Int.J.Curr.Microbiol.App.Sci (2017) *6*(8): 1637-1648

International Journal of Current Microbiology and Applied Sciences
ISSN: 2319-7706 **Volume 6 Number 8 (2017) pp. 1637-1648**
Journal homepage: http://www.ijcmas.com

Original Research Article https://doi.org/10.20546/ijcmas.2017.608.197

Growth and Yield of Capsicum (*Capsicum annuum* L. Var. Grossum) as Influenced by Organic Liquid Formulations

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Keywords

Liquid formulation, Capsicum, Panchagavya, Jeevamrutha, Cow urine, Days after transplanting (DAT).

Article Info

Accepted:
17 June 2017
Available Online:
10 August 2017

A B S T R A C T

A field experiment was conducted to evaluate the effect of organic liquid formulations on growth and yield of capsicum at Agricultural Research Station, Arsikere, Karnataka. India. There were 12 treatment combinations consisting of three factors *viz*., Jeevamrutha (2 levels), Cow urine (2 levels) and Panchagavya (3 levels). Among different organic liquid formulations, application of jeevamrutha recorded significantly higher plant height (20.68, 26.56, 28.88, 30.95 cm at 30, 60, 90 DAT and at harvest, respectively), number of branches per plant (5.23, 5.46, 5.83, 6.47 at 30, 60, 90 DAT and at harvest, respectively), number of fruits per plant (4.43, 5.41, 6.40, 9.0, 10.34, 8.19, 6.38 at 60, 70, 80, 90, 100, 110 and 120 DAT, respectively) and fruit yield (413.14, 610.49, 747.20, 2124.32, 1740.69, 1361.4, 854.35 g at 60, 70, 80, 90, 100, 110 and 120 DAT, respectively). Significantly higher plant height (20.49, 26.14, 28.45, 29.72 cm at 30, 60, 90 DAT and at harvest, respectively), number of branches per plant (5.0, 5.27, 5.64, 6.10 at 30, 60, 90 DAT and at harvest, respectively), number of fruits per plant (4.32, 5.22, 6.15, 8.82, 10.24, 8.08, 6.19 at 60, 70, 80, 90, 100, 110 and 120 DAT, respectively) and fruit yield (395.1, 583.98, 721.21, 2036.95, 1666.84, 1308.39, 823.69 g at 60, 70, 80, 90, 100, 110 and 120 DAT, respectively) were recorded with the application of cow urine. Panchagavya 6 per cent spray recorded significantly higher plant height (20.08, 27.24, 28.19, 29.97 cm at 30, 60, 90 DAT and harvest, respectively), number of branches per plant (5.17, 5.5, 5.92, 6.36 at 30, 60, 90 DAT and harvest, respectively), number of fruits per plant (4.43, 5.41, 6.29, 8.78, 10.42, 8.43, 6.97 and at 60, 70, 80, 90, 100, 110 and 120 DAT, respectively) and fruit yield per plant (390.04, 582.66, 713.86, 2067.66, 1660.78, 1324.76, 811.28 g at 60, 70, 80, 90, 100, 110 and 120 DAT, respectively).

Introduction

Capsicum is one of the most important nutritious and highly remunerative vegetable crop grown mainly for its green fruits. It is a rich source of vitamin "A" and "C" (ascorbic acid) and considered better than tomato. Owing to its delicious and pleasant flavor coupled with reservoir of vitamins, it is eaten raw or used in dehydrated and processed meat, stuffing, baking, pizza and preparation of salad and soup. Hence, there is good demand from urban consumers and export necessitating the production throughout the year.

Adoption of organic farming among the farming community has started gaining momentum in all crops including capsicum. Export market demands organically grown good quality capsicum having longer shelf life, mild pungency with good taste throughout the year. Therefore, there is an immediate need for a fresh look to exploit the organic farming approaches by making use of locally available organic sources of nutrients for growing capsicum and improving soil fertility and environmental safety is essential.

Organic farming practices are gaining importance as farmers have realized the benefits in terms of soil fertility, soil health, toxic free food and sustainable productivity. Farmers are well aware with the use of organic liquid manures such as jeevamrutha, panchagavya and cow urine in organic farming. Spraying of panchagavya to chillies produced dark green coloured leaves within 10 days (Sreenivasa *et al.,* 2009). The cost of fertilizers can be reduced by using liquid manures and they can be prepared on-farm itself. Organic liquid manures contain macro and micro nutrients along with vitamins, essential amino acids, growth promoting substances like IAA,GA and beneficial microorganisms (Sreenivasa *et al*, 2010 and Devakumar *et al.,* 2008 and 2011). Thus, these formulations help in increasing growth and productivity of crop. Though many farmers are getting better yield by using organic liquid manures, scientific validation has not been carried out so far. Hence, the present experiment was conducted to study the effect of organic liquid formulations on growth and yield of capsicum.

