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## Effect of fish amino acid and egg amino acid as foliar application to increase the growth and yield of green gram

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### Abstract

A field experiment was conducted at College of Agricultural Technology, Theni to study the effect of fish amino acid and egg amino acid as foliar application to increase the growth and yield of green gram during 2018-2019. The experiment was laid out in Randomized block design (RBD) with three replications and eight treatments viz., control (T<sub>1</sub>), foliar spray of egg amino acid 0.5 % (T<sub>2</sub>), egg amino acid 1.0 % (T<sub>3</sub>), egg amino acid 1.5 % (T<sub>4</sub>), fish amino acid 0.5 % (T<sub>5</sub>), fish amino acid 1.0 % (T<sub>6</sub>), fish amino acid 1.5 % (T<sub>7</sub>) and DAP 2.0 % (T<sub>8</sub>). The results revealed that foliar application significantly influenced the growth and yield of greengram. Fish amino acid 1.0 % foliar spray at 15 DAS, 30 DAS and 45 DAS (T<sub>6</sub>) was recorded higher growth and yield parameters.

**Keywords:** DAP, fish amino acid, egg amino acid, green gram, growth and yield

### Introduction

Green gram (*Vigna radiata*) commonly known as moong bean. It is a drought and high temperature tolerant shallow rooted summer annual legume of high social and economic significance. In India it occupied an area of 34.5 lakh hectares having total production of 15.91 lakh tons of grain with productivity of 461 kg/ha (2016-17). In Andhra Pradesh, it is cultivated in about 1.61 lakh hectares with an annual production of 1.12 lakh tonnes and average productivity of 696 kg/ha (Anonymous, 2016) [9]. Modern agricultural techniques, which have been emphasized for high crop productivity, have caused environmental stress such as soil erosion, salt accumulation, Contamination of ground water and so on. Commercially available nitrogenous fertilizers are costly and improper or excessive use of N fertilizer can lead to nitrate pollution of ground or surface water (Foley *et al.*, 2012) [1].

Various organic preparations viz., panchakavya, amirthakaraisal, amrithpani, fish amino acid (FAA), egg amino acid (EAA) and vermiwash are being used for improving crop growth and development. Among these organic preparations, panchakavya has been scientifically evaluated for its physical, chemical and biological properties as well as effect on growth and development of many crops. But in case of fish amino acid and egg amino acid, research findings on its growth effects on crops are very meager. The fish amino acid is liquid organic manure made from fish waste. Fish amino acid is of great value to both plants and microorganisms in their growth, because it contains various nutrients and types of amino acids. Foliar application or a soil drenching of fish amino acid could maximize uptake and minimize runoff or leaching, providing just enough N to the plant for the production of chlorophyll to maintain plant health. Fish amino acid diluted with water (1:1000) with other natural farming inputs and applied as a foliar spray as well as soil drench increased the fruit numbers in tomato (Aung and Flick, 1980) [2]. Egg lime mix with panchakavya sprayed over the plants produced larger leaves and developed denser canopy. The stem produced lateral shoots and much more sturdy branches; the rooting was profuse and dense helped in better intake of nutrients and water (Natarajan, 2003) [4]. Similarly, Jayasree and George (2006) [3] reported that egg lime mix with panchakavya treated plants showed an increase in fruit weight (34.2 g fruit<sup>-1</sup>) than the control (22.0 g fruit<sup>-1</sup>) in tomato. The present study was, therefore, planned and conducted to effect of fish amino acid and egg amino acid in greengram cultivation.

## Materials and Methods

A field experiment was conducted at College of Agricultural Technology, Theni to study the effect of fish amino acid and egg amino acid as foliar application to increase the growth and yield of green gram during 2018-2019. The experiment was laid out in Randomized block design (RBD) with three replications and eight treatments *viz.*, control (T<sub>1</sub>), foliar spray of egg amino acid 0.5 % (T<sub>2</sub>), egg amino acid 1.0 % (T<sub>3</sub>), egg amino acid 1.5 % (T<sub>4</sub>), fish amino acid 0.5 % (T<sub>5</sub>), fish amino acid 1.0 % (T<sub>6</sub>), fish amino acid 1.5 % (T<sub>7</sub>) and DAP 2.0 % (T<sub>8</sub>). The experiment was tested with green gram variety Co 6. It is a short duration (67 days) Suitable for all season, resistant to Yellow Mosaic Virus.

### Preparation of egg amino acid

Twenty numbers of ripened lemon was squeezed and the juice was taken in a plastic container. Then 10 numbers of eggs kept inside the lemon juice till the eggs were soaked completely and kept for 10 days. After 10 days, eggs were smashed well and 250 g jaggery was added and kept for 10 days. The content was filtered after 10 days and the liquid portion was collected and stored in separate container for foliar spray (Anonymous, 2015) [5].

### Preparation of fish amino acid

Fish amino acid was prepared from fish waste obtained from local fish market. Equal amount of fish waste and jaggery were taken (1 kg of each fish waste and jaggery). The fish waste was taken an air tight plastic jar/bottle and jaggery was added. The materials were mixed well and stored in a cool dry place. It was kept away from direct sun light. After 10 days, the liquid portion was filtered and used for spraying (Maghirang, 2011). The final product was viscous fluid and had smell of panchamirtham.

**Observations:** Growth parameters and yield parameters are observed at 15 DAS, 30 DAS and 45 DAS. Plant samples collected for dry matter production were air dried initially and then dried in a hot air oven at 60°C, powdered in a Willy Mill and utilized for further analysis. Total N, P and K contents of plant samples were estimated by standard procedure. The data were statistically analyzed and results are discussed.

## Results and Discussion

**Growth parameters of green gram:** Foliar spray of fish amino acid, egg amino acid and DAP spray had significantly led to higher plant height and DMP. Application of foliar spray of fish amino acid 1.0% (T<sub>6</sub>) recorded significantly higher plant height (34.8 cm) than DAP 2% spray. Shorter plants of 28 cm was recorded with control (T<sub>1</sub>) (Table 1). This might be due to higher availability of N from soil as well as foliar spray of fish amino acid increased the cell division and metabolic activity resulting in higher plant height at all the growth stages. In addition, the fish amino acid and egg amino acid contained considerable amount of nutrients and amino acids that enhanced the growth of paddy. These results are in accordance with the findings of Vasmathi (2001) [1] and Sanjutha *et al.* (2008) [7]. Foliar spray of egg amino acid or fish amino