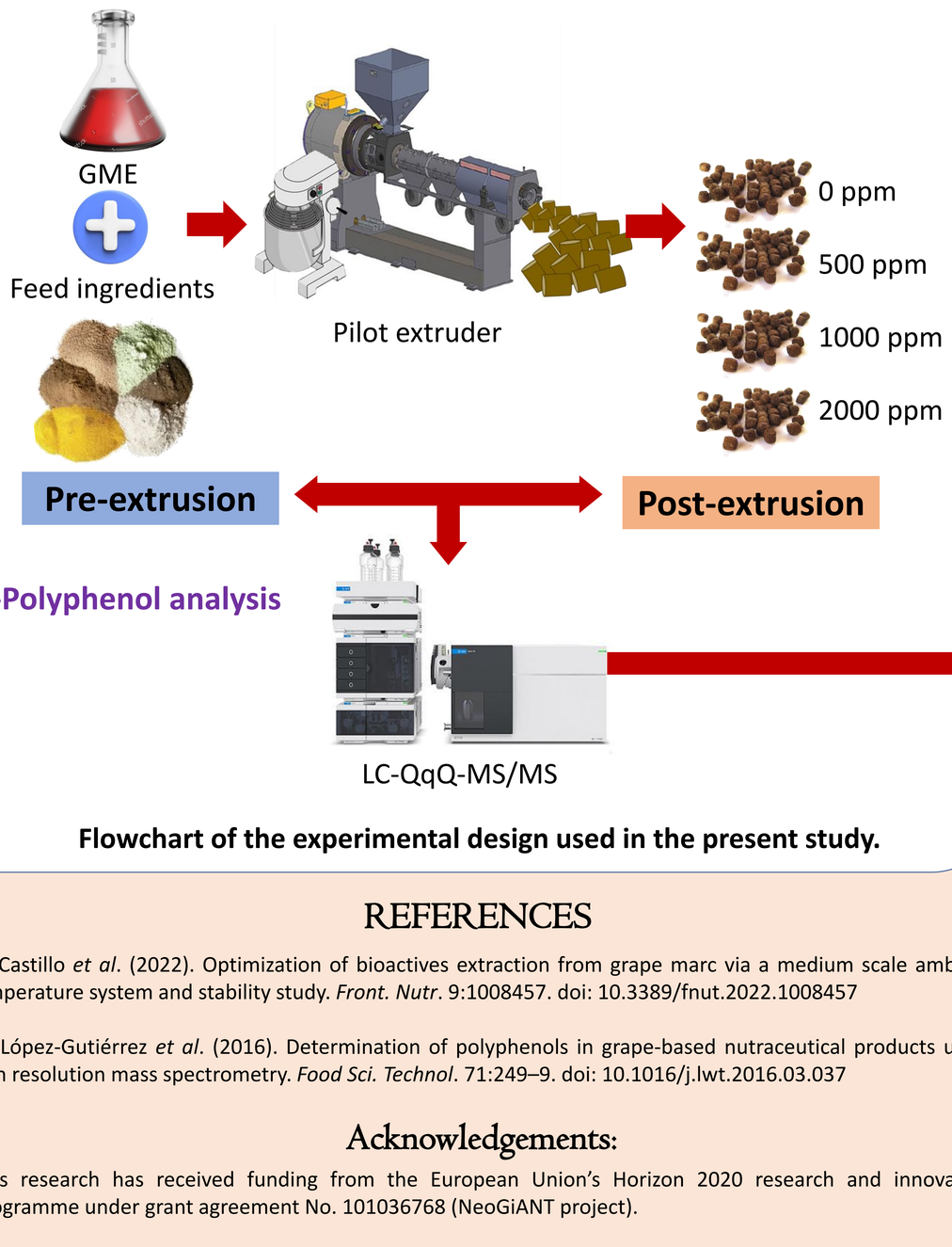
MATERIAL AND METHODS

The GME was obtained from Galician vineyards by-products, specifically from Albariño white grapes according to Castillo *et al*. [1]. The identification and quantification of polyphenols was performed by LC-QqQ-MS/MS [2]. Four aquafeeds (45% protein and 18% lipid) with different GME supplementation (0, 500, 1000 and 2000 ppm) were elaborated using a laboratory single screw extruder (51SP, JS Conwell, New Zealand) with a temperature configuration of 95, 100, 95 and 92ºC from the inlet to the outlet barrels. The effect of temperature on the polyphenol stability was assessed before and after the extrusion.