Materials and Methods

A field experiment was conducted during *kharif* at Agricultural Research Station, Arsikere, University of Agricultural Sciences, Bangalore, Karnataka. Soil of the experimental plot is red sandy loam, grouped under the classification of Alfisols. Soil is neutral to slight acidic in reaction pH (6.42), low organic carbon (0.40 %) and medium in available nitrogen (241.50 kg ha^{-1}), low available phosphorus (8.80 kg ha^{-1}) and potassium (231.00 kg ha^{-1}) content. The trial was laid out on Factorial Randomized Complete Block design with three replications. There were 12 treatment combinations consisting of three factors and they are jeevamrutha (2 levels) - with jeevamrutha (J_1) and without jeevamrutha (J_0), cow urine (2 levels) - with cow urine (C_1) and without cow urine (C_0) and panchagavya (3) - without panchagavya spray (P_0), 3 per cent panchagavya spray (P_1) and 6 per cent panchagavya spray (P_2). Well decomposed farm yard manure (100 % N equivalent basis) was applied 3 weeks before transplanting of capsicum seedlings and incorporated into the soil. Jeevamrutha (500 litre ha^{-1}) was applied to the base of the seedlings manually at 25, 50, 75 and 100 DAT, panchagavya was sprayed on 25, 50, 75 and 100 DAT. Diluted mixture of cow urine (2500 litre ha^{-1}) was applied to the base of the seedlings at vegetative and flowering stages. All cultural operations were carried out as per package of practice. Growth parameters were recorded regularly at 30, 60, 90 DAT and at harvest and yield observation were recorded at 60, 70, 80, 90, 100, 110 and 120 DAT.

Results and Discussion

Growth parameters

Growth parameters of capsicum at different phonological stages differed significantly due to application of liquid organic formulations (Tables 1 and 2). Significantly higher plant height was observed with jeevamrutha (20.68, 26.56, 28.88 and 30.95 cm at 30, 60, 90 DAT and at harvest, respectively) while, lower plant height was observed in without

jeevamrutha spray (16.66, 22.09, 24.48 and 25.09 cm at 30, 60, 90 DAT and at harvest, respectively) application. Might be due to the fact that jeevamrutha is a rich source of beneficial microorganisms and contains growth promoting substances such as auxins, gibberlins, cytokinens apart from having lower concentration of both macro and micro nutrients. This is in conformity with Devakumar *et al.,* (2008 and 2011) and Sreenivasa *et al.,* (2009) have also reported the higher beneficial microbial population and the beneficial effect of jeevamrutha in enhancing the microbial load in the soil. Significant difference in plant height was observed with application of cow urine. Maximum plant height was observed with application of cow urine (20.49, 26.14, 28.45 and 29.72 cm at 30, 60, 90 DAT and at harvest, respectively) whereas, minimum plant height was observed in without cow urine (16.85, 22.51, 24.91 and 26.32 cm at 30, 60, 90 DAT and harvest, respectively). This might be due to presence of both ammonical and nitrate form of nitrogen in the cow urine was readily available to the plants.

Spray influenced significantly on plant height. Spraying of 6 % panchagavya recorded higher plant height of 20.08, 27.24, 28.19 and 29.97 cm at 30, 60, 90 DAT and harvest, respectively and lower plant height of 17.06, 21.24, 24.82 and 26.17 cm at 30, 60, 90 DAT and harvest, respectively was recorded in without panchagavya spray. This r esults are inconformity with Natarajan, (2002), Selvaraj *et al.,* (2006), Mamaril and Lopez, (1997), Kalarani (1991) who have inferred that panchagavya contain beneficial microbial population load and plant growth promoting substances in addition to nutrients that help in improving plant growth, metabolic activities and yield. The data on the interaction effect of jeevamrutha and cow urine, jeevamrutha and panchagavya and cow urine and panchagavya did not show any significant difference with respect to plant height.

