

EFFECT OF POTASSIUM ON QUALITY CHARACTERS OF GRAPES cv. MUSCAT

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ABSTRACT

An experiment was conducted to find out the “Effect of potassium on quality characters of grapes cv. Muscat”. The potassium fertilizer was given as soil application and foliar spray in the form of sulphate of potash (SOP) along with recommended dose of nitrogen and phosphorus at 0, 200, 400, 600, 800, 1000 grams per vine, and also (T₇) 600 grams + 0.5% of foliar spray, (T₈) 600 grams + 1% of foliar spray application at pea and marble stage application is done to find the response of potash on grapes. There is a need to develop well-calibrated soil nutrient management in vineyard for maximising the quality of grapes. The potassium application as 600 grams along with 0.5% foliar spray shows the best results in total sugars, reducing sugars, non reducing sugars, juice content, total soluble solids, pH of juice and least acidity level was observed and also enhanced the shelf life by retaining grape berry in stalk for about 9 days from harvest.

Key words .grapes ,quality,shelf life,potassium,tss and acidity.

INTRODUCTION

Grapes (*Vitis vinifera*) belonging to the family Vitaceae, was introduced to India by the Persian invaders in 1300 A. D. Grape cultivation in India has been commercially taken up under a wide range of soil and climatic conditions. While there are three distinct regions, e.g., temperate (J.K. and H.P.), sub-tropical (Punjab, Haryana, Rajasthan and Western U.P.) and tropical (Maharashtra, Karnataka, Tamil Nadu and Andhra Pradesh),

nearly 94% of the area falls in the tropical region. Tamilnadu occupies the maximum productivity as 29.8 tonnes per hectare and Maharashtra accounts for more than 75.3% of the total production (Bijay kumar, 2009).Grape is one of the most delicious, refreshing and nourishing subtropical fruits. The berries are a good source of minerals and vitamins (B1, B2 and C). The fruits are consumed in fresh forms as a table fruit and in the processed form as wine, raisin and fresh juice. In India, while 78 per cent of grape produced in used for table purposes, nearly 17-20 percent is dried for raisin production, while the remaining 2 percent is used for manufacturing of juice and wine.

Potassium acts as a catalytic element for photosynthesis and protein synthesis. It is more needed for the growth of meristem region, for formation of secondary roots and new emerging branches. It maintains proper C/N ratio, play a vital role in uptake of nutrients as Ca, N, P etc., Potassium has increase disease resistance in plant and improves quality of grapes (Singh *et al.*, 2005).The main major nutrients N, P₂O₅ and K₂O are essential for higher yield of any crop (Shikhamany, 1982). Potassium sulphate has an important role in grape cultivation, as it recommended as high as 800 kg K₂O / ha. Beside soil application of potash as twice a year, weekly sprays of potassium sulphate solution have been reported to improve various quality characters. Keeping these facts in view, a study was undertaken to study the effect of potassium on quality characters of grapes.

MATERIALS AND METHODS

An investigation was carried out at Surulipatti village, near Theni district of Tamilnadu to study the “Effect of potassium on quality character of grapes cv. Muscat”. The experiment was laid out in Randomised Block Design (RBD) with three replication for each treatment. The quality attributes like Total sugars, Reducing sugars(%), Non-reducing sugars (%), Titratable

acidity (%), Juice content(%), Total soluble solids (°Brix), Physiological loss in weight (PLW) were recorded periodically.

EXPERIMENTAL DETAILS

Treatment	Levels of NPK composition (gm/vine)			
	N	P	K	Foliar spray of SOP
T ₁ Control	200	160	-	-
T ₂	200	160	200	-
T ₃	200	160	400	-
T ₄	200	160	600	-
T ₅	200	160	800	-
T ₆	200	160	1000	-
T ₇	200	160	600	+ 0.5% SOP foliar spray @ initial fruit setting period and 15 days after first spray.
T ₈	200	160	600	+ 1% SOP foliar spray @ initial fruit setting period and 15 days after first spray.

