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Varietal evaluation of some important nutritional constituents in onion (*Allium cepa* L.) genotypes

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ABSTRACT : Total 44 onion genotypes were analysed for total soluble solids, dry matter content, pyruvic acid, calcium, fibre, magnesium and vitamin C. The TSS range observed was 8.36°Brix (OG-42) to 22.60°Brix (OG-3), dry matter content ranged from 14.61 per cent (OG-23) to 22.50 per cent (OG-13), pyruvic acid was 4.15 μ moles/g (OG-24) to 6.10 μ moles/g (OG-3). The maximum calcium content was recorded in genotype OG-28 (20.86 mg/100 g), fibre ranged from 8.00 mg/100g (OG-17) to 28.33 mg/100 g (OG-44), Amount of magnesium is ranged from 0.46 mg/100g (OG-17) to 6.23 mg/100 g (OG-2) and vitamin. C content ranged from 57.00 mg/100g in OG-5 to 95.93 mg/100g (OG-3).

KEY WORDS : *Allium cepa* L. TSS, Dry matter, Pyruvic acid, Calcium, Fibre, Magnesium, Vitamin C.

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Onion is one of the most important commercial vegetable crops grown in India and exported. Its characteristic flavour accounts for its popularity. Onions are used in salads and cooked in various ways in curries, fried, boiled and baked vegetables, in soups and in pickles. Onion having good medicinal properties and it cures many diseases. The nutritive value and pungency of onions varies from variety to variety (Choudhury, 1967). Considering the importance of this crop, research is lacking and little information is available on the chemical constituents of different varieties of onion. Pal and Singh (1987) have reported the pyruvic acid is used as a measure of pungency, which is a very important character for the better storage qualities and processing. The white onion varieties with high dry matter content and pungency are considered suitable for dehydration purpose (Valdivia and Holle, 1971).

RESEARCH METHODS

The experiment was laid out in a Randomized Block

Design with three replications at the Horticulture Research Station Haveri (Devihosur) during *Rabi*, 2012-13. The 44 onion genotype included local cultivars, pre breeding lines and some released varieties. The recommended dose of fertilizers and other agronomic practices were adopted in raising the crop as per the package of practice (Anonymous, 2012). Fresh globe shaped onions, stored for about a month after harvest of each variety was taken for chemical analysis. Five onion bulbs from each replication were selected at random, pooled and composite samples were analysed. Total soluble solids were determined from onion juice using refractometer, dry matter content (%) bulbs were sliced, kept in the hot air oven for 48 hours at a temperature of 70^o C, then the dried slices were weighed. For pyruvic acid (μ mol/g) estimation method was followed of Ketter and Randle (1998), fibre (mg/100 g) following the method of Maynard (1970), for vitamin C (mg/100 g) (Anonymous, 1975), whereas, calcium (mg/100 g) and magnesium (mg/100 g), were determined by following

