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Performance of organic inputs on the yield and pest incidence in Chilli (*Capsicum annuum* L.)

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Abstract

Capsicum annuum L. $2n=2x=24$, is a significant crop that is grown in tropical and subtropical climates all over the world. In addition to being abundant in calcium and phosphorus, it is also abundant in vitamins A, C, and K. However, the use of inorganic fertilizers in large quantities has a detrimental effect on the quality of the soil in order to maintain the productivity of the soil and improve its quality, organic treatment is used. Foliar use of organic inputs improves crop growth, production, and quality. A major loss in the production of chilli was observed due to insect pest infestation at various phases of growth. The application of organic inputs showed less infestation by pest. The study was conducted at the College of Horticulture and Forestry, Pasighat, Arunachal Pradesh using different organic inputs T_0 : Control, T_1 : Panchagavya @10%, T_2 : Herbal kunapajala @10%, T_3 : Vermiwash @10%, T_4 : Jeevamrut @10%, T_5 : Amritpani @10%, T_6 : CAU Bioenhancer @ 2%. The treatment Herbal kunapajala showed natural resistance to pest and disease. T_4 was observed to have positive influence on the number of fruits per plant (55.67 no.), yield per plant (157.07g). The number of aphid population was found least in fourth spray of treatment T_2 (8.45). The thrips and mites population was recorded least in T_2 (3.01 and 2.91 respectively). The least number of fruits infested by borer was recorded in T_2 (Herbal kunapajala) with infested fruit of 4.88.

Keywords: organic inputs, Jeevamrut, Panchagavya, Herbal kunapajala, Infestation

Introduction

Chilli (*Capsicum annuum* L., $2n=2x=24$), is a major vegetable cum spice crop cultivated in tropical and sub-tropical regions of the world. Capsicum is a term originated from a Greek word, 'Kapsino' which meaning 'to bite' (Basu and De, 2003) [1]. It is grown worldwide for its immature green and red ripe fruits. Fertilization is crucial for optimal development and output since it provides plants with needed nutrients. In chilli farming, the use of inorganic fertilizers has been observed to enhance yield per hectare (Islam *et al.*, 2018) [2]. Continuous use of inorganic fertilizers can increase production costs, make soil toxic, and cause unmeasured environmental damages, as reported by workers and environmentalists. To address concerns about the usage of inorganic fertilizers, there has been a shift towards natural formulations that prioritize ecological health (Khandaker, 2017) [3].

To maintain a healthy ecosystem in a sustainable manner, there is a need to adopt an alternative agriculture system that is self-sufficient and sustainable, such organic farming (Behera *et al.*, 2011) [4]. The naturally occurring compounds that provide nutrients to a developing plant are known as organic inputs. Panchagavya, vermiwash, kunapajala, jeevamruth, and biological waste are a few of the many organic inputs used. Panchagavya is also known to contain growth regulatory substances such as IAA, GA, and cytokinin. Panchagavya has played a significant role in providing resistance to pests and diseases, resulting in increased overall yields (Tharmaraj *et al.* 2011) [5]. Jeevamrut, an organic liquid made mixing cow urine, cow dung, pulse flour and jaggery (gur), it is prepared and allowed to ferment for a week.

The use of jeevamrutha will boost microbial activity and population in the soil to a greater extent (Boraiah *et al.* 2017) [6]. According to Nene (1999) [7], Kunapajala may also be made with plant-based ingredients rather than animal meat. Kunapajala may be divided into two categories: herbal and nonherbal. This herbal Kunapajala is also known as Shasyagavya is prepared by, mix

cowdung, cow urine, organic residue, and water in a 1:1:1:2 ratio, then ferment the mixture. The weed based herbal kunapajala includes plant such neem (*Azadirachta indica*), wild jasmine (*Clerodendrum* sp.), beal (*Aegle marmelos*), datura (*Datura* sp.), lantana (*Lantana camara*), mango (*Mangifera indica*), guava (*Psidium guajava*); calotropis (*Calotropis* sp.), castor (*Ricinus communis*) and billy goat weed (*Ageratum conyzoides*) along with the cow urine, cowdung for its preparation. This liquid formulation contains nutrients, growth hormones, enzymes, vitamins, and organic molecules that promote crop growth and development. It also provides natural resistance to diseases and pests.

