Effect of Edible Mushroom Powder on Antioxidant Activity of Tarhana

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ABSTRACT

Background: In this study, two edible mushroom (Morchella conica and Ramaria flava) were used to raise the biological value of tarhana. Objective: Tarhana was supplemented with two edible mushroom species to improve its nutritional value and functional properties. Method: Antioxidant activities of tarhana were analysed by using different assays. Total phenolic (TPC) and flavonoid contents (TFC) were also determined. Results: Tarhana with mushroom had high total phenolic, flavonoid contents as well as antioxidant activities. Conclusion: The results indicated that high positive correlations were found between the antioxidant activities and the polyphenol contents of tarhana with mushroom. Keywords: Tarhana, Fermented Product, Antioxidant Activity, Phenolic, Flavonoid, Frap.

INTRODUCTION

Tarhana which is a fermented traditionally product prepared with cereal flour, yoghurt, some vegetables and spices, is widely consumed and a popular nutrient source in Turkey. Fermented foods have an importance in all around the world because of long shelf life, high nutritional and sensory values when compared to the raw materials used in their production.1-3 Tarhana-like products made in our country are also produced and often consumed in some countries. For example, “kishk” in Egypt, Palestina and Jordan, “kushuk” in Iraq, “trahana” in Greece, “tahonya” in Hungary and “talkuna” in Finland is similar to tarhana in Turkey.4 There are several studies, adding different cereals to increase the nutritional and antioxidant properties of tarhana.5-7 In the present study, tarhana with different mushroom powders were produced for the first time and antioxidant activities were investigated.

MATERIAL AND METHODS

Materials

Ramaria flava on November 2015 and Morchella conica on May 2015 were collected from Cebel (37°01’27” N, 36°22’24” E, 975 m) and Hasanbeyli (37°09’26” N, 36°27’56” E, 650 m) regions of Amanos Mountains (Osmaniye, Turkey), respectively. Macro-fungal species were dried in dehydrator and then powdered.

METHODS

Tarhana samples were produced according to Kilci and Göçmen (2014).8 The solid-liquid extraction was performed as previously mentioned by Bilgicli et al.9 The clear supernatant was used to determine total phenolic described by Singleton and Rosie (1965),10 total flavonoid described by Sun et al.11 Antioxidant activity was measured using a free radical DPPH (2,2-diphenyl-1-picryl-hydrazyl) methanolic solution,12 reducing power,13 FRAP (ferric reducing antioxidant power)14 and NO (nitric oxide) removal activity15. The colour of tarhana samples measured by using colorimeter (Minolta Chroma meter CR-400, Japan). SPSS statistical software (version 18.0, Chicago, IL) were used for analysing data. At 5% level, the significance of differences among means was
RESULTS AND DISCUSSION

It was determined that total phenolic and flavonoid contents of tarhana gradually increased with the addition mushroom powder, when compared to the control (Table 1). The published report monitored that addition steel-cut oats visibly increased the total phenolic content of tarhana.8 The addition of edible mushroom powder in tarhana formulation enhanced levels of antioxidant activity significantly because of rich antioxidant capacities of mushroom species compared with wheat flour. When compared to the control, values in all analyses (DPPH, RP, FRAP, NO) were significantly increased with the addition mushroom (Table 1).

Positive and sufficiently good correlations were found between polyphenol contents and antioxidant activities of tarhana samples. Except between TFC and NO, all correlations were significant at p<0.01. In earlier studies, correlation between total phenolic content and antioxidant activity in mushroom extracts was determined.16-18

Table 1 : Total phenolic, flavonoid content and antioxidant activity of tarhana samples.

<table>
<thead>
<tr>
<th>Concentrations</th>
<th>DPPH (µM Trolox)</th>
<th>NO (µM Trolox)</th>
<th>FRAP (Fe²⁺ mM)</th>
<th>RP (µM Trolox)</th>
<th>TPC (GAE mg/100g)</th>
<th>TF (mg CE/100g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>197.0±14.14</td>
<td>60.00±06.22</td>
<td>1.51±0.02</td>
<td>298.2±02.12</td>
<td>202.20±11.31</td>
<td>3.50±00.64</td>
</tr>
<tr>
<td>100 %M</td>
<td>740.6±09.19</td>
<td>268.70±02.05</td>
<td>2.65±0.09</td>
<td>956.2±26.87</td>
<td>1099.50±53.03</td>
<td>106.30±07.78</td>
</tr>
<tr>
<td>100 %R</td>
<td>782.7±04.94</td>
<td>246.40±14.42</td>
<td>2.87±0.55</td>
<td>962.5±31.81</td>
<td>1124.90±101.82</td>
<td>209.90±10.93</td>
</tr>
<tr>
<td>50%M+50%M</td>
<td>794.2±02.12</td>
<td>199.30±39.81</td>
<td>2.94±0.02</td>
<td>1010.0±29.69</td>
<td>1168.10±21.92</td>
<td>281.30±14.14</td>
</tr>
<tr>
<td>25%M+25%M+50%C</td>
<td>733.1±01.41</td>
<td>130.40±0.00</td>
<td>2.57±0.00</td>
<td>944.0±07.07</td>
<td>815.10±22.62</td>
<td>112.60±03.21</td>
</tr>
</tbody>
</table>

Results of this study showed that high positive correlations were observed between the antioxidant activities and the phenolic contents. According to sensory analyses of the tarhana supplemented with edible mushroom indicated that the using of lower concentrations of the edible mushroom powders was suggested to decrease detrimental effect on sensory properties of tarhana.

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CONFLICT OF INTEREST

None

ABBREVIATION USED

TPC: Total phenolic flavonoid content; TFC: Total flavonoid content; DPPH: 2,2-diphenyl-1-picrylhydrazyl; FRAP: ferric reducing antioxidant power; NO: nitric oxide

REFERENCES


CONCLUSION
Tulin and Fuat: Tarhana enriched with Mushroom powder

PICTORIAL ABSTRACT

Tarhana Production

SUMMARY

- Tarhana was supplemented with two edible mushroom species (Morchella conica and Ramaria flava) to improve its nutritional value and functional properties.
- Antioxidant activities of tarhana were analysed by using different assays.
- Total phenolic (TPC) and flavonoid contents (TFC) were also determined.
- Tarhana with mushroom had high total phenolic, flavonoid contents as well as antioxidant activities.
- The results indicated that high positive correlations were found between the antioxidant activities and the polyphenol contents of tarhana with mushroom.

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