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Development of potential functional biscuits with the incorporation of Tannat grape pomace and sweetener

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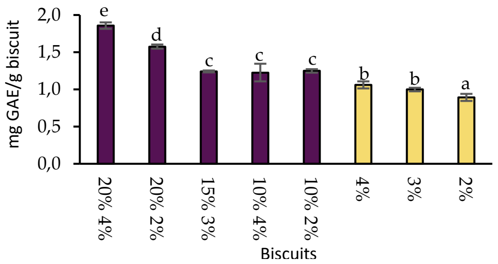
INTRODUCTION

Nowadays, consumers are becoming more aware of having a good diet, being essential to prevent chronic diseases [1]. Functional foods have the potential to decrease the risk of suffering chronic diseases, associated with the action of bioactive compounds [2]. A bioactive compounds source is grape pomace, a byproduct from winemaking industry [3]. The aim of this work was to develop formulations of potential functional biscuits with the nutrition claims of "source of dietary fiber" and "with no added sugar" with the addition of different percentages of Tannat grape pomace and sucralose. The bioactive properties (antioxidant, antidiabetic and antiobesity) were evaluated.

METHODS

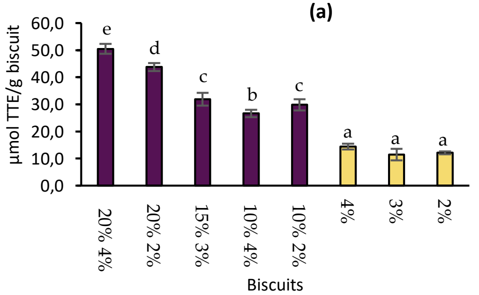
RESULTS AND DISCUSSION

Antioxidant capacity

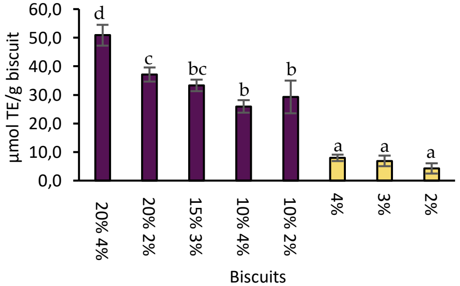


(a)

The substitution of wheat flour by TGP in the biscuits increased the content of total polyphenols and the antioxidant capacity compared with their controls ($p < 0.05$).



(b)

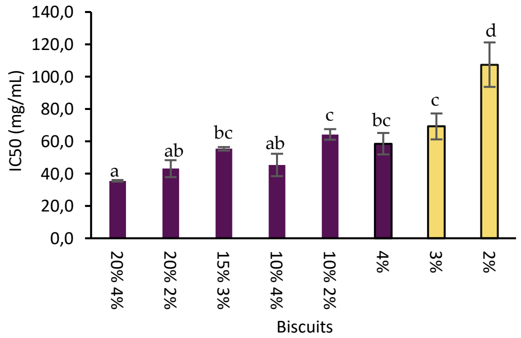


(c)

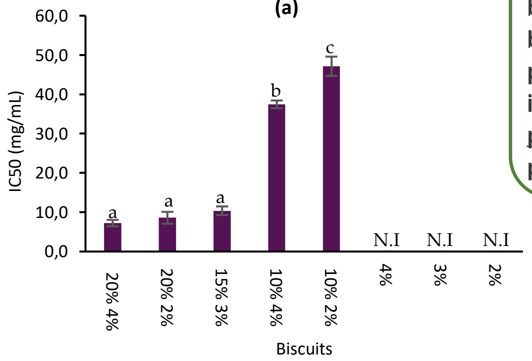
Figure 1. Total polyphenol content **(a)** and antioxidant capacity measured by ABTS **(b)** and ORAC-FL **(c)**. Bars denote the mean values and error bars the standard deviation. Different letters represent significant differences according to Tukey test ($p < 0.05$). TGP biscuits: 20% 4%, 20% 2%, 15% 3%, 10% 4%, and 10% 2% (percentages of TGP and sucralose respectively). Control biscuits (without TGP): 4%, 3%, and 2% (percentages of sucralose).

Bioactive Properties

Antidiabetic and antiobesity capacities



(a)



(b)

Formulations with the highest substitution of wheat flour by TGP (20%) presented greater capacity to inhibit α-glucosidase and pancreatic lipase compared with the control ($p < 0.05$).

To our knowledge this is the first time that biscuits with the substitution of wheat flour by grape pomace has been reported to have pancreatic lipase and α-glucosidase inhibition capacities, making them a potential functional food for regulating post-prandial fat levels and glucose

Figure 2. Antidiabetic and antiobesity capacities measured by α-glucosidase **(a)** and pancreatic lipase **(b)** inhibition. N.I: no inhibition. Bars denote the mean values and error bars the standard deviation. Different letters represent significant differences according to Tukey test ($p < 0.05$). TGP biscuits: 20% 4%, 20% 2%, 15% 3%, 10% 4%, and 10% 2% (percentages of TGP and sucralose respectively). Control biscuits (without TGP): 4%, 3%, and 2% (percentages of sucralose).

CONCLUSIONS

Biscuit formulations with TGP and sucralose showed antioxidant, antidiabetic and antiobesity properties due to the incorporation of the byproduct. The formulation with the highest content of TGP and sucralose presented the highest bioactive properties, showing the added-value of an agro-food industry byproduct.

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