



# Plant Archives

Journal homepage: <http://www.plantarchives.org>  
doi link : <https://doi.org/10.51470/PLANTARCHIVES.2021.v21.S1.412>

## EFFECT OF ORGANIC MANURES AND FOLIAR APPLICATION OF FISH AMINO ACID ON YIELD AND QUALITY PARAMETERS OF AFRICAN MARIGOLD (*TAGETES ERECTA* L.)

S.Sivasankar<sup>1\*</sup>, P.Ilakkiya<sup>1</sup>, S.Rameshkumar<sup>1</sup>, C.Muruganandam<sup>1</sup> and P. K. Karthikeyan<sup>2</sup>

<sup>1</sup>Department of Horticulture, Faculty of Agriculture Annamalai University, Tamil Nadu, India

<sup>2</sup>Department of Soil Science and Agricultural Chemistry, Faculty of Agriculture, Annamalai University, Tamil Nadu, India

\*Author for correspondence

### ABSTRACT

An experiment was carried out to study the “Effect of organic manures and foliar application of fish amino acid on yield and quality parameters of African marigold (*Tagetes erecta* L.)” in the department of Horticulture, Faculty of Agriculture, Annamalai University, Annamalai nagar during (2018 – 2020). The twelve treatments includes organic manures such as farmyard manure (25 t ha<sup>-1</sup>), vermicompost (5t ha<sup>-1</sup>), oilcake (2 t ha<sup>-1</sup>) along with foliar application of two levels of fish amino acid @ 2% and 4 % under randomised block design. The various treatments significantly enhanced the days to 50% flowering, number of flowers, flower diameter, individual flower weight and xanthophyll content. Evaluating the different treatments revealed that plants treated with T<sub>9</sub>(FYM @ 25t ha<sup>-1</sup>+ Vermicompost @ 5 t ha<sup>-1</sup> + FAA @ 4%) resulted in enhanced flower quality with the highest flower yield (28.97 t ha<sup>-1</sup>).

**Keywords** : FAA, Xanthophyll, Vermicompost, Marigold

### Introduction

Marigold is an herbaceous annual and is exclusively known for their attractive blooms, cheerful colors and wider adaptability. It is usually a semi hardy plant and can thrive well even under saline conditions. Blooms are single with large attractive globular heads with a wide variety of colours ranging from lemon yellow to golden yellow and orange colours. Apart from the ornamental value it has many medicinal properties. Calendula flowers belonging to marigold species are used to cure constipation and abdominal cramps. The popularity of the organic farming stems up from the increasing awareness about the negative effects of intensive agriculture including human health and environmental risk due to pesticide residual effect.

Organic manures are prepared by decomposition of the natural products such as plant waste, animal waste, etc. Farmyard manure increases the microbial population near the rhizosphere region and are found to be more effective in increasing the crop yield. Vermicompost are peat like material which holds good properties such as water holding capacity, porosity, etc. Compared to other conventional compost, the earthworm improves the bio oxidation of organic material.

Oilcake are recognized as a potential source of organic nitrogen content which are beneficial for plant growth. These are nothing but the residues left after the oil extraction of seeds such as Groundnut, Castor, Gingelly, Pongamia, Neem, etc. Fish amino is one of the upcoming bio-organic inputs applied in the form of foliar spray. They improve crop yield and quality which has a beneficial impact to the farmers. . In this study, an attempt was made to stud the effect of organic

manures with foliar application of fish amino acid on yield and quality parameters of African marigold (*Tagetes erecta* L.)