Application of jeevamrutha to capsicum at different growth stages differed significantly with respect to number of branches. Spraying of jeevamrutha application recorded significantly higher number of branches per plant (5.23, 5.46, 5.83 and 6.47 at 30, 60, 90 DAT and harvest, respectively) while, lower number of branches per plant were recorded in without jeevamrutha (4.15, 4.55, 4.98 and 5.58 at 30, 60, 90 DAT and at harvest, respectively). This might be due to the favourable effects of IAA, GA3, major and micronutrients and also microorganisms (Somasundaram, 2003) present in these liquid manures. When these liquid manures sprayed two times resulted in stimuli in the plant system and in turn increased the production of growth regulator in the cell system. There were significant differences observed in number of branches per plant with application of cow urine. Maximum numbers of branches per plant were observed with application of cow urine (5.0, 5.27, 5.64 and 6.10 at 30, 60, 90 DAT and at harvest, respectively) whereas, minimum numbers of branches per plant were observed in without cow urine (4.38, 4.74, 5.17 and 5.95 at 30, 60, 90 DAT and harvest, respectively). Nitrogen present in the cow urine might helped in the faster decomposition of FYM resulted in continuous release of nutrients during plant growth period. The N content in cow urine might have helped in increase in the soil microbial population which in turn might have enhanced both growth and yield parameters. Panchagavya spray varied significantly on number of branches per plant. Spraying of 6 % panchagavya spray recorded higher number of branches per plant of 5.17, 5.5, 5.92 and 6.36 at 30, 60, 90 DAT and harvest, respectively and lower number of branches per plant of 4.4, 4.45, 4.82 and 5.66 at 30, 60, 90 DAT and harvest, respectively were

recorded in without panchagavya spray. The increase in plant height might be due to the application of nutrients through foliar spray of panchagavya which enhanced the growth rate of plant since it contains the favorable macro and micro nutrients, growth hormones and biofertilizers in liquid formulation.

Moreover the presence of growth enzymes in panchagavya might have favoured rapid cell division and elongation. Similar findings have been reported by Venkatlakshmi *et al.*, (2009). The data on the interaction effect of jeevamrutha and cow urine, jeevamrutha and panchagavya and cow urine and panchagavya did not show any significant difference with respect to number of branches per plant.

Yield parameters

Yield parameters of capsicum at different phonological stages differed significantly due to application of liquid organic formulations (Tables 3a, 3b, 4a and 4b). Number of fruits and fruit yield per plant differed significantly with application of organic liquid formulations. Number of fruits per plant varied significantly due to the application of jeevamrutha.

Higher numbers of fruits per plant were observed with jeevamrutha (4.43, 5.41, 6.40, 9.0, 10.34, 8.19 and 6.38 at 60, 70, 80, 90, 100, 110 and 120 DAT, respectively) while, lower number of plants were observed in without jeevamrutha (3.79, 4.79, 5.54, 7.33, 9.03, 7.12 and 5.67 at 60, 70, 80, 90, 100, 110 and 120 DAT, respectively) application. The beneficial effects of Jeevamrut reported by Palekar (2006) and Vasanthkumar (2006) was attributed to huge quantity of microbial load and growth harmones which might have enhanced the soil biomass thereby sustaining the availability and uptake of applied as well as native soil nutrients which ultimately resulted in growth and yield of crops. Significant differences in number of fruits per plant were observed with application of cow urine. Maximum numbers of fruits per plant were observed with application of cow urine (4.32, 5.22, 6.15, 8.82, 10.24, 8.08 and 6.19 at 60, 70, 80, 90, 100, 110 and 120 DAT, respectively) whereas, minimum numbers of fruits were observed in without cow urine (3.91, 4.97, 5.79, 7.51, 9.13, 7.23 and 5.86 at 60, 70, 80, 90, 100, 110 and 120 DAT, respectively). This is in conformity with Reddy *et al.*, (2010) who have also reported higher yield levels obtained with application of biodigester liquid manures to many field crops.

Similarly**,** Siddaram, (2012) have also reported increased yield levels of rice with biodigester liquid manures. Panchagavya spray influenced significantly on number of fruits per plant. Spraying of 6 % panchagavya recorded higher number of fruits per plant of 4.43, 5.41, 6.29, 8.78, 10.42, 8.43 and 6.97 at 60, 70, 80, 90, 100, 110 and 120 DAT, respectively and lower number of fruits per plant of 3.81, 4.76, 5.65, 7.63, 8.88, 6.88 and 5.15 at 60, 70, 80, 90, 100, 110 and 120 DAT, respectively were noticed in without panchagavya spray. Might be due to adequate supply of nutrients at different growth stages of the crop as well as presence of growth regulators in Panchagavya contributing to higher yield (Sridhar *et al.*, 2001 and Somasundaram *et al.*, 2003), the yield of any crop plants depends on the assimilatory surface of the plant system. A sound source interms of plant height, LAI, number of branches to support and hold the leaves are logically able to increase the dry matter and its distribution in different parts is important for determination of total yield of the crop (Krishnamurthy, 2012). Number of fruits per plant did not differ significantly due to the interaction effect of jeevamrutha and cow urine, jeevamrutha and panchagavya and cow urine and panchagavya.