Table 1 : The chemical compositions of the different varieties of onion

Sr. No.	Genotypes	Colour	Dry matter (%)	TSS °Brix	Pyruvic acid (µm/g)	Calcium (mg/100 g)	Fibre (mg/100 g)	Magnesium (mg/100 g)	Vit. C (mg/100 g)
1.	OG-1	Red	18.83	13.466	4.866	10.70	11.00	2.866	94.50
2.	OG-2	Red	16.30	11.20	5.04	10.73	9.00	6.23	90.50
3.	OG-3	Dark Red	16.90	22.60	6.10	9.83	18.33	3.66	95.93
4.	OG-4	Red	17.01	13.63	6.01	12.13	12.33	4.23	82.93
5.	OG-5	Red	22.01	12.20	4.59	10.23	21.33	3.63	57.00
6.	OG-6	Medium Red	16.14	13.76	4.15	11.93	20.00	5.53	67.80
7.	OG-7	Dark Red	17.04	22.00	5.98	13.13	22.66	5.43	57.00
8.	OG-8	Dark Red	20.43	13.50	4.54	10.53	9.00	5.466	63.66
9.	OG-9	Dark Red	18.83	19.90	5.48	9.80	11.00	4.76	79.00
10.	OG-10	Red	16.59	12.90	4.34	10.00	13.66	3.63	57.10
11.	OG-11	Red	16.59	13.03	4.77	10.06	19.66	3.80	95.53
12.	OG-12	Red	18.20	9.90	5.033	10.56	28.33	0.93	92.40
13.	OG-13	Dark Red	22.50	20.90	5.20	13.83	28.33	4.36	77.33
14.	OG-14	Medium Red	16.63	9.96	4.82	14.56	22.33	4.36	96.80
15.	OG-15	Medium Red	16.90	11.16	4.75	14.06	19.33	3.63	83.03
16.	OG-16	Medium Red	17.59	9.90	4.92	12.20	10.33	0.50	62.83
17.	OG-17	Medium Red	15.76	14.40	4.44	15.26	8.00	0.46	70.5
18.	OG-18	Medium Red	16.06	11.53	5.21	11.26	12.66	1.63	70.43
19.	OG-19	Medium Red	16.52	13.40	4.81	17.86	11.66	3.36	94.90
20.	OG-20	Red	17.48	13.30	4.93	14.76	10.33	4.03	68.43
21.	OG-21	Red	16.13	11.83	4.52	15.26	11.66	0.90	95.76
22.	OG-22	Red	16.00	11.60	4.36	13.40	20.33	1.30	51.13
23.	OG-23	White	14.61	12.13	4.78	13.40	13.00	4.73	81.16
24.	OG-24	Red	21.51	11.40	4.15	11.26	28.00	3.93	77.00
25.	OG-25	Medium Red	14.98	15.70	4.95	10.06	11.66	3.33	58.76
26.	OG-26	Medium Red	15.88	10.86	5.06	12.20	22.33	1.43	72.66
27.	OG-27	Dark Red	18.55	13.46	5.22	8.26	10.33	1.56	83.03
28.	OG-28	Red	14.91	15.73	4.90	20.86	9.00	3.93	87.26
29.	OG-29	Dark Red	16.23	14.23	5.23	9.93	12.33	4.06	70.43
30.	OG-30	Dark Red	21.06	13.33	4.92	12.20	11.00	3.86	84.50
31.	OG-31	Medium Red	17.24	12.90	4.95	10.93	14.66	1.40	63.83
32.	OG-32	Red	16.87	14.40	4.93	9.66	20.33	1.43	72.66
33.	OG-33	Medium Red	16.75	12.10	5.01	11.00	10.33	1.06	83.90
34.	OG-34	Medium Red	16.67	13.40	4.25	14.43	22.66	1.63	76.76
35.	OG-35	Medium Red	16.13	10.90	4.61	15.26	11.00	1.50	84.60
36.	OG-36	Red	16.21	14.60	5.00	11.93	11.66	1.23	62.83
37.	OG-37	Medium Red	16.75	12.90	4.38	16.2	10.33	3.80	98.60
38.	OG-38	Medium Red	15.70	14.63	4.99	11.26	11.00	1.30	72.86
39.	OG-39	Medium Red	16.53	13.63	5.23	11.46	9.00	2.13	73.76
40.	OG-40	Red	16.06	11.83	5.02	10.06	9.66	1.66	83.50
41.	OG-41	Dark Red	16.70	13.26	5.043	14.06	10.33	0.46	71.73
42.	OG-42	Red	16.04	8.36	4.85	13.86	12.00	0.53	45.83
43.	OG-43	Medium Red	16.60	10.66	5.15	11.26	23.33	2.63	88.93
44.	OG-44	Red	17.08	14.76	5.54	10.06	28.33	2.96	60.80
		Mean	17.17	13.43	4.93	12.31	15.31	2.85	76.36
		C.V.	2.42	2.03	4.19	8.24	15.35	17.22	6.95
		S.E. _±	0.24	0.15	0.11	0.58	1.35	0.28	3.06
		C.D. (P=0.05)	0.67	0.44	0.33	1.64	3.81	0.79	8.62
		C.D. (P=0.01)	0.89	0.58	0.44	2.18	5.05	1.05	11.47

the methods of Bernard and Hawks (1965).

RESEARCH FINDINGS AND DISCUSSION

The chemical compositions of the different varieties of onion are presented in Table 1. Total soluble solids important quality criteria for onions contribute towards flavour. In the present investigations, TSS content varied from 8.36°Brix (OG-42) to 22.60°Brix (OG-3). Onions are generally used for dehydration and pickling purposes. The varieties with high soluble solids, good reasonable size, proper shape minimize the losses during slicing etc. and having high dry matter content are considered suitable for processing purposes (Kapur *et al.*, 1976). Among the genotypes in this study dry matter content ranged from 14.61 per cent (OG-23) to 22.50 per cent (OG-13). Similar results were obtained by Dhotre *et al.* (2010); Ram *et al.* (2011) and Golani *et al.* (2006). Onion pungency develops when the enzyme allinase hydrolyzes the flavour precursors S-alk(en)yl cysteine sulfoxides during tissue bruising or maceration. The reaction products are pyruvate, ammonia and the many volatile sulphur compounds characteristic of onion flavour and aroma (Carson and Wong, 1961 and Lancaster and Boland, 1990). The range for pyruvic acid was recorded from 4.15 µmoles/g (OG-24) to 6.10 µmoles/g (OG-3) in the present study. Similar range was reported by Bajaj *et al.* (1990); Sharma *et al.* (1997); Anthon and Barrett (2003); Channagoudar and Janawade (2006) and Gallina *et al.* (2012), who reported the effect of different levels of irrigation and sulphur on pyruvic acid content in onion cv. BELLARY RED. It indicates that the pyruvic acid is highly influenced by the external factors. The range for calcium 8.26-20.86 mg/100g, magnesium 0.46- 6.23 mg/100g, fibre 8-28.33 mg/100g and vitamin C 57-95.93 mg/100g were recorded in the present study. This is confirmation with the study of Jonanthan *et al.* (2012); Grabben and Denton (2004) and Leja *et al.* (2008).

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