STABILITY OF ELLAGIC ACID FROM RASPBERRY SEEDS DURING THE PROCESS OF EXTRUSION

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INTRODUCTION

Raspberry is an important crop and Serbia is one of the largest producers of raspberries in the world (Dimić et al., 2012). Production of raspberry products leaves large amounts of seeds, which are considered as by-product or waste (Couto et al., 2008). These seeds are rich source of ellagic acid (Godjevac et al., 2009). Previous studies show that about 88% of the ellagic acid in raspberries is coming from raspberry seeds (Daniel et al., 1989). Ellagic acid is well known for its antimicrobial, antmutagenic, antioxidant, anti-inflammatory and anticarcinogenic properties (Khanduja et al., 1999).

Extrusion cooking is one of the most important food processing technologies, and over the years it has become the major processing method for food and feed industries (Brennan et al. 2011).

The aim of this investigation was to provide information about stability of ellagic acid from “Willamette” raspberry seeds during the process of extrusion at different temperatures.
Materials and Methods

Corn grits and milled “Willamette” raspberry seeds were used for this study. “Willamette” raspberry seeds were milled with laboratory mill and mixed with corn grits so that the ratio was 10% of the seed and 90% of the grits. The extract of this mix was analyzed on the HPLC/DAD to quantify the amount of ellagic acid. Prior to the extrusion, the humidity of the mix was set to 18%, and then the mix was extruded. After that, HPLC method was used to determine ellagic acid content in the extruded product. The single-screw laboratory extruder (Model GNF 1014/2, Type 110513, Brabender, Germany) was used for the extrusion process.
Results and discussion

The results show that the concentration of the ellagic acid in samples extruded at 140°C is 7.585 μg/g, in samples extruded at 160°C is 5.533 μg/g, and in samples extruded at 200°C is 6.618 μg/g. Statistical analysis shows that there are not significant differences in these results. So it can be concluded that extrusion temperature does not have significant influence on ellagic acid content in extruded products. Additionally, it can be seen that the ellagic acid in extruded products is very stable and it was not degraded by temperatures up to 200°C.

Table 1. Concentration of ellagic acid in raspberry seeds, corn grits and mix of 10% raspberry seeds in corn grits

<table>
<thead>
<tr>
<th>Temperature (°C)</th>
<th>Concentration (μg/g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>140</td>
<td>7.585 ± 2.3335a</td>
</tr>
<tr>
<td>160</td>
<td>5.533 ± 2.2368a</td>
</tr>
<tr>
<td>200</td>
<td>6.618 ± 2.1053a</td>
</tr>
</tbody>
</table>

Figure 1. Chromatogram of ellagic acid from samples extruded on 140°C

Figure 2. Chromatogram of ellagic acid from samples extruded on 160°C

Figure 3. Chromatogram of ellagic acid from samples extruded on 200°C

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Conclusions

This study has found that ellagic acid from „Willamette“ raspberry seeds was stable up to 200°C, during the extrusion process, and there were no significant differences in ellagic acid content in samples extruded at different temperatures, so raspberry seeds can be implemented in food products where production requires higher temperatures.
Thank You

Get in Touch

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