Table.1 Effect of different organic liquid formulations on plant height (cm) of capsicum pooled data of two seasons

Organic liquid formulations	Plant height (cm)											
	30 DAT			60 DAT			90 DAT			At harvest		
	Jeevamrutha (J)											
	without (J_0)	with (J_1)	Mean	without (J_0)	with (J_1)	Mean	without (J_0)	with (J_1)	Mean	without (J_0)	with (J_1)	Mean
Cow urine (C)												
C_0 without	14.39	19.32	**16.85**	20.04	24.98	**22.51**	21.91	27.91	**24.91**	22.71	29.93	**26.32**
C_1 with	18.93	22.04	**20.49**	24.14	28.14	**26.14**	27.04	29.86	**28.45**	27.47	31.97	**29.72**
Mean	**16.66**	**20.68**		**22.09**	**26.56**		**24.48**	**28.88**		**25.09**	**30.95**	
	S.Em±	C.D.		S.Em±	C.D.		S.Em±	C.D.		S.Em±	C.D.	
Jeevamrutha (J)	0.54	1.59		0.67	1.96		0.82	2.40		0.69	2.01	
Cow urine (C)	0.54	1.59		0.67	1.96		0.82	2.40		0.69	2.01	
J x C	0.77	NS		0.94	NS		1.16	NS		0.97	NS	
Panchagavya spray (P)												
P_0 0 %	14.73	19.39	**17.06**	18.61	23.87	**21.24**	22.00	27.64	**24.82**	22.52	29.81	**26.17**
P_1 3 %	16.78	20.95	**18.87**	21.94	27.03	**24.49**	25.25	28.81	**27.03**	25.23	30.61	**27.92**
P_2 6 %	18.47	21.70	**20.08**	25.72	28.77	**27.24**	26.18	30.20	**28.19**	27.52	32.43	**29.97**
Mean	**16.66**	**20.68**		**22.09**	**26.56**		**24.48**	**28.88**		**25.09**	**30.95**	
	S.Em±	C.D.		S.Em±	C.D.		S.Em±	C.D.		S.Em±	C.D.	
Panchagavya spray (P)	0.67	1.95		0.82	2.40		1.00	NS		0.84	2.46	
J x P	0.94	NS		1.16	NS		1.42	NS		1.19	NS	
	Panchagavya spray (P)											
	P_0	P_1	P_2	P_0	P_1	P_2	P_0	P_1	P_2	P_0	P_1	P_2
Cow urine (C)												
C_0 without	15.18	16.89	18.49	18.81	23.36	25.35	22.64	25.41	26.68	23.85	26.52	28.58
C_1 with	18.95	20.84	21.68	23.67	25.61	29.14	26.99	28.65	29.70	28.49	29.31	31.36
C x P	S.Em±	C.D.		S.Em±	C.D.		S.Em±	C.D.		S.Em±	C.D.	
	0.94	NS		1.16	NS		1.42	NS		1.19	NS	

C.D. at 5 % level NS = Non significant DAT = Days after transplanting

Table.2 Effect of different organic liquid formulations on number of branches per plant of capsicum pooled data of two seasons

