Microwave-assisted Extraction of Resveratrol from Functional Foods: Cookies and Jams

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INTRODUCTION

Trans-resveratrol (3,5,4′-trihydroxystilbene) is a natural compound with pharmacological properties such as antioxidant, anti-inflammatory, analgesic, cardio-protective, neuro-protective and anticancer activities (1). In the field of neurodegeneration, resveratrol has been proved to be beneficial for example for in vitro and in vivo models of Alzheimer’s disease (AD), therefore it would be interesting to determine resveratrol levels in functional foods (2).

OBJECTIVE

The aim of this work was to develop a new method for fast determination of resveratrol in cookies and jam by microwave-assisted extraction. This method would also allow for the determination of the effect of baking and pasteurization steps in the functional ingredient (resveratrol).

MATERIALS AND METHODS

Commerical resveratrol source was used for preparing two functional foods.

The microwave-assisted extractions (MAE) were performed in Milestone Ethos 1600 Advanced Microwave Digestion Lan station (Milestone, CT, USA). MAE was used for the extraction of resveratrol in cookies and jams. Also to evaluate the effect of baking and pasteurization steps during food preparation. A Box Behrenk design with three factors (solvent composition, microwave power and solvent to solid ratio) has been used for optimizing the microwave-assisted extraction. (Fig. 1)

RESULTS

For cookies and jam, solvent composition was found to have the highest effect on the recovery of resveratrol (p<0.05) (Fig. 1). Interactions effects among extraction variables appeared for both cookies and jam. Response surface methodology was used to establish the optimum values for the extraction variables (Fig. 2 and 3).

The best MAE condition for cookies were: 80% methanol in water, solvent-solid ratio 25:5 and microwave power 250 W. For jams, the best MAE conditions were: 80% methanol in water, solvent-solid ratio 40:5 and microwave power 500W. Kinetics for the extraction was also evaluated. For both jam and cookies samples, 15 min was the best extraction time (Figure 4).

The relative standard deviation for repeatability and precision was lower that 4% which indicates that he UAE methods is effective for extraction of resveratrol from cookies and jams. Recoveries above 90% were found for both kind of samples.

The baking and pasteurization steps slightly degrade resveratrol; for cookies a 14% degradation was found whilst for jams 12% degradation was recorded. Most likely, higher degradation for cookies are because of the high temperature used in oven (170°C) during the baking step. It is well know that resveratrol is highly sensitive to degradation by light and high temperatures (3). The degradation found was acceptable for functional food preparation because of it was below 15%.

CONCLUSIONS

MAE method allows for the determination of resveratrol in functional foods.

The degradation of resveratrol during the baking or the pasteurization steps was less than 15% of the initial content.

Therefore resveratrol can be used as active compound in functional foods

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LITERATURE CITED