Vermiwash is the liquid extract collected after the passage of water through the different layers of worm culture unit. Amritpani is a bioenhancer contains beneficial microbes viz; nitrogen fixing, phosphorus solubilising and bio agents (Ram *et al.* 2018) [8]. Insect and non-insect pests that attack chillies at various phases of growth are among the most important. Severe infestations can produce apparent damage, including thrips bending leaves upwards and mites curling leaves downwards (Kandasamy *et al.*, 1990 [9]; Kethran *et al.* 2014) [10]. Aphids (*Aphis gossypii* Glover, *Myzus persicae* Sulzer) yellow mite (*Polyphagotarsonemus latus* Banks) and fruit borer (*Helicoverpa armigera* Hubner) are the most significant pests that damage chillies (Berke and Shieh, 2000) [11]. They are regarded as sucking pests. When a plant is severely infested, its leaves coil up and eventually wither. The plant dies, grows slowly, and gradually dries out. The loss caused by the thrips is reported to range from 50 to 90 per cent and fruit borers account to 90 per cent (Reddy and Reddy, 1999) [12]. The effect of different organic inputs was checked in the pest incidence of chilli.

Materials and Methods

Site of study: The present study was performed at Vegetable Research Farm of the Department of Vegetable Science, College of horticulture and Forestry, Central Agricultural University, Pasighat, Arunachal Pradesh, during 2023 to 2024. Local genotype of Arunachal Pradesh (CHF CG-11) chilli is used for this experiment. The fruit is long and average weight of the fruit is 4-5 g. The treatment of organic inputs includes T₀: Control, T₁: Panchagavya @10%, T₂: Herbal kunapajala @10%, T₃: Vermiwash @10%, T₄: Jeevamrut @10%, T₅: Amritpani@10%, T₆: CAU Bioenhancer @ 2%. The row-to-row distance maintained is 60 cm² and plant to plant distance maintained is 30 cm².

Application of liquid manure: Liquid manure was applied as foliar spray of panchagavya @10%, herbal kunapajala @10%, vermiwash @10%, jeevamrut @10%, amritpani @10% and CAU bioenhancer @2% at 30 days interval started from transplanting. The application was done for four times with an interval of 15 days. The total number of fruits harvested at every picking was taken into consideration to work out as mean number of fruits per plant. For total yield of fruits, total weight of fruits from each tagged plant was recorded and their mean were calculated. It is expressed in gram the observations of aphids, whiteflies, thrips, mites and coccinellid beetles recorded before spraying as pre-count and at 3, 7 and 14 days after treatment and their mean are taken. The treatment was given at 15 days interval after one month of transplanting. Observations were recorded after 1st, 2nd, 3rd and 4th spray. The statistical analysis was carried out using MS- Excel. The effects of different treatments were tested for their significance by using the analysis of variance for randomized block design method. The significance and non-significance of the variance due to

different treatments were determined by calculating the respective 'F' values as the method described by Gomez and Gomez (1984) [13].

Results and Discussion

The height number of fruits was observed in T₄ (Jeevamrut) (55.66). T₁ (Panchagavya) (54.66) and T₆ (CAU bioenhancer) (51.33) treatments were statistically equivalent to T₄ (Jeevamrut) (55.66). The use of liquid organic inputs such as panchagavya, jeevamrut and increases the quantity of beneficial bacteria while also having a significant influence on soil enzymatic activity. It contains growth-promoting compounds that enhance the flowering, pollination, and fruit set processes. The bioactive substances in it, like as auxins and cytokinin, may also aid to increase fruit yield by increasing hormonal regulation and fruiting efficiency. These factors lead to development of a greater number of fruits per chilli. Similar result was reported by Rathore *et al.* (2023) [14] in eggplant, Gopal *et al.* (2022) [15] in tomato, Jakhar *et al.* (2022) [16] in okra, Mandodi *et al.* (2022) [17] in okra and Panda *et al.* (2020) [18] in tomato.

