



Effect of Spacing and Fertilizer Levels on Quality of Zucchini (*Cucurbita pepo* L.)

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Zucchini (*Cucurbita pepo* L.) belongs to the family Cucurbitaceae and has been regarded as a highly polymorphic vegetable. It is very low in calories (about 17 K cal 100 g⁻¹) and has large amount of fiber (Tamer *et al.*, 2010). An investigation on quality parameters of zucchini fruits under various spacing and different levels of nitrogen application were carried out at Dr. B.S.K.K.V., Dapoli. The experiment was conducted in a split plot design with spacing as four main treatments (S₁ - 45 x 60 cm; S₂ - 60 x 60 cm; S₃ - 90 x 60 cm; S₄ - 90 x 90 cm) and nitrogen as three sub treatments (N₁ - 100 kg N ha⁻¹; N₂ - 125 kg N ha⁻¹; N₃ - 150 kg N ha⁻¹). After harvesting 5 fruits per treatment were sampled for chemical analysis. The length of fruit in cm was recorded longitudinally from calyx end to pedicel end. Diameter of fruit was recorded with the help of vernier caliper. Ascorbic acid content of samples were determined by 2,6 dichlorophenol indophenol (DCPIP) titration (Rao and Deshpande, 2006). Ascorbic acid content was expressed in mg 100 g⁻¹. Fiber content was estimated from fat free sample of green dried fruits as per method suggested by Ranganna (1977). Moisture contents, total soluble solid and ash content were determined using the routine chemical analytical methods of Association of Official Agricultural Chemists (AOAC, 1995). Data was statistically analyzed for the effect of spacing and fertilizer levels on physico-chemical properties of zucchini as per the methods prescribed by Panse and Sukhatme (1985).

Length of fruits was affected significantly whereas effect on diameter and weight was found non-significant. The highest length of fruit was recorded in S₄ (21.72 cm). The highest diameter of fruit (5.85 cm) and weight (367.80 g) was recorded in S₂ whereas, lowest length (20.69 cm), diameter (5.69 cm) and weight (361.86) was recorded in S₁. The highest moisture content (94.01%) was noticed in S₁, whereas the lowest (92.23%) in S₄. However, the highest fiber content (0.87%) was

reported in S₄, whereas the lowest (0.82%) in S₁. Highest ash content (0.62%) was found in S₃ and lowest (0.53%) in S₁ (Table 1).

The nitrogen level N₃ recorded maximum value but treatment showed non-significant effect on length of fruit (21.60 cm), diameter of fruit (5.85 cm) and weight of fruit (366.53 g). Significantly lowest moisture content was observed in N₃ (92.98%) as compared to N₁ and N₂, which were statistically at par. Further, the highest ascorbic acid content was recorded in N₃ (14.25 mg 100 g⁻¹) and the lowest in N₁ (13.37 mg 100 g⁻¹). Similarly, the highest fiber were obtained in N₂ (0.86 %), whereas the lowest in N₁ (0.83%) (Table 1).

Interaction of spacing and nitrogen levels showed non-significant effect on all physical as well as chemical parameters. The highest length of fruit was observed in S₄N₃ (21.87 cm). Further, the highest diameter of fruit was recorded in S₂N₁ (5.89 cm). The highest weight of fruit (369.23 g) was observed in S₂N₂. Whereas, all these parameters were lowest in S₁N₁ (Table 1).

The above result indicated that there was an increase in the fruit length due to increase in the spacing. The results were in agreement with those reported by Karde (2014) and Narke *et al.* (2015) in zucchini. This may also be due to more nutrients supplied in higher nitrogen levels in the required form which has helped in efficient uptake resulting in increased length and diameter of the fruits. The results were in close conformity with the findings of Karde (2014), Eifediyi and Remison (2010) in cucumber and Jilani *et al.* (2009) who reported that increase in nitrogen application rates resulted in maximum fruit length and width. Application of nitrogen above 100 kg N ha⁻¹ reduced the moisture and fibre content, whereas it increased protein and ascorbic acid contents in zucchini. Closer spacing (S₁) reduced TSS,

Table 1. Effect of spacing and nitrogen levels physico- chemical properties of zucchini (*Cucurbita pepo* L.)