Organic liquid formulations	Number of branches per plant														
	30 DAT			60 DAT			90 DAT			At harvest			Cumulative		
	Jeevamrutha (J)														
	without (J_0)	with (J_1)	Mean	without (J_0)	with (J_1)	Mean	without (J_0)	with (J_1)	Mean	without (J_0)	with (J_1)	Mean	without (J_0)	with (J_1)	Mean
Cow urine (C)															
C_0 without	3.86	4.90	**4.38**	4.19	5.28	**4.74**	4.57	5.78	**5.17**	5.62	6.28	**5.95**	18.24	22.24	**20.24**
C_1 with	4.44	5.56	**5.00**	4.91	5.63	**5.27**	5.39	5.88	**5.64**	5.55	6.65	**6.10**	20.28	23.72	**22.00**
Mean	**4.15**	**5.23**		**4.55**	**5.46**		**4.98**	**5.83**		**5.58**	**6.47**		**19.26**	**22.98**	
	S.Em±	C.D.		S.Em±	C.D.		S.Em±	C.D.		S.Em±	C.D.		S.Em±	C.D.	
Jeevamrutha (J)	0.18	0.53		0.13	0.37		0.11	0.32		0.13	0.37		0.46	1.36	
Cow urine (C)	0.18	0.53		0.13	0.37		0.11	0.32		0.13	NS		0.46	1.36	
J x C	0.25	NS		0.18	NS		0.15	0.45		0.18	NS		0.66	NS	
Panchagavya spray (P)															
P_0 0 %	3.40	4.83	**4.11**	3.74	5.15	**4.45**	4.21	5.42	**4.82**	5.12	6.20	**5.66**	16.48	21.59	**19.04**
P_1 3 %	4.30	5.27	**4.79**	4.76	5.37	**5.06**	5.15	5.80	**5.48**	5.78	6.31	**6.05**	20.00	22.75	**21.37**
P_2 6 %	4.74	5.60	**5.17**	5.15	5.86	**5.50**	5.58	6.26	**5.92**	5.84	6.89	**6.36**	21.30	24.60	**22.95**
Mean	**4.15**	**5.23**		**4.55**	**5.46**		**4.98**	**5.83**		**5.58**	**6.47**		**19.26**	**22.98**	
	S.Em±	C.D.		S.Em±	C.D.		S.Em±	C.D.		S.Em±	C.D.		S.Em±	C.D.	
Panchagavya spray (P)	0.22	0.65		0.16	0.46		0.13	0.39		0.15	0.45		0.57	1.67	
J x P	0.31	NS		0.22	NS		0.19	NS		0.22	NS		0.80	NS	
	Panchagavya spray (P)														
	P_0	P_1	P_2	P_0	P_1	P_2	P_0	P_1	P_2	P_0	P_1	P_2	P_0	P_1	P_2
Cow urine (C)															
C_0 without	3.69	4.60	4.84	3.98	4.88	5.35	4.41	5.31	5.80	5.39	6.14	6.31	17.49	20.94	22.30
C_1 with	4.53	4.97	5.50	4.91	5.24	5.66	5.22	5.64	6.04	5.93	5.96	6.41	20.59	21.81	23.61
C x P	S.Em±	C.D.		S.Em±	C.D.		S.Em±	C.D.		S.Em±	C.D.		S.Em±	C.D.	
	0.31	NS		0.22	NS		0.19	NS		0.22	NS		0.80	NS	

C.D. at 5 % level NS = Non significant DAT = Days after transplanting

Table.3a Effect of different organic liquid formulations on number of fruits per plant of capsicum pooled data of two seasons

Organic liquid formulations	Number of fruits per plant											
	60 DAT			70 DAT			80 DAT			90 DAT		
	Jeevamrutha (J)											
	without (J_0)	with (J_1)	Mean	without (J_0)	with (J_1)	Mean	without (J_0)	with (J_1)	Mean	without (J_0)	with (J_1)	Mean
Cow urine (C)				0								
C_0 without	3.55	4.26	**3.91**	4.55	5.39	**4.97**	5.39	6.19	**5.79**	6.74	8.28	**7.51**
C_1 with	4.03	4.60	**4.32**	5.02	5.42	**5.22**	5.70	6.60	**6.15**	7.91	9.73	**8.82**
Mean	**3.79**	**4.43**		**4.79**	**5.41**		**5.54**	**6.40**		**7.33**	**9.00**	
	S.Em±	C.D.		S.Em±	C.D.		S.Em±	C.D.		S.Em±	C.D.	
Jeevamrutha (J)	0.09	0.26		0.13	0.39		0.14	0.42		0.17	0.48	
Cow urine (C)	0.09	0.26		0.13	NS		0.14	NS		0.17	0.48	
J x C	0.12	NS		0.19	NS		0.20	NS		0.23	NS	
Panchagavya spray (P)												
P_0 0 %	3.45	4.17	**3.81**	4.41	5.12	**4.76**	5.18	6.11	**5.65**	6.79	8.48	**7.63**
P_1 3 %	3.83	4.37	**4.10**	4.86	5.38	**5.12**	5.63	6.32	**5.97**	7.30	8.86	**8.08**
P_2 6 %	4.09	4.76	**4.43**	5.10	5.72	**5.41**	5.82	6.76	**6.29**	7.89	9.67	**8.78**
Mean	**3.79**	**4.43**		**4.79**	**5.41**		**5.54**	**6.40**		**7.33**	**9.00**	
	S.Em±	C.D.		S.Em±	C.D.		S.Em±	C.D.		S.Em±	C.D.	
Panchagavya spray (P)	0.11	0.31		0.16	0.47		0.18	NS		0.20	0.59	
J x P	0.15	NS		0.23	NS		0.25	NS		0.29	NS	
	Panchagavya spray (P)											
	P_0	P_1	P_2	P_0	P_1	P_2	P_0	P_1	P_2	P_0	P_1	P_2
Cow urine (C)												
C_0 without	3.66	3.89	4.18	4.63	5.01	5.27	5.33	5.89	6.15	6.77	7.54	8.22
C_1 with	3.96	4.31	4.67	4.90	5.22	5.55	5.97	6.05	6.44	8.49	8.62	9.35
C x P	S.Em±	C.D.		S.Em±	C.D.		S.Em±	C.D.		S.Em±	C.D.	
	0.15	NS		0.23	NS		0.25	NS		0.29	NS	