RESULTS AND DISCUSSION

Potassium ions are involved in the activation of more than 60 enzymes and for the formation of sugars, starch and protein synthesis, (Etourneaud, 1996). The quality of fruits particularly sugars content may be due to the role of S04 ions released from SOP (Prabhu and Singaram, 2001). Similar results were also reported by various author in grapes viz., Chokha et al.,(2002) and Ollat et al., (2002).

The titratable acidity of berries seems to be reduced due to application of potassic fertilizer in soil (600gm) along with the foliar application of potassium at 0.5 % percent than the other treatments (T₇). The acidity of grapes are very important to determine the consumption rate of grapes by consumers. The data are in conformity with the findings of Beniwal et al., (1992), Kumar et al., (2008) in papaya.

The highest juice percentage was found in the treatment (T₇). It is evident from these results that sulphate of potash had better effect on the increase of juice formation in the berries compared to murate of potash. Potassium helps in the photo-phosphorylation, transportation of photo assimilates from phloem to xylem enhances enzyme activation, Hegele, (2008). Potash also helps in reducing the transpiration loss and helps to prevent the loss of juice content in fruit juice as reported by Acevedo et al., (2004).

The maximum TSS was observed in the treatment (T₇) when compared with other treatment. The maintenance of TSS in stored fruit may be due to decline in hydrolytic enzymes that are associated with the fruit spoilage (Balakrishnan, 1996) Potassium is also known to help in sugar translocation in papaya plants, thus its application increased TSS Kumar et al., (2006). This was in line with Sharma and Sindhu (2005) in grapes.

The minimum physiological loss in weight was recorded in the treatment (T₇) and maximum was recorded in the treatment (T₁). The berry continues to lose water by transpiration which leads to a reduction of fresh berry mass and volume and an increase in the sugar concentration of the berry (Wang et al., 2003). Kumar and Jayakumar, (2001) stated that the SOP spray @ 1% and 1.5% produced lesser physiological loss of weight and also helps in the extension of ripening period and delays the senescence action on banana fruits. These observations are in the accordance with the findings of Somkuwar et al., (2007) in grapes.

The highest pH of juice was recorded in the (T₇) treatment and followed by (T₈). Potassium application, especially after flowering shows imports of K from leaves via phloem and it enhances quality as TSS and pH on juice content Mpelasoka et al., (2003).

The application of potash showed better stability of berries in the pedicel, with higher durability to withstand the total weight of berries, when compared to other treatment. This effect

of potassium treatment helped in extending the shelf life of berries and therefore these treatments enhances the profitability of marketers.

Effect of potassium on total sugars (%) and reducing sugars (%) of grapes cv. Muscat.

Treatment	Level of fertilizer composition (g/vine)			Total sugars (%)	Reducing sugars (%)
	N	P	K		
T ₁	200	160	-control-	14.75	11.79
T ₂	200	160	200	16.05	12.55
T ₃	200	160	400	15.40	13.30
T ₄	200	160	600	16.73	14.13
T ₅	200	160	800	17.35	14.92
T ₆	200	160	1000	18.10	15.74
T ₇	200	160	600 + 0.5% foliar spray of SOP	19.30	17.29
T ₈	200	160	600 + 1% foliar spray of SOP	18.65	16.50
SE(d)				0.50	0.425
CD(p=0.05)				0.01	0.85

Effect of potassium on juice content (%) and total soluble solids (° Brix) of grapes cv. Muscat.

Treatment	Level of fertilizer composition			Juice content (%)	TSS (° Brix)	Shelf life (days)
	N	P	K			
T ₁	200	160	-control-	72.09	13.09	5.19
T ₂	200	160	200	75.57	13.99	6.12
T ₃	200	160	400	76.82	14.89	6.54

T ₄	200	160	600	77.92	16.69	8.10
T ₅	200	160	800	81.74	17.58	7.46
T ₆	200	160	1000	79.90	18.57	7.01
T ₇	200	160	600 + 0.5% foliar spray of SOP	85.01	20.72	9.01
T ₈	200	160	600 + 1% foliar spray of SOP	83.87	19.80	8.41
SE(d)				0.50	0.425	0.16
CD(p=0.05)				0.01	0.85	0.32

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