The most fruit was produced by treatment T₄ (Jeevamrut), yielding 157.07 g per plant. Treatments T₁ (Panchagavya) and T₄ (Jeevamrut) showed statistical similarities in terms of fruit output per plant (156.90g). Sreenivasa *et al.* (2010) [19] found a variety of helpful microorganisms in panchagavya and jeevamrut, including nitrogen fixers, phosphorus solubilizers, actinomycetes, and fungi. The application of organic inputs increased the plant's biological efficiency by improving its photosynthetic and metabolic activities. This allowed the roots to grow into the deeper soil layer, where they could absorb more nutrients and accumulate more carbohydrates, which in turn led to the production of more fruit yield per plant. Panda *et al.* (2020) [18] in tomato, Gopal *et al.* (2022) [15] in tomato, Nath *et al.* (2022) [20] in french bean, Parmar *et al.* (2024) [21] in African marigold also reported findings which showed similar results.

Table 1: Effect of organic inputs in yield attributes of chilli

Treatment	No. of fruits per plant	Yield per plant (g)
T ₀	38.18 ^d	112.06 ^d
T ₁	54.66 ^a	156.90 ^a
T ₂	45.03 ^b	129.93 ^c
T ₃	44.33 ^b	121.12 ^c
T ₄	55.67 ^a	157.07 ^a
T ₅	41.05 ^{bc}	116.04 ^d
T ₆	51.33 ^a	142.16 ^b
CD at 5%	5.31	7.38
SE(m)	1.86	4.3792
CV (5%)	4.40	3.31

Pest infestation

The data for number of aphids per three leaves per plant, it was found that after continuous application, there was reduction in number of aphids. The treatment T₂ (Herbal kunapajala) observed the minimum population of aphid 8.45 of fourth spray. The plant which was untreated with any inputs showed maximum population of aphid 10.16 of first spray. The azadirachtin component of neem is regarded the chemical of highest biological relevance, accounting for more than 90% of the neem's pest-control effects. (Elteraifi *et al.* 2011) [22]. This active chemical substance repelled, hinder eating, and inhibits their development and reproduction of insect. This leads to reduction in the aphid population of plant treated with herbal kunapajala. Tobing *et al.* (2023) [23] also observed reduction in severity of attack of red chilli aphid on chilli. Table 2.

The data for number of whiteflies per three leaves per plant. The application of organic inputs was checked for number of whiteflies in chilli plant. T₂ (Herbal kunapajala) was determined to be the most effective input, with a population of 3.02 of fourth application. The highest number of whiteflies was seen following the fourth spray of T₀-Control (4.38). The plants treated with T₂ (Herbal kunapajala) showed minimum incidence of whiteflies. The Herbal kunapajala is an organic input which consists of insecticidal properties. The composition used here includes neem leaves. Each element of the neem tree has pesticidal capabilities. It contains Azadirachtin and about 25 other similar chemicals. Neem contains myristic, palmitic, stearic, oleic, linoleic, arachidic, and other lower fatty acids. Azadirachtin is an active component present in it. Azadirachtin inhibits feeding in a variety of insect pests. It disrupts the molting process of insects, lowering Ecdysone hormone levels and prevents larvae from developing into adults. This led to reduction in number of whiteflies in treated with herbal kunapajala. Shah *et al.* (2021)^[24] and Nzanza *et al.* (2012)^[25] also showed that whitefly populations decreased after being treated with neem extracts. Table 3.

The data for number of thrips per three leaves per plant, T₂ (Herbal Kunapajala) had the fewest thrips per three leaves per plant (3.02), followed by T₁ (Panchagavya) with 3.20 at the fourth spray. At the fourth spray, T₀ - Control had the most thrips (4.3). It was found that after 4th spray there was reduction in population of thrips. It may be related to the presence of Azadirachtin, an active chemical found in neem. Neem does not kill pests directly, but instead limits their eating and reproduction, leading to a decrease in pest populations. It interferes with the molting process of insects, reducing Ecdysone production and inhibiting larvae from growing into adults. Shah *et al.* (2021)^[24] observed the reduction of pest infestation by thrips using neem leaf extract. Table 4.