C.D. at 5 % level NS = Non significant DAT = Days after transplanting

Table.3b Effect of different organic liquid formulations on number of fruits per plant of capsicum pooled data of two seasons

Organic liquid formulations	Number of fruits per plant											
	100 DAT			110 DAT			120 DAT			Cumulative		
	Jeevamrutha (J)											
	without (J_0)	with (J_1)	Mean	without (J_0)	with (J_1)	Mean	without (J_0)	with (J_1)	Mean	without (J_0)	with (J_1)	Mean
Cow urine (C)												
C_0 without	8.86	9.40	**9.13**	6.95	7.51	**7.23**	5.43	6.30	**5.86**	41.48	47.33	**44.41**
C_1 with	9.20	11.28	**10.24**	7.29	8.86	**8.08**	5.91	6.47	**6.19**	45.06	52.97	**49.01**
Mean	**9.03**	**10.34**		**7.12**	**8.19**		**5.67**	**6.38**		**43.27**	**50.15**	
	S.Em±	C.D.		S.Em±	C.D.		S.Em±	C.D.		S.Em±	C.D.	
Jeevamrutha (J)	0.20	0.59		0.18	0.53		0.14	0.41		0.91	2.67	
Cow urine (C)	0.20	0.59		0.18	0.53		0.14	NS		0.91	2.67	
J x C	0.29	0.84		0.26	NS		0.20	NS		1.29	NS	
Panchagavya spray (P)												
P_0 0 %	8.25	9.52	**8.88**	6.33	7.43	**6.88**	4.69	5.60	**5.15**	39.11	46.42	**42.76**
P_1 3 %	9.31	10.21	**9.76**	7.12	8.17	**7.65**	5.64	6.28	**5.96**	43.68	49.59	**46.63**
P_2 6 %	9.54	11.29	**10.42**	7.90	8.96	**8.43**	6.68	7.27	**6.97**	47.03	54.44	**50.74**
Mean	**9.03**	**10.34**		**7.12**	**8.19**		**5.67**	**6.38**		**43.27**	**50.15**	
	S.Em±	C.D.		S.Em±	C.D.		S.Em±	C.D.		S.Em±	C.D.	
Panchagavya spray (P)	0.25	0.73		0.22	0.66		0.17	0.51		1.11	3.27	
J x P	0.35	NS		0.32	NS		0.24	NS		1.58	NS	
	Panchagavya spray (P)											
	P_0	P_1	P_2	P_0	P_1	P_2	P_0	P_1	P_2	P_0	P_1	P_2
Cow urine (C)												
C_0 without	8.40	9.34	9.66	6.49	7.24	7.96	4.95	5.94	6.70	40.22	44.86	48.15
C_1 with	9.36	10.17	11.18	7.27	8.06	8.90	5.34	5.98	7.25	45.30	48.41	53.33
C x P	S.Em±	C.D.		S.Em±	C.D.		S.Em±	C.D.		S.Em±	C.D.	
	0.35	NS		0.32	NS		0.24	NS		1.58	NS	

C.D. at 5 % level NS = Non significant DAT = Days after transplanting

Table.4a Effect of different organic liquid formulations on fruit yield per plant (g) of capsicum pooled data of two seasons

