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EFFECT OF ORGANIC INPUTS ON YIELD AND QUALITY OF GRAPES CV. MUSCAT

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Abstract

An experiment was conducted to study the "Effect of organic inputs on yield and quality characters of grapes cv. Muscat". The various organic inputs were given as foliar application in the form of seaweed extract, humic acid, panchakavya, vermiwash, chitin at the rate of 0.1% and 0.5% at pea and marble stage. The vermiwash application @ 0.5% showed the best result in bunch length (cm), bunch width (cm), bunch weight (kg), bunch volume(g), number of bunches per vine, yield/vine(kg/ha) and yield/hectare(t/ha). The same treatment vermiwash application @0.5% recorded the maximum reducing sugars (%), titrable acidity (1%), juice content (%), total soluble solids (Brix) than other treatments. It showed the maximum yield of (24.44 t/ha) and also enhanced the shelf life by retaining grape berry in stalk for about 7 days from harvest.

Keywords : Organic inputs, Yield, *Vitis vinifera* L., vermiwash.

Introduction

Grapes (*Vitis vinifera* L.) belongs to the family Vitaceae was introduced to India by the Persian invaders in 1300A.D. Grapes is cultivated over an area of 6976108 hectares in the world with an annual production of 68412467 million tonnes. In India, it is cultivated over an area of 118.7 thousand hectares with an annual production of 2585.3 million tonnes. Tamilnadu has the maximum productivity of 29.8 tonnes per hectare and Maharastra accounts for more than 75.3% of the total production (Indian Horticulture database, 2014).

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 form as a table fruit and in the processed form as wine, raisin and fresh juice. Grapes are grown in Punjab, Haryana, Maharastra, Karnataka and Tamilnadu in the southern part of India. Normally the harvest was done four to five crops in two year (Lester, 2007). The popular grape variety of South India are Muscat, Thompson Seedless, Anab-e-shahi and Bangalore Blue. Muscat seeded is gaining more popularity on table purpose because of its nutritive value, high total soluble solids, thin skin and desirable taste. Cumbum is a major centre for grape production with 4,000 small farmers producing over 90,000 tonnes of Muscat grapes, known locally as Panner Dhrakshai. The unique factor about this area is the grapes are harvested throughout the year while in most grape growing centres elsewhere the season ends with summer.

Nutrition is one of the most important aspect of crop production and accounts for 30% of the total cost of cultivation. Nutritional requirement of fruit crop like grape differs, due to long duration crop. The nutrition removed from the soil is increased by harvested procedure and has to be replenished for sustaining the soil fertility and productivity. Balanced fertilization is the only way for enhancing the crop productivity in a sustainable manner (Lester *et al*., 2007).

Organic manures and fertigation methods are harmless to the environment. Organic farming is the most effective and convenient means of maintaining optimum fertility level and water supply according to the specific requirement (Schnitzer *et al*., 1991). The various organic inputs like humic acid, panchakavya, vermiwash, seaweed extract, chitin are suitable for grapes.

Humic acid are the main fractions of humic substances and the most active components of soil and compost organic matter. The liquid organic solution panchakavya is prepared from cowdung, cow's urine, milk, curd, ghee, legume flour and jaggery, contains macro nutrients, essential micro nutrients, many vitamins, essential amino acids, growth promoting factors like IAA, GA and beneficial microorganisms (Palekar *et al*., 2010). The seaweed as manure is a common practice in coastal area throughout the world. The marine weed manures are applied either directly or in the form of compost and the seaweed is applied

through the foliar application. Vermiwash contains various enzymes and microbes. Those are beneficial for growth and develop of plant. The vermiwash also contains enzymes and secretions of earthworms and would stimulate the growth and yield of crops. Zambare *et al*. (2008) concluded that vermiwash contains various enzymes of protease, amylase urease and phosphatase and also Microbial study of vermiwash found that nitrogen fixing bacteria like *Azotobacter sp., Agrobacterium sp*., and *Rhizobium sp*. and some phosphatesolubilizing bacteria.

Keeping this view point a study has been carried out with the following objectives.

1) To study the effect of different organic inputs on yield characters of grapes cv. Muscat and
2) To study the effect of different organic inputs on quality characters of grapes cv. Muscat

Materials and Methods

An investigation was carried out at cumbum near Theni of Tamilnadu The experiment was laid out on RBD with 11 treatments and three times replicated. The yield attributes like Number of bunch per vine, Total number of berries per bunch, Number of quality berries per bunch, Diameter of berries (cm), Bunch length (cm), Bunch width (cm), Bunch weight (kg), Bunch volume(g), Yield per vine(kg), Yield per hectare (t/ha) were recorded periodically. Fruits were analyzed for Total sugars, Reducing and Non-reducing sugar (%), Titratable acidity (%), Juice content (%), Total soluble solids (°Brix), pH of juice, Physiological loss in weight (PLW), shelf life (days).

