NUTRITIONAL EVALUATION OF ONION POWDER DRIED USING DIFFERENT DRYING METHODS

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ABSTRACT

Onion powders were prepared using four different drying methods viz. shade, solar, oven and microwave. Sensory analysis indicated that all the onion powders were liked moderately by the panelists. The proximate composition varied from 0.64% to 6.81% and mineral content ranged from 0.70 to 340 mg/100g, respectively. ß-carotene and ascorbic acid contents were higher in shade dried onion powder. Polyphenol content was almost similar in all the different dried onion powders. Therefore, onion powders could be developed in the off season at remunerative prices.

Key words: Onion powder, Shade dried, Oven dried, Microwave, Solar dried, Nutritional evaluation, Sensory analysis, ß-carotene, Ascorbic acid, Polyphenol.

INTRODUCTION

Spices are native of India and hence India is known as the land of spices. It is biggest exporter of spices and grows over 50 different varieties of spices. Total production is around 2.7 million tones. Of this, about 0.25 million tones (8-10 per cent) is exported to more than 150 countries. Onion is one of the most important spices of India. It is that plant product which is used primarily for seasoning purposes. Onions are used in our daily dietary because of its significant role as taste enhancer and flavouring material in the diet. It contains essential oils, which provide the flavour and taste. Onions are also fair sources of ß-carotene, vitamin C, calcium and iron. These are used in whole, ground paste or liquid form mainly for flavouring and seasoning food. It is natural food additive which have been in use for thousands of years (Patel and Srinivasan, 2004). Onion because of its medicinal values used as flavouring agent or as preservative in many pharmaceutical preparations (Lamikanra, 2002). It is highly seasonal and in the peak season sold at throw away prices (Singh et al. 1997) and its abundant supply during the season results in spoilage of large quantities (Lakshmi and Vimla, 2000). Preservation of onion can prevent huge wastage and make it available in off season at remunerative prices (Mandhyan et al. 1988). Dehydration is one of the convenient method of preservation of onion. In addition to increasing variety in menu and reducing wastage, labour and storage space, dehydrated onions are simple to use and have longer shelf life than fresh one (Chauhan and Sharma, 1993). These can not only be stored for longer period of times but also saves time, money and energy. Moreover in dehydrated stage, onion powder is less prone to microbial contamination. Considering importance of onion, an attempt was made to develop onion powder using different drying methods and carry out its nutritional evaluation.

MATERIAL AND METHODS

Onion (Allium cepa) was procured from the local market of Hisar city for experimental work. Blanching and sulphiting: To improve the color and shelf life, onions were subjected to blanching by steeping in boiling water for 10-15 seconds and then immersing in 0.2 per cent KMS solution for 5 minutes at room temperature (Singh et al. 1997). Treated onions were chopped into small pieces and dried by four different drying methods.

i) Shade drying: Onions were dried in shade at room temp.
ii) Oven drying: Onions were dried in oven at 50 ± 5°C temp. for 6-8 hrs.

iii) Microwave drying: Onions were dried in microwave of 800 W power for 3 to 4 minutes.

iv) Solar drying: Onions were dried in hot air solar dryer at 54°C temp. for 6-8 hrs.

Dried onion pieces were ground in grinder to make fine powder. The sensory quality of the developed powders in respect of color, appearance, flavor and texture was judged by panelists using 9-point hedonic scale (Lawless and Klein 1999). Moisture content, protein, crude fibre, fat, ash, α-carotene and vit. C in the sample were estimated by employing the standard method of analysis (AOAC, 1995). Antinutrient polyphenol was estimated by the method of Singh and Jambunathan (1981). Total calcium, iron and copper contents were determined by atomic absorption spectrometer 2380, Perkin Elmer (USA) according to the method of Lindsey and Norwell (1969). Data was analyzed using complete randomized design and factorial complete randomized design.

RESULTS AND DISCUSSION

Sensory quality: Onion powders prepared using different drying methods were found to be acceptable by the panelists. Mean scores for color, appearance, flavour, texture and overall acceptability ranged from 7.50 to 7.80, 7.60 to 7.80, 7.30 to 7.60, 7.40 to 7.50 and 7.40 to 7.60, respectively (Table 1). However, the score obtained for color was slightly higher in shade dried onion powder i.e. 7.80 as compared to other powders. Mean scores indicated that onion powder prepared by different methods were in the category of “liked moderately”.

The moisture content of onion powder dried using four different methods i.e., shade, solar, oven and microwave was 2.82, 2.68, 2.71 and 2.77 per cent, respectively. Non-significant difference (P<0.05) was observed in moisture content of onion powders dried by various methods (Table 2). Protein content ranged from 6.46 per cent in oven dried onion powder to 6.81 per cent in microwave dried onion powder. Hong and Kim (2004) also reported almost similar protein content i.e. 5.28 per cent in shade dried onion powder (Table 2). Crude fibre, fat and ash contents of shade, solar, oven and microwave dried onion powder varied from 5.58 to 5.85, 0.64 to 0.83, 4.23 to 4.46 per cent, respectively. (Table 2).