The data for number of mites per three leaves per plant, the infestation of mites was checked after the application of organic inputs. T₂ (Herbal Kunapajala) had the lowest incidence of mite, at 2.91, followed by 3.15 in T₄ (Jeevamrut) of the fourth spray. Azadirachtin works as a natural anti-feedant and insect development inhibitor. Anti-feedants influence feeding, mating, and post-embryonic development via altering mating and fertility. Thus, application of herbal kunapajala led to decrease in the population of whiteflies. Hossain *et al.* (2013)^[26] found that mite populations were reduced when treated with neem leaf extracts. Table 5.

The data for the infestation of fruit borer. The fruit infection was lowest in treatment T₂ (herbal kunapajala), with 4.88 infected fruits, followed by 5.93 fruits in Panchagavya. The number of infections was highest in T₀-Control (6.71 fruits). The highest infection percentage was reported in T₀ - Control (18.12%). The herbal kunapajala had neem leaves as composition and this acted as a repellent to the lepidopterans. The neem tree is a rich source of triterpenoids (Siddiqui *et al.* 2004)^[27]. Gisbert *et al.* (2006)^[28] found that neem plants contain salannin, making them unappealing to insects. The presence of triterpenoids and salannin in neem leaf extract may have served as an anti-feedant, preventing insects from eating on the leaves and fruits. This was confirmed by Wondafrash (2012)^[29], who observed a considerable reduction in food intake and growth for *Spodoptera litura* after treatment with Azadirachtin, an active response. They also discovered a considerable reduction in glucose and nitrogen ingestion and utilization, as well as midgut enzyme activity (protease, phosphatase, amylase, and invertase) in borer which led to reduction in population of it. Wondafrash *et al.*

(2012)^[29] also had similar findings where neem extract reduces the infestation of borer. Table 6.

The data for number of natural enemies (coccinellid beetles) per plant, among all organic inputs, Treatment T₀-Control had the most natural enemies at the third spray (3.52), and treatment T₂ (Herbal kunapajala @ 10%) had the fewest natural enemies at the fourth spray (1.96). It demonstrated that natural enemies are not negatively impacted by organic inputs. The decreased frequency of pests during the fourth spray might be linked to the natural enemies' concurrently rising activity, which typically tracks the pest accumulation pattern in typical agro-ecosystems. Table 7.

Table 2: Effect of different organic inputs on number of aphids per three leaves per plant

Number of aphids per three leaves per plant					
Treatment	Before spray	1 st spray	2 nd spray	3 rd spray	4 th spray
T ₀	10.31 (3.29)	10.16 (3.26)	10.16 (3.26)	9.88 (3.22)	9.55 (3.17)
T ₁	9.96 (3.23)	9.91 (3.23)	9.92 (3.23)	9.46 (3.16)	9.12 (3.10)
T ₂	9.45 (3.15)	9.34 (3.14)	9.24 (3.14)	8.79 (3.05)	8.45 (2.99)
T ₃	9.49 (3.16)	9.71 (3.20)	9.62 (3.20)	9.17 (3.11)	8.83 (3.05)
T ₄	9.76 (3.20)	9.64 (3.18)	9.84 (3.18)	9.39 (3.18)	9.05 (3.09)
T ₅	9.66 (3.19)	9.54 (3.17)	9.61 (3.17)	9.16 (3.21)	8.82 (3.05)
T ₆	9.90 (3.23)	9.93 (3.23)	9.93 (3.23)	9.48 (3.11)	9.14 (3.10)
CD at 5%	-	-	-	-	-
SE(m)±	0.54	0.44	0.53	0.41	0.41
CV	9.59	7.84	9.46	7.62	7.91