1.- Preparation and characterisation of GME



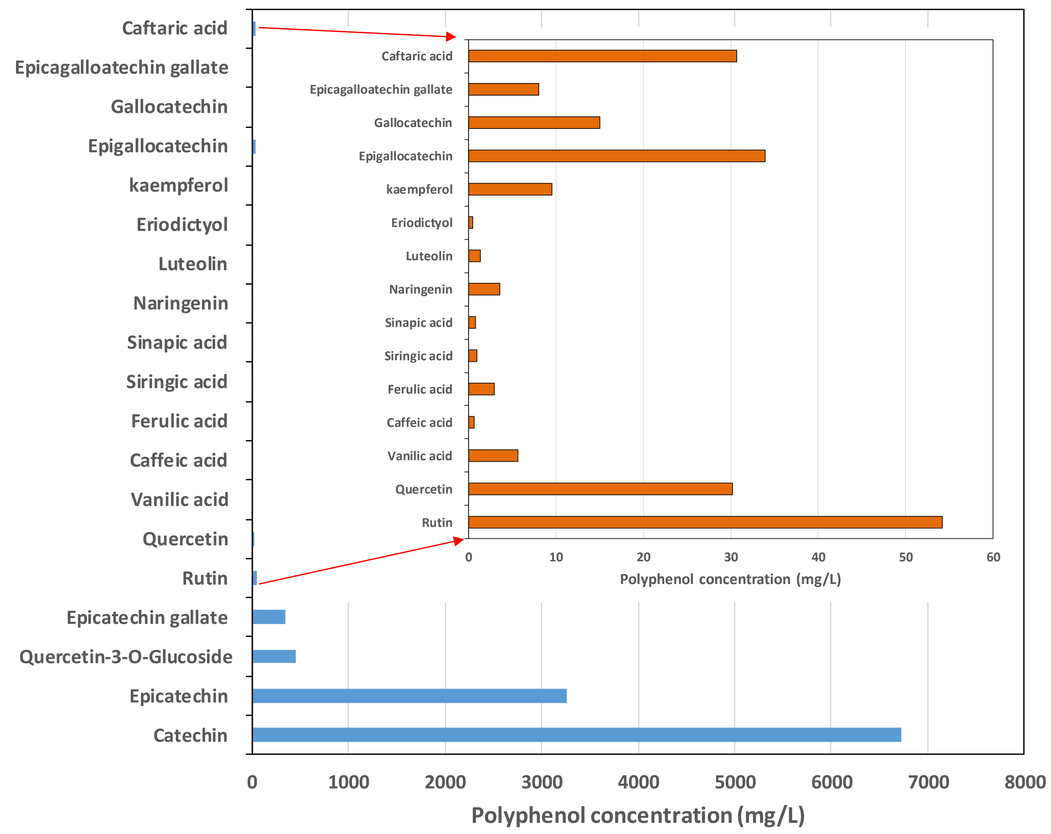
2.- Elaboration of aquafeeds with GME supplementation