### Materials and Methods

The present experiment entitled “Effect of organic manures and foliar application of fish amino acid on growth and yield of African marigold (*Tagetes erecta* L.)” was carried out in the Floriculture yard, Department of Horticulture, Annamalai University, Annamalai nagar, Tamil Nadu during the year 2018 to 2020. The experiment was laid out in Randomized block design with the plant spacing of 30 x 45 cm.. The treatments imposed in this study was (T<sub>1</sub>) Farmyard manure @ 25t ha<sup>-1</sup>, (T<sub>2</sub>) Vermicompost @ 5t ha<sup>-1</sup>, (T<sub>3</sub>) Oilcake @ 2 t ha<sup>-1</sup> (Coconut oilcake ), (T<sub>4</sub>) Fish amino acid (2%), (T<sub>5</sub>) Fish amino acid (4%), (T<sub>6</sub>) FYM @ 25t ha<sup>-1</sup>+ Vermicompost @ 5t ha<sup>-1</sup> + FAA 2%, (T<sub>7</sub>) FYM@ 25t ha<sup>-1</sup> + Oilcake @ 2t ha<sup>-1</sup>+FAA 2%, (T<sub>8</sub>) Vermicompost @ 5t ha<sup>-1</sup>+ Oilcake@ 2t ha<sup>-1</sup> + FAA 2%, (T<sub>9</sub>) FYM @ 25t ha<sup>-1</sup> + Vermicompost@ 5t ha<sup>-1</sup> + FAA 4% , (T<sub>10</sub>) FYM@ 25t ha<sup>-1</sup> + Oilcake @ 2t ha<sup>-1</sup>+FAA 4%, (T<sub>11</sub>) Vermicompost@ 5t ha<sup>-1</sup> + Oilcake @ 2t ha<sup>-1</sup> + FAA 4% , (T<sub>12</sub>) Control (RDF). Three replications were maintained for each treatment.

Organic manure such as well decomposed farm yard manure, vermicompost and oil cakes were taken in appropriate quantities as per the treatment and applied to individual plots at the time of land preparation. Thirty days old healthy uniform seedlings were selected and transplanted in the main field. Two seedlings were planted per hill later on thinning operation was done to maintain single seedling per hill. 2% FAA solution was prepared by dissolving 2 ml in 100 ml of water. In the same way 4% solution was also

prepared. The prepared solution of fish amino acid @ 2 % and 4% concentration were sprayed immediately after pinching operation and subsequent spray was given at 15 days interval. Totally 6 sprays was given at subsequent intervals. The application was individually given to the respective plots as per the treatment schedule.

Data pertaining to flowering parameters such as days to 50% flowering, number of flowers per plant, flower weight, flower diameter, xanthophyll content, flower yield per plot, estimated flower yield per ha were recorded periodically

### Results and Discussion

The results of the study entitled “Effect of organic manures and foliar application of fish amino acid on yield and quality parameters of African marigold (*Tagetes erecta* L.)” revealed that the yield and quality characters such as days to 50% flowering, number of flowers, flower diameter, individual flower weight and xanthophyll content were significantly influenced by the application of organic manures and fish amino acid. the data relevant to different characters are furnished in table 1. The earliness in flowering and superior flowering behavior was found in plants treated with FYM @ 25 t ha<sup>-1</sup> + Vermicompost @ 5 t ha<sup>-1</sup> + FAA 4% (T<sub>9</sub>) with the values, minimum days for 50 % flowering (48.96) and the maximum number of flowers plant<sup>-1</sup> (46.52). It was followed by plants in T<sub>11</sub> (Vermicompost @ 5 t ha<sup>-1</sup> + Oilcake @ 2 t ha<sup>-1</sup> + FAA 4%) which was considered as second best among the twelve treatments. The present results were in accordance with earlier reports of Sisodia and Singh (2015) in gladiolus and Chamakumari *et al.* (2017) in jasmine.

Application of organic manures and fish amino acid has significantly influenced the flower diameter among the

treatment. Among the twelve treatments the highest flower diameter (12.39 cm) was observed in T<sub>9</sub> (FYM @ 25 t ha<sup>-1</sup> + vermicompost @ 5t ha<sup>-1</sup> + FAA 4%). The lowest flower diameter (6.27 cm) was observed in T<sub>3</sub> (oilcake @ 2t ha<sup>-1</sup>). The increased flower diameter and weight might be due to the uptake of major nutrients which increases the carbohydrate assimilation. These results are in conformity with Patel *et al.* (2018) in his work on chrysanthemum and Pritam *et al.* (2010) in marigold.