Organic liquid formulations	Fruit yield per plant (g)											
	60 DAT			70 DAT			80 DAT			90 DAT		
	Jeevamrutha (J)											
	without (J_0)	with (J_1)	Mean	without (J_0)	with (J_1)	Mean	without (J_0)	with (J_1)	Mean	without (J_0)	with (J_1)	Mean
Cow urine (C)												
C_0 without	310.73	385.24	**347.99**	420.93	560.03	**490.48**	514.49	691.37	**602.93**	1647.77	1985.50	**1816.64**
C_1 with	349.17	441.04	**395.10**	507.12	660.84	**583.98**	639.39	803.03	**721.21**	1810.77	2263.13	**2036.95**
Mean	**329.95**	**413.14**		**464.03**	**610.44**		**576.94**	**747.20**		**1729.27**	**2124.32**	
	S.Em±	C.D.		S.Em±	C.D.		S.Em±	C.D.		S.Em±	C.D.	
Jeevamrutha (J)	6.20	18.17		7.90	23.16		9.54	27.97		36.38	106.70	
Cow urine (C)	6.20	18.17		7.90	23.16		9.54	27.97		36.38	106.70	
J x C	8.76	NS		11.17	NS		13.49	NS		51.45	NS	
Panchagavya spray (P)												
P_0 0 %	317.40	391.01	**354.21**	425.68	569.70	**497.69**	512.03	704.85	**608.44**	1612.96	2000.98	**1806.97**
P_1 3 %	329.10	411.67	**370.38**	468.00	594.70	**531.35**	592.27	735.54	**663.91**	1734.71	2076.80	**1905.75**
P_2 6 %	343.35	436.74	**390.04**	498.40	666.92	**582.66**	626.50	801.21	**713.86**	1840.15	2295.17	**2067.66**
Mean	**329.95**	**413.14**		**464.03**	**610.44**		**576.94**	**747.20**		**1729.27**	**2124.32**	
	S.Em±	C.D.		S.Em±	C.D.		S.Em±	C.D.		S.Em±	C.D.	
Panchagavya spray (P)	7.59	22.26		9.67	28.36		11.68	34.26		44.56	130.68	
J x P	10.73	NS		13.68	NS		16.52	NS		63.01	NS	
	Panchagavya spray (P)											
	P_0	P_1	P_2	P_0	P_1	P_2	P_0	P_1	P_2	P_0	P_1	P_2
Cow urine (C)												
C_0 without	334.25	350.58	359.13	452.28	500.56	518.60	547.71	619.57	641.51	1673.79	1820.00	1956.11
C_1 with	374.17	390.19	420.96	543.10	562.13	646.72	669.18	708.24	786.20	1940.14	1991.50	2179.21
C x P	S.Em±	C.D.		S.Em±	C.D.		S.Em±	C.D.		S.Em±	C.D.	
	10.73	NS		13.68	NS		16.52	NS		63.01	NS	

C.D. at 5 % level NS = Non significant DAT = Days after transplanting

Table.4b Effect of different organic liquid formulations on fruit yield per plant (g) of capsicum pooled data of two seasons

Organic liquid formulations	Fruit yield per plant (g)											
	100 DAT			110 DAT			120 DAT			cumulative		
	Jeevamrutha (J)											
	without (J_0)	with (J_1)	Mean	without (J_0)	with (J_1)	Mean	without (J_0)	with (J_1)	Mean	without (J_0)	with (J_1)	Mean
Cow urine (C)												
C_0 without	1319.66	1641.00	**1480.33**	1029.93	1278.04	**1153.98**	609.32	792.04	**700.68**	2972.91	3731.07	**3351.99**
C_1 with	1493.30	1840.38	**1666.84**	1172.02	1444.76	**1308.39**	730.70	916.67	**823.69**	3413.03	4224.81	**3818.92**
Mean	**1406.48**	**1740.69**		**1100.98**	**1361.40**		**670.01**	**854.35**		**3192.97**	**3977.94**	
	S.Em±	C.D.		S.Em±	C.D.		S.Em±	C.D.		S.Em±	C.D.	
Jeevamrutha (J)	31.53	92.48		30.60	89.76		16.79	49.24		66.90	196.20	
Cow urine (C)	31.53	92.48		30.60	89.76		16.79	49.24		66.90	196.20	
J x C	44.60	NS		43.28	NS		23.74	NS		94.60	NS	
Panchagavya spray (P)												
P_0 0 %	1291.18	1650.88	**1471.03**	1002.45	1283.33	**1142.89**	624.40	799.33	**711.86**	2932.52	3754.04	**3343.28**
P_1 3 %	1417.54	1760.35	**1588.94**	1114.59	1337.24	**1225.91**	682.68	844.13	**763.40**	3230.31	3963.22	**3596.76**
P_2 6 %	1510.73	1810.83	**1660.78**	1185.89	1463.63	**1324.76**	702.95	919.60	**811.28**	3416.08	4216.56	**3816.32**
Mean	**1406.48**	**1740.69**		**1100.98**	**1361.40**		**670.01**	**854.35**		**3192.97**	**3977.94**	
	S.Em±	C.D.		S.Em±	C.D.		S.Em±	C.D.		S.Em±	C.D.	
Panchagavya spray (P)	38.62	113.27		37.48	109.93		20.56	60.31		81.93	240.29	
J x P	54.62	NS		53.01	NS		29.08	NS		115.87	NS	
	Panchagavya spray (P)											
	P_0	P_1	P_2	P_0	P_1	P_2	P_0	P_1	P_2	P_0	P_1	P_2
Cow urine (C)												
C_0 without	1358.03	1506.10	1576.86	1048.89	1169.53	1243.53	645.02	713.04	743.98	3067.94	3405.67	3582.36
C_1 with	1584.02	1671.79	1744.71	1236.89	1282.30	1405.99	778.71	813.77	878.58	3618.62	3787.86	4050.28
C x P	S.Em±	C.D.		S.Em±	C.D.		S.Em±	C.D.		S.Em±	C.D.	
	54.62	NS		53.01	NS		29.08	NS		115.87	NS	