T₀ = Control, T₁ = Panchagavya @ 10%, T₂ = Herbal kunapajala @ 10%, T₃ = Vermiwash @ 10%, T₄ = Jeevamrut @ 10%, T₅ = Amritpani @ 10%, T₆ = CAU bioenhancer @ 2% CD = Critical Difference, SE(m) = Standard Error of mean, CV = Coefficient of Variance the number in the parentheses are square root transform value

Table 3: Effect of different organic inputs on number of whiteflies per three leaves per plant

No. of whiteflies per three leaves per plants					
Treatment	Before spray	1 st spray	2 nd spray	3 rd spray	4 th spray
T ₀	4.57 (2.17)	4.55 (2.25)	4.17 (2.16)	4.04 (2.13)	4.01 (2.12)
T ₁	4.25 (2.18)	3.82 (2.08)	3.44 (1.98)	3.31 (1.95)	3.08 (1.89)
T ₂	4.15 (2.16)	3.73 (2.06)	3.36 (1.96)	3.22 (1.93)	3.00 (1.86)
T ₃	4.19 (2.17)	4.16 (2.16)	3.78 (2.07)	3.65 (2.03)	3.42 (1.97)
T ₄	4.23 (2.17)	4.01 (2.12)	3.59 (2.02)	3.46 (1.99)	3.23 (1.92)
T ₅	4.12 (2.15)	4.08 (2.14)	3.71 (2.05)	3.57 (2.02)	3.35 (1.96)
T ₆	4.17 (2.16)	4.01 (2.13)	3.67 (2.04)	3.58 (2.01)	3.31 (2.05)
CD at 5%	NS	0.41	0.44	0.44	0.507
SE(m)±	0.013	0.136	0.143	0.143	0.165
CV	8.33	5.79	6.74	6.99	8.53

T₀ = Control, T₁ = Panchagavya @ 10%, T₂ = Herbal kunapajala @ 10%, T₃ = Vermiwash @ 10%, T₄ = Jeevamrut @ 10%, T₅ = Amritpani @ 10%, T₆ = CAU bioenhancer @ 2% CD = Critical Difference, SE(m) = Standard Error of mean, CV = Coefficient of Variance the number in the parentheses are square root transform value

Table 4: Effect of organic inputs on number of thrips per three leaves per plant

Number of thrips per three leaves per plant					
Treatment	Before spray	1 st spray	2 nd spray	3 rd spray	4 th spray
T ₀	4.55 (2.25)	4.68 (2.24)	4.51 (2.24)	4.41 (2.22)	4.38 (2.21)
T ₁	4.59 (2.26)	3.95 (2.08)	3.82 (2.08)	3.83 (2.08)	3.20 (1.92)
T ₂	4.35 (2.09)	3.86 (2.05)	3.70 (2.05)	3.63 (2.03)	3.02 (1.88)
T ₃	4.44 (2.19)	4.29 (2.15)	4.12 (2.15)	4.05 (2.13)	3.45 (1.99)
T ₄	4.42 (2.15)	4.14 (2.12)	3.97 (2.12)	3.90 (2.10)	3.53 (2.01)
T ₅	4.42 (2.17)	4.21 (2.13)	3.97 (2.13)	3.98 (2.12)	3.42 (1.98)
T ₆	4.39 (2.16)	4.18 (2.12)	4.01 (2.12)	3.94 (2.11)	3.58 (2.01)
CD at 5%	NS	0.44	0.44	0.43	0.53
SE(m)±	0.179	0.14	0.14	0.14	0.17
CV	6.983	6.01	6.33	6.29	8.43

T₀ = Control, T₁ = Panchagavya @ 10%, T₂ = Herbal kunapajala @ 10%, T₃ = Vermiwash @ 10%, T₄ = Jeevamrut @10%, T₅ = Amritpani @10%, T₆ = CAU bioenhancer @ 2% CD = Critical Difference, SE(m) = Standard Error of mean, CV= Coefficient of Variance the number in the parentheses are square root transform value