The highest individual flower weight (14.32 g) was observed in plants supplied with T<sub>9</sub> (FYM @ 25 t ha<sup>-1</sup> + vermicompost @ 5 t ha<sup>-1</sup> + FAA 4%) . The individual weight of T<sub>11</sub> and T<sub>12</sub> were found to be on par with each other having a value of (13.84 g and 13.77 g). Among the twelve treatments the maximum xanthophyll content (5.51 mg g<sup>-1</sup>) was observed in plants treated in T<sub>9</sub> (FYM @ 25 t ha<sup>-1</sup> + Vermicompost @5t ha<sup>-1</sup> + FAA 4%). The better quality flowers might be due to the assimilation of essential nutrients through foliar spraying of fish amino acid. The results of the experiment was found to be in accordance with Koli *et al.*,(2018) in his work on marigold

In general, different doses of organic manures and fish amino acid resulted in increase in yield characters of African marigold. The maximum yield value per plot (8.59 kg plot<sup>-1</sup>) and estimated flower yield (28.97 kg ha<sup>-1</sup>). It was followed by T<sub>11</sub> (Vermicompost @ 5 t ha<sup>-1</sup> + Oilcake @ 2 t ha<sup>-1</sup> + FAA 4%) which recorded (28.39 kg ha<sup>-1</sup>) The lowest yield per plot (4.96 kg plot<sup>-1</sup>) and estimated flower yield (22.43 ha<sup>-1</sup>) was noted in T<sub>3</sub> (Oilcake @ 2t ha<sup>-1</sup>). The improvement in yield attributes may be due to the combined effect of farmyard manure, vermicompost along with FAA. The results are found to be in consonance with Tiwari *et al.*, (2018 ) and Lokhande *et al.* (2019 ) in African marigold .

**Table 1:** Effect of organic manures and foliar application of fish amino acid on yield and quality parameters of African marigold (*Tagetes erecta* L.)

TREATMENT	Days to 50% flowering	No of flowers/plant	Flower diameter	Flower weight	Xanthophyll content	yield (g/plot)	Yield (kg/Plot)
T <sub>1</sub> - Farmyard manure @25 t ha <sup>-1</sup>	60.36	37.97	7.86	10.35	3.26	5.90	24.12
T <sub>2</sub> - Vermicompost @5 t ha <sup>-1</sup>	57.56	40.07	8.97	11.32	3.86	6.56	25.31
T <sub>3</sub> - Oilcake @2 t ha <sup>-1</sup>	64.35	34.98	6.27	8.96	2.91	4.96	22.43
T <sub>4</sub> - Fish amino acid (2%)	58.99	39.00	8.40	10.83	3.54	6.22	24.71
T <sub>5</sub> - Fish amino acid (4%)	56.21	41.09	9.51	11.80	4.15	6.88	25.89
T <sub>6</sub> - FYM @25t ha <sup>-1</sup> + Vermicompost @ 5t ha <sup>-1</sup> +FAA 2%	53.27	43.29	10.68	12.82	4.63	7.57	27.14
T <sub>7</sub> - FYM@ 25t ha <sup>-1</sup> + Oilcake @ 2t ha <sup>-1</sup> +FAA 2%	54.68	42.09	10.04	12.26	4.42	7.20	26.46
T <sub>8</sub> - Vermicompost @ 5t ha <sup>-1</sup> + Oilcake@ 2t ha <sup>-1</sup> + FAA 2%	54.86	42.23	10.11	12.33	4.36	7.24	26.97
T <sub>9</sub> - FYM @ 25t ha <sup>-1</sup> + Vermicompost@ 5t ha <sup>-1</sup> + FAA 4%	48.96	46.52	12.39	14.32	5.51	8.59	28.97
T <sub>10</sub> - FYM@ 25t ha <sup>-1</sup> + Oilcake @ 2t ha <sup>-1</sup> +FAA 4%	51.93	44.30	11.21	13.29	4.89	7.89	27.71
T <sub>11</sub> - Vermicompost@ 5t ha <sup>-1</sup> + Oilcake@ 2t ha <sup>-1</sup> + FAA4%	50.33	45.49	11.84	13.84	5.29	8.27	28.39
CONTROL (RDF)	50.53	45.35	11.77	13.77	5.15	8.22	28.30
<b>S.Ed.</b>	0.62	0.30	0.16	0.14	0.21	0.09	0.17
<b>CD (p = 0.05)</b>	1.26	0.79	0.42	0.37	0.45	0.25	0.45