C.D. at 5 % level NS = Non significant DAT = Days after transplanting

Significantly higher fruit yield per plant was observed with jeevamrutha (413.14, 610.49, 747.20, 2124.32, 1740.69, 1361.4 and 854.35 g at 60, 70, 80, 90, 100, 110 and 120 DAT, respectively) while, lower fruit yield was observed in without jeevamrutha (329.95, 464.03, 576.94, 1729.27, 1406.48, 1100.98 and 670.01 g at 60, 70, 80, 90, 100, 110 and 120 DAT, respectively) (Tables 4a and 4b). Devakumar *et al.,* (2008) have reported that maximum microbial population was observed between 9th and 12th day after preparation of jeevamrutha. This might have enhanced the decomposition process in the soil which might have resulted in relatively quick release of nutrients from compost than without application of jeevamrutha. There was significant difference with application of cow urine on fruit yield per plant. Maximum fruit yield per plant was observed with application of cow urine (395.1, 583.98, 721.21, 2036.95, 1666.84, 1308.39 and 823.69 g at 60, 70, 80, 90, 100, 110 and 120 DAT, respectively) whereas, minimum fruit yield was observed in without cow urine (347.99, 490.48, 602.93, 1816.64, 1480.33, 1153.98 and 700.98 g at 60, 70, 80, 90, 100, 110 and 120 DAT, respectively) (Tables 4a and 4b). Higher yield of capsicum from urine application plot might be due to greater availability of different essential nutrient elements and hormones from cattle urine at various growth stages of capsicum. These results are inconformity with Hormones present in urine helped to produce higher yield in alfalfa (Erb *et al.,* 1977). Panchagavya spray influenced significantly on fruit yield per plant. Spraying of 6 % panchagavya recorded higher fruit yield per plant of 390.04, 582.66, 713.86, 2067.66, 1660.78, 1324.76 and 811.28 g at 60, 70, 80, 90, 100, 110 and 120 DAT, respectively and lower fruit yield of 354.21, 497.69, 608.44, 1806.97, 1471.03, 1142.89 and 711.86 g at 60, 70, 80, 90, 100, 110 and 120 DAT, respectively was observed in without panchagavya spray (Tables 4a and 4b). This might be due to increased plant height, Number of branches and higher number of fruit per plant. This might also be due to improvement in soil physical condition coupled with increased availability of plant nutrients. This is in conformity with Sadanandan *et al.,* (1998). Foliar spraying of panchagavya at 3 per cent enhanced the growth parameters since it contains macro and micro nutrients, growth hormones and biofertilizers in the liquid formulations and further it might be due to growth enzymes present in panchagavya which favour rapid cell division and multiplication and this is in accordance with Vasumathi, *et al.,* (2001). Fruit yield per plant did not vary significantly due to the interaction effect of jeevamrutha and cow urine, jeevamrutha and panchagavya and cow urine and panchagavya.

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How to cite this article:

Boraiah, B., N. Devakumar and Palanna, K.B. 2017. Growth and Yield of Capsicum (*Capsicum annuum* L. Var. Grossum) as Influenced by Organic Liquid Formulations. *Int.J.Curr.Microbiol.App.Sci.* 6(8): 1637-1648. doi: https://doi.org/10.20546/ijcmas.2017.608.197