Table 5: Effect of organic inputs on number of mites per three leaves per plant

Number of mites per three leaves per plant					
Treatment	Before spray	1 st spray	2 nd spray	3 rd spray	4 th spray
T ₀	4.55 (2.25)	4.46 (2.23)	4.39 (2.21)	4.23 (2.18)	4.21 (2.17)
T ₁	4.05 (2.13)	4.08 (2.14)	3.69 (2.05)	3.59 (2.02)	3.36 (1.96)
T ₂	4.17 (2.16)	3.97 (2.11)	3.43 (1.98)	3.14 (1.90)	2.91 (1.84)
T ₃	4.05 (2.13)	3.99 (2.12)	3.78 (2.07)	3.56 (2.01)	3.34 (1.95)
T ₄	4.01 (2.12)	3.92 (2.10)	3.67 (2.04)	3.36 (1.96)	3.15 (1.90)
T ₅	4.08 (2.14)	4.03 (2.13)	3.62 (2.03)	3.49 (2.00)	3.26 (1.93)
T ₆	4.39 (2.21)	4.30 (2.19)	3.93 (2.11)	3.85 (2.09)	3.81 (2.08)
CD at 5%	NS	0.39	0.61	0.61	0.72
SE(m)±	0.22	0.12	0.153	0.20	0.234
CV	9.17	5.49	6.98	9.64	11.78

T₀ = Control, T₁ = Panchagavya @ 10%, T₂ = Herbal kunapajala @ 10%, T₃ = Vermiwash @ 10%, T₄ = Jeevamrut @10%, T₅ = Amritpani @10%, T₆ = CAU bioenhancer @ 2% CD = Critical Difference, SE(m) = Standard Error of mean, CV= Coefficient of Variance the number in the parentheses are square root transform value

Table 6: The effect of different organic inputs on fruit infestation by fruit borer (%)

Treatment	Number of fruits per five plants			% of infested fruit
	Total number of fruits	Healthy no. of fruits	Affected fruits	
T ₀	37.04	30.33	6.71	18.12(25.19)
T ₁	54.62	48.69	5.93	10.83(19.20)
T ₂	45.00	40.12	4.88	10.89(19.25)
T ₃	43.33	37.30	6.02	14.02(21.94)
T ₄	55.67	49.51	6.15	11.46 (19.78)
T ₅	41.93	35.55	6.37	15.21 (22.93)
T ₆	42.67	36.07	6.59	15.55 (22.21)
CD at 0.05%	5.31	5.08	0.74	2.483
SE(m)±	1.86	1.63	0.23	0.797
CV (5%)	4.40	7.13	6.77	10.096

T₀ = Control, T₁ = Panchagavya @ 10%, T₂ = Herbal kunapajala @ 10%, T₃ = Vermiwash @ 10%, T₄ = Jeevamrut @10%, T₅ = Amritpani @10%, T₆ = CAU bioenhancer @ 2% CD = Critical Difference, SE(m) = Standard Error of mean, CV= Coefficient of Variance the number in the parentheses are square root transform value

Table 7: Effect of different organic inputs on the number of natural enemies (coccinellid beetles)

Number of natural enemies per plant					
Treatment	Before spray	1 st spray	2 nd spray	3 rd spray	4 th spray
T ₀	2.02 (1.58)	2.30 (1.67)	2.53 (1.74)	3.52 (2.00)	1.96 (1.56)
T ₁	1.95 (1.56)	1.95 (1.56)	2.17 (1.63)	2.78 (1.81)	1.30 (1.34)
T ₂	1.98 (1.57)	2.08 (1.60)	2.30 (1.67)	2.70 (1.78)	1.22 (1.31)
T ₃	1.90 (1.54)	2.01 (1.58)	2.24 (1.65)	3.02 (1.87)	1.54 (1.42)
T ₄	2.16 (1.63)	2.16 (1.62)	2.38 (1.69)	2.98 (1.86)	1.50 (1.41)
T ₅	2.05 (1.59)	2.06 (1.60)	2.29 (1.67)	3.05 (1.88)	1.57 (1.43)
T ₆	2.31 (1.67)	2.30 (1.67)	2.53 (1.74)	3.12 (1.90)	1.64 (1.46)
CD at 5%	NS	0.69	0.195	0.423	0.427
SE(m)±	0.14	0.16	0.063	0.13	0.194
CV	12.06	17.01	4.69	7.78	15.45