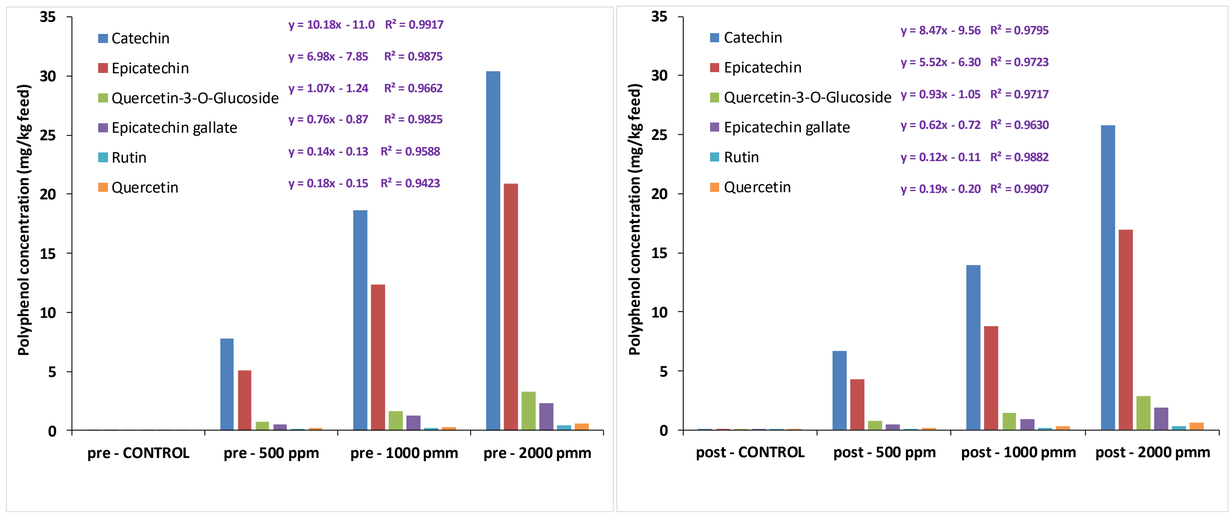
Flowchart of the experimental design used in the present study.

RESULTS

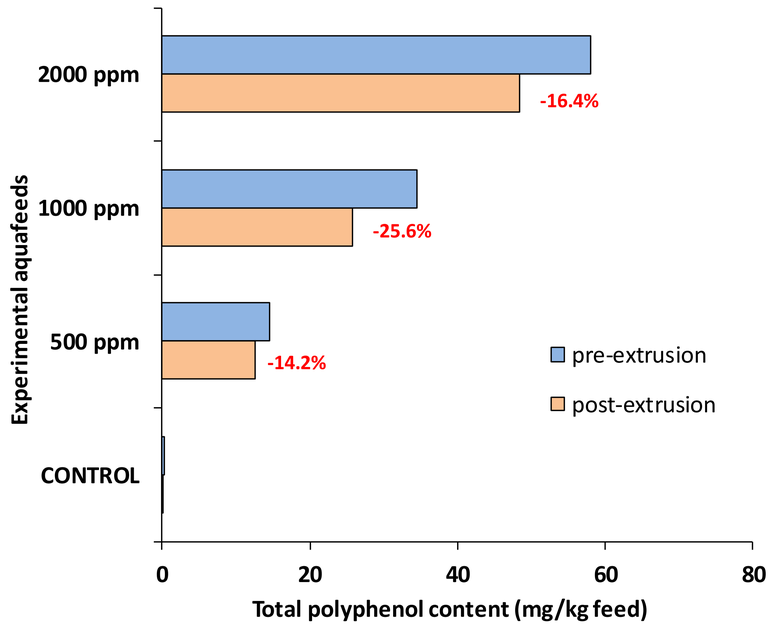
The **main polyphenols** found in the GME were catechin (62%), epicatechin (30%), quercetin-3-O-glucoside (4%), epicatechin gallate (3%), rutin (0.5%) and quercetin (0.3%).



The results confirmed a **linear relationship** between the dietary GME supplementation and the polyphenol content measured in pre- and post-extrusion in aquafeeds. The main compounds found in the diets were the same detected in the GME. However a reduction in the polyphenol content was evidenced in the experimental aquafeeds after the extrusion.



It was confirmed that the extrusion process **reduced the content** of the main polyphenols depending on the GME dietary supplementation level. The concentrations of catechin (15-25%), epicatechin (15-29%), epicatechin galate (16-27%) and quercetin-3-O-glucoside (3-13%) were reduced. Overall, taking into account all the polyphenol detected in the experimental aquafeeds, the reduction observed was ranged from 14% in 500 ppm-diet to 26% in 1000 ppm-diet.



CONCLUSIONS

The process of **extrusion affected the stability of polyphenols** in aquafeeds supplemented with GME. The **suitability of supplementing aquafeeds with polyphenols** of GME was evidenced, though further analysis are requested for assessing their stability during the storage.

REFERENCES

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Acknowledgements:

This research has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 101036768 (NeoGiANT project).