### Reference

- Adhikari, Y.S.; Bohra, M.; Punetha, P.; Upadhyay, S. and Nautiyal, B.P. (2018). Studies on effect of integrated nutrient management on vegetative growth, floral Attributes, corm yield and economics of Gladiolus cv. Arka Amar in Bharsar, Uttarakhand. *International Journal of Pure and Applied Bioscience.*, 6: 643-650.
- Anburani, A.; Shakila, A. and Gayathiri, M. (2008). Effect of organic manures combination with fertilizers on yield in Gundumalli (*Jasminum sambac Ait.*). *Asian J. Hort.*, 3(2): 419-421.
- Carol, L.; Vijay, B.; David, A.A.; Prasad, V.M. and Tajungsola, J. (2017). Effect of organic manures, organic supplements and biofertilizers on the growth and yield of Cowpea. *Int. J. of Current Microbiology and Applied Sci.*, 6(8): 1029-1036.
- Chamakumari, N.; Saravanan, S. and Ravi, J. (2017). Effect of NPK and organic manures on plant growth, flower yield and flower quality parameters of Jasmine (*Jasminum sambac*) var. Double mogra. *Agric. Update*, 524-529.
- Idan, R.O.; Prasad, V.M. and Saravanan, S. (2014). Effect of organic manures on flower yield of African marigold (*Tagetes erecta L.*) Cv. Pusa narangi gainda. *IJASR.*, SSN(P): 2250- 0057.
- Karim, K.; Nellipalli, V.; Babu, R. and Pal. (2017). Effect of Biostimulants on Growth and Floral Attributes of Tuberose (*Polianthes tuberosa L.*). cv. Prajwal. *International Journal of Current Microbiology and Applied Sciences.*, 6(6) : 1–8.
- Koli, R.; Jayanthi, R. and Kumari, V. (2018). Effect of INM on flower yield and quality of African marigold (*Tagetes erecta L.*) cv. Pusa Basanti Gainda. *International Journal of Chemical Studies.*, 6(4): 2617-2620.
- Krushnaiah, R.; Nayak, M.H.; Prasanth, P. and Saidanaik, D. (2018). Studies on the Effect of Integrated Nutrient Management on Growth, Flowering and Yield of Italian Aster (*Aster amellus L.*) cv. 'Purple Multipetal.' *Int. J. Curr. Microbiol. App. Sci.*, 7(10): 936–946.
- Lokhande, S.; Dalal, S. and Mahadik, M. (2019). Performance of marigold rooted cuttings on yield and quality transplanted from different growing media. *Journal of Pharmacognosy and Phytochemistry.*, 8(3): 1088-1090.
- Mukesh, K.; Sharma, S.K.; Singh, S.; Dahiya, D.S.; Mohammed, S. and Singh, V. (2006). Effect of farm yard manure and different biofertilizers on yield and nutrients content of marigold cv. Pusa Narangi. *Haryana J Hort. Sci.*, 35(3&4):256-257.
- Patel, V.; Malam, V.; Nurbhanej, K.; Vihol, A. and Chavada, J. (2017). Effect of organic manures and biofertilizers on growth, flowering and flower yield of rose (*Rosa hybrida L.*) cv. Gladiator. *International Journal of Chemical Studies*: 5(5): 1924-1927.
- Pritam, S.; Garg, V.K. and Kaushik, C.P. (2010). Growth and yield response of marigold to potting media containing vermicompost produced from different wastes. *Environmentalist*, 30: 123-130.
- Sharma, G.; Sahu, N.P. and Shukla, N. (2017). Effect of Bio-Organic and Inorganic Nutrient Sources on Growth and Flower Production of African Marigold. *Horticulturae.*, 3(1): 11.
- Sisodia, A. and Singh, A.K. (2015). Effects of farmyard manure, vermicompost and Trichoderma on flowering and corm attributes in gladiolus. *Bangladesh Journal of Botany* .,44(2): 309–314.
- Tiwari, H.; Kumar, M.; Naresh, R.; Singh, M.; Malik, S. (2018). Effect of organic and inorganic fertilizers with foliar application of gibberellic acid on productivity, profitability and soil health of marigold (*Tagetes erecta L.*) cv. Pusa Narangi Gainda. *International Journal of Agricultural and Statistics Sciences.*,14: 575–585.