T₀ = Control, T₁ = Panchagavya @ 10%, T₂ = Herbal kunapajala @ 10%, T₃ = Vermiwash @ 10%, T₄ = Jeevamrut @10%, T₅ = Amritpani @10%, T₆ = CAU bioenhancer @ 2% CD = Critical Difference, SE(m) = Standard Error of mean, CV= Coefficient of Variance the number in the parentheses are square root transform value

the parentheses are square root transform value

Conclusion

The application of organic inputs had some impact on the pest incidence of chilli. The application of herbal kunapajala reduced the population of aphid in chilli. In terms of whiteflies the most effective input was found to be treatment T₂ (Herbal kunapajala @10%) with a population of 3.02. The lowest number of thrips per three leaves per plant was found in T₂ (Herbal Kunapajala) 8.45, followed by T₅ (Amritpani) of fourth spray. The infestation of fruit was least in the treatment T₂ (Herbal kunapajala) with the value of 4.88 infected fruits followed by 5.93 fruits in T₂ (Panchagavya). T₂ (Herbal Kunapajala) had the lowest prevalence of mite population, at 2.91, followed by 3.15 in T₄ (Jeevamrut) of the fourth spray. The number of whiteflies, thrips and mites were also reduced after the application of herbal kunapajala. The infestation percentage of fruit is found lesser in this treatment.

References

- Basu SK, De AK. Capsicum: historical and botanical perspectives. In: *Capsicum*. 2003:21–35. CRC Press.
- Islam MR, Sultana T, Haque MA, Hossain MI, Sabrin N, Islam R. Growth and yield of chilli influenced by nitrogen and phosphorus. *J Agric Vet Sci*. 2018;11(5):54–68.