T_1 - 0.1% of Panchakavya
T_2 - 0.5% 0f Panchakavya
T_3 - 0.1% of Humic acid
T_4 - 0.5% of Humic acid
T_5 - 0.1% of Vermiwash
T_6 - 0.5% of Vermiwash
T_7 - 0.1% of Seaweed extract
T_8 - 0.5% of Seaweed extract
T_9 - 0.1% of Chitin
T_{10} - 0.5% of Chitin
T_{11} - Control

Results and Discussion

The application of Vermiwash showed the best result in treatment (T_5) and (T_6), when compared to other treatments. The results were in conformity wuth the findings of Sinha *et al.,* (2009) and Adhikar (2012) in grapes.

The maximum berry weight was found in the treatment (T_6) (0.5% of vermiwash) which is in accordance with the report of Aracon *et al.,*(2008) who reported positive effect of vermiwash on fruit weight in grapes under field condition.

The largest bunch volume was recorded in the treatment T_6 (281.71) and the smallest bunch volume was recorded in the control T_{11} (220.45). Tge maximum bunch weight was registered in T_6 (0.32) and the minimum bunch weight was recorded in control T_{11}(0.18).

The maximum number of bunches (64.67) were observed in (T_6) which is in accordance with the findings of Bukerfield and Webster (1998) who reported the vermiwash produces 18 percent increase in bunch number.

The maximum number of berries was observed in (T_6). This may be related to microorganisms being harboured in the vermiwash. The microorganisms might have aided in the release of auxins, gibberellins and cytokinins due to their metabolic activity (Kale *et al.,* 1980).

The maximum TSS (15.78) and total sugars (15.49%) was found in the T_6 (0.5% Vermiwash). This is mainly due to increase rate of translocation of photosynthetic products from leaves to developing fruits and there by increasing the total sugars. High TSS and other quality parameters obtained in the present study was due to the better role of nutrients which is involved in carbohydrate synthesis, breakdown and translocation of starch, synthesis of proteins and neutralization of physiologically important organic acids.

The titrable acidity of berries seems to be reduced due to the application of vermiwash @0.5% (0.33%) than other treatments. 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 Venketesh (1991) who found the readily assimilable form of nutrients present in the vermiwash reduces acidity percentage and improves quality.

The minimum physiological loss in weight was recorded in the treatment T_6 (8.57) and the maximum was recorded in T_{11} (11.66). These findings was in accordance with the results of Venketash (1991) in grapes and reported that physiological loss in weight was found minimum in vermiwash treatments. Mitra *et al*. (2012) in guava, Dey *et al*. (2005) in guava and Reddy *et al.* (2010) in papaya also observed similar results wuth respect to physiological loss in weight.

The maximum shelf life was recorded in T_6 (7.65) and the least shelf life was recorded in control T_{11} (3.12). The extended shelf life might be due to the consequence of reduced respiration and transpiration. The results lends support to the findings of Athani and

Hulmani (2001) in banana who reported that the influence of nutrients derived from organic sources had a positive effect on the postharvest characters of the fruits.

Table : Effect of organic inputs on total number of bunches/vine, number of berries/bunch and no of quality berries/bunch of grapes cv. Muscat.

Treatments	Total number of berries/bunch	Number of bunch / vine	Number of quality berries/bunch
T_1	61.87	62.42	46.78
T_2	66.37	62.62	51.42
T_3	70.15	62.99	56.19
T_4	71.34	63.19	57.62
T_5	74.84	63.59	62.12
T_6	76.86	64.67	64.32
T_7	51.43	61.77	36.07
T_8	56.50	61.97	41.28
T_9	42.41	61.20	26.28
T_{10}	47.57	61.39	31.57
T_{11}	38.44	59.21	20.24

Table : Effect of organic inputs on total sugar (%), titrable acidity (%) and TSS (°brix) content of grapes cv. Muscat

Treatment	Total sugar (%)	Titrable acidity (%)	TSS (°brix)
T_1	13.54	0.41	13.57
T_2	13.67	0.40	13.72
T_3	14.28	0.36	14.62
T_4	14.47	0.35	14.84
T_5	15.15	0.34	15.69
T_6	15.49	0.33	15.78
T_7	13.18	0.51	12.53
T_8	12.92	0.50	12.77
T_9	12.10	0.47	11.30
T_{10}	12.28	0.46	11.65
T_{11}	11.36	0.62	10.15

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