Treatments	Physical parameters			Moisture (%)	Protein (%)	Ascorbic Acid (mg 100 g ⁻¹)	TSS (°B)	Fat (%)	Fiber (%)	Ash (%)
	Length (cm)	Diameter (cm)	Weight (g)							
Spacing Levels										
S ₁ (45 cm x 60 cm)	20.69	5.69	361.86	94.01	6.01	13.56	4.52	0.53	0.82	0.53
S ₂ (60 cm x 60 cm)	21.66	5.85	367.80	93.64	6.13	13.61	4.59	0.60	0.84	0.55
S ₃ (90 cm x 60 cm)	21.48	5.83	366.24	93.15	6.26	13.83	4.60	0.62	0.85	0.62
S ₄ (90 cm x 90 cm)	21.72	5.80	366.84	92.23	6.42	14.15	4.82	0.65	0.87	0.6
S. Em±	0.21	0.07	1.84	0.25	0.27	0.17	0.16	0.02	0.07	0.01
C.D. @ 5%	0.72	—	—	0.89	—	—	—	—	0.02	0.03
Nitrogen Levels										
N ₁ (100 kg N ha ⁻¹)	21.21	5.75	364.00	93.68	6.11	13.37	4.67	0.59	0.83	0.57
N ₂ (125 kg N ha ⁻¹)	21.36	5.78	366.50	93.11	6.17	13.74	4.58	0.63	0.86	0.56
N ₃ (150 kg N ha ⁻¹)	21.60	5.85	366.53	92.98	6.33	14.25	4.65	0.59	0.84	0.6
S.Em±	0.23	0.05	1.67	0.42	0.13	0.51	0.05	0.02	0.01	0.02
C.D. @ 5%	—	—	—	1.2	—	1.54	—	—	0.05	—
Interaction (Spacing x Nitrogen Levels)										
S ₁ N ₁	20.20	5.54	360.00	94.09	5.95	12.93	4.67	0.54	0.81	0.52
S ₁ N ₂	20.71	5.72	362.20	94.04	5.95	13.74	4.33	0.56	0.84	0.53
S ₁ N ₃	21.17	5.80	363.37	93.91	6.13	14.01	4.57	0.49	0.81	0.54
S ₂ N ₁	21.56	5.89	366.93	94.11	6.01	13.20	4.70	0.59	0.82	0.55
S ₂ N ₂	21.57	5.77	369.23	93.77	6.13	13.47	4.50	0.58	0.86	0.52
S ₂ N ₃	21.86	5.88	367.23	93.03	6.24	14.15	4.57	0.64	0.82	0.59
S ₃ N ₁	21.57	5.77	363.97	93.26	6.18	13.61	4.47	0.60	0.84	0.62
S ₃ N ₂	21.37	5.85	367.50	92.92	6.24	13.61	4.63	0.68	0.87	0.59
S ₃ N ₃	21.50	5.87	367.27	93.27	6.36	14.29	4.70	0.58	0.84	0.65
S ₄ N ₁	21.52	5.80	365.17	93.26	6.30	13.74	4.83	0.62	0.86	0.58
S ₄ N ₂	21.77	5.77	367.13	91.73	6.36	14.15	4.87	0.68	0.88	0.6
S ₄ N ₃	21.87	5.84	368.23	91.7	6.59	14.56	4.77	0.66	0.87	0.61
S.Em±	0.23	0.07	0.9	0.44	0.03	0.17	0.12	0.02	0.01	0.01
C.D. @ 5%	—	—	—	—	—	—	—	—	—	—

fat, fiber and ash content. The results were in close conformity with that obtained by Gohari *et al.* (2011) in pumpkin.

Increase application of nitrogen resulted increase of fruits size diameter fruit weight and ascorbic acid content (Table 1). No significant interaction of spacing with nitrogen was observed.

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