β-carotene content of the onion powder was observed to be maximum in shade dried onion powder i.e. 1.02 mg / 100 g and minimum in solar dried sample i.e. 0.78 mg / 100 g, respectively (Table 3). The ascorbic acid content of onion powder dried by different drying methods i.e. shade, solar, oven and microwave was 6.92, 4.98, 5.12 and 6.45 mg/100g, respectively. Ascorbic acid content was found to be maximum in shade dried sample followed by powder of onion dried in microwave, oven and solar dryer. However, Chaudhary et al (2006) reported slightly higher value of ascorbic acid i.e., 7.20 mg./100g in shade dried onion powder, which might be due to difference in variety of onion selected for preparation of powder (Table 3).

Table 1: Organoleptic acceptability of onion powder prepared by different drying methods

<table>
<thead>
<tr>
<th>Onion powder</th>
<th>Colour</th>
<th>Appearance</th>
<th>Flavour</th>
<th>Texture</th>
<th>Overall acceptability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shade dried</td>
<td>7.80±0.11</td>
<td>7.80±0.20</td>
<td>7.60±0.13</td>
<td>7.50±0.16</td>
<td>7.60±0.09</td>
</tr>
<tr>
<td>Solar dried</td>
<td>7.60±0.10</td>
<td>7.70±0.13</td>
<td>7.40±0.16</td>
<td>7.40±0.16</td>
<td>7.40±0.07</td>
</tr>
<tr>
<td>Oven dried</td>
<td>7.50±0.16</td>
<td>7.60±0.10</td>
<td>7.30±0.15</td>
<td>7.50±0.16</td>
<td>7.50±0.05</td>
</tr>
<tr>
<td>Microwave dried</td>
<td>7.50±0.15</td>
<td>7.70±0.16</td>
<td>7.40±0.16</td>
<td>7.50±0.16</td>
<td>7.50±0.11</td>
</tr>
<tr>
<td>CD at 5%</td>
<td>0.35</td>
<td>0.44</td>
<td>0.44</td>
<td>0.47</td>
<td>0.25</td>
</tr>
</tbody>
</table>

Values are Mean ± SE of ten observations

Table 2: Proximate composition of onion powder prepared by different drying methods (per cent, dry matter basis)

<table>
<thead>
<tr>
<th>Onion powder</th>
<th>Moisture</th>
<th>Protein</th>
<th>Crude fibre</th>
<th>Fat</th>
<th>Ash</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shade dried</td>
<td>2.82±0.05</td>
<td>6.77±0.08</td>
<td>5.85±0.07</td>
<td>0.83±0.04</td>
<td>4.23±0.06</td>
</tr>
<tr>
<td>Solar dried</td>
<td>2.68±0.03</td>
<td>6.58±0.09</td>
<td>5.58±0.08</td>
<td>0.64±0.04</td>
<td>4.31±0.03</td>
</tr>
<tr>
<td>Oven dried</td>
<td>2.71±0.08</td>
<td>6.46±0.03</td>
<td>5.66±0.10</td>
<td>0.71±0.04</td>
<td>4.46±0.11</td>
</tr>
<tr>
<td>Microwave dried</td>
<td>2.77±0.03</td>
<td>6.81±0.06</td>
<td>5.73±0.04</td>
<td>0.76±0.05</td>
<td>4.36±0.07</td>
</tr>
<tr>
<td>CD at 5%</td>
<td>0.18</td>
<td>0.21</td>
<td>0.37</td>
<td>0.17</td>
<td>0.25</td>
</tr>
</tbody>
</table>

Values are Mean ± SE of three replicates
Polyphenol content of shade, solar, oven and microwave dried onion powder was found to be 18.34, 17.28, 18.13 and 18.23 mg/100g, respectively (Table 3). Non-significant difference (P<0.05) was observed in polyphenol content of onion powder prepared by different drying methods. Bawa et al. (2007) also reported almost similar value of polyphenol in onion powder i.e. 17.07 mg/100g. The total calcium, iron and copper content of onion powder dried in shade, solar, oven and microwave ranged from 332 to 340, 1.40 to 1.68 and 0.70 to 0.92 mg/100g, respectively (Table 4). Similar findings for mineral contents in onion powder have been reported earlier by Pruthi. (1988).

**CONCLUSION**

The study has indicated that onion powder prepared from different drying methods had good nutritional profile. Onion powder could be stored and used during off-season and could help to save money, time and energy of a housewife.

**REFERENCES**