3. Khandaker MM, Rohani F, Dalorima T, Mat N. Effects of different organic fertilizers on growth, yield and quality of *Capsicum annuum* L. var. Kulai (Red Chilli Kulai). Biosci Biotechnol Res Asia 2017;14(1):185–192.
4. Behera KK, Alam A, Vats S, Sharma HP, Sharma V. Organic farming history and techniques. In: *Agroecology and Strategies for Climate Change*. Banasthali, Rajasthan; 2011:287–328.
5. Tharmaraj K, Ganesh P, Sureshkumar R, Anandan A, Kolanjinathan K. A critical review on panchagavya – A boon plant growth. Int J Pharm Biol Sci Arch. 2011;2(6):1611–1614.
6. Boraiah B, Devakumar N, Shubha S, Palanna KB. Effect of Panchagavya, Jeevamrutha and cow urine on beneficial microorganisms and yield of capsicum (*Capsicum annuum* L. var. *grossum*). Int J Curr Microbiol Appl Sci. 2017;6(9):3226–3234.
7. Nene YL. The concept and formulation of Kunapajala, the world's oldest fermented liquid organic manure. Asian Agri-Hist. 2018;22(1):1–7.
8. Ram RA, Singha A, Vaish S. Microbial characterization of on-farm produced bio-enhancers used in organic farming. Indian J Agric Sci. 2018;88(1):35–40.
9. Kandasamy C, Mohanasundaram M, Karuppuchamy P. Evaluation of insecticides for the control of the thrips *Scirtothrips dorsalis* Hood on chillies (*Capsicum annuum* L.). Madras Agric J. 1990;77:169–172.
10. Kethran MR, Sun YY, Khan S, Baloch SU, Wu LL, Lu TT, et al. Effect of different sowing dates on insect pest population of chillies (*Capsicum annuum* L.). J Biol Agric Healthc. 2014;4(25):196–214.
11. Berke T, Sheih SC. Chilli peppers in Asia. Capsicum Eggplant Newsl. 2000;19:38–41.
12. Reddy MRS, Reddy GS. An eco-friendly method to combat *Helicoverpa armigera* (Hub.). Insect Environ. 1999;4:143–144.
13. Gomez KA, Gomez AA. Statistical Procedures for Agricultural Research. John Wiley & Sons; 1984.
14. Rathore G, Kaushal R, Sharma V, Lalkhumliana F. Quantifying the effect of fermented liquid bio formulations and organic amendments on yield and quality of eggplant (*Solanum melongena* L.). J Plant Nutr. 2023;46(10):2276–2288.
15. Gopal V, Gurusiddappa LH. Influence of jeevamrutha (fermented liquid manure) on growth and yield parameters of tomato (*Solanum lycopersicum* L.). World J Environ Biosci. 2022;11(3):1–7.
16. Jakhar S, Aravindakshan K, Sharma RK, Chopra R, Nagar B. Effect of vermicompost and liquid bioenhancers on growth, yield and quality of okra (*Abelmoschus esculentus* L.). Int J Hort Food Sci. 2022;4(2):203–207.
17. Mandodi D, Bahadur V. Effect of Panchagavya on growth, yield and quality of okra (*Abelmoschus esculentus* L.). Int J Plant Soil Sci. 2022;34(22):525–531.
18. Panda D, Padhiary AK, Mondal S. Effect of panchagavya and jeevamrit on growth and yield of tomato (*Solanum lycopersicum* L.). Ann Plant Soil Res. 2020;22(1):80–85.
19. Sreenivasa MN, Nagaraj MN, Bhat SN. Beejamruth: A source for beneficial bacteria. Karnataka J Agric Sci. 2010;17(3):72–77.
20. Nath S, Devakumar N, Rao GE, Murali K. Effect of different sources of organic manures and Jeevamrutha on growth and yield of French bean (*Phaseolus vulgaris* L.). Mysore J Agric Sci. 2023;57(2).
21. Parmar RJ, Wankhade VR, Nandre BM, Bhadaraka JV, Manani PK. Effect of Jeevamruth on yield of African marigold (*Tagetes erecta* L.). Int J Res. 2024;7(7S):722–725.
22. Elterai IE, Hassanali A. Oil and Azadirachtin contents of neem (*Azadirachta indica* A. Juss.) seed kernels collected from trees growing in different habitats in Sudan. Int J Biol. Chem Sci. 2011;5(3).
23. Tobing OL, Mulyaningsih Y, Safitri AD. The effect of concentration and frequency of neem leaf extract on aphid attacks on chili plants. Indones J Appl. Res. 2023;4(2):146–158.
24. Shah MS, Anjum H, Dar AA, Ahmad SI. Insect pest spectrum of brinjal, *Solanum melongena* (L.) and effect of neem leaf extract (Azadirachtin) for their management. Munis Entomol Zool. 2021;16(2):872–877.
25. Nzanza B, Mashela PW. Control of whiteflies and aphids in tomato (*Solanum lycopersicum* L.) by fermented plant extracts of neem leaf and wild garlic. Afr J Biotechnol. 2012;11(94):16077–16082.
26. Siddiqui BS, Afshan F, Faizi S, Naqvi SN, Tariq RM. Two insecticidal tetranortriterpenoids from *Azadirachta indica*. Phytochemistry 2000;53(3):371–376.
27. Gisbert C, Prohens J, Nuez F. Efficient regeneration in two potential new crops for subtropical climates, the scarlet (*Solanum aethiopicum*) and gboma (*S. macrocarpon*) eggplants. N Z J Crop Hortic. Sci. 2006;34(1):55–62.
28. Wondafrash M, Getu E, Terefe G. Neem, *Azadirachta indica* (A. Juss.) extracts negatively influenced growth and development of African bollworm, *Helicoverpa armigera* (Hubner) (Lepidoptera: Noctuidae). Acad J Entomol. 2012;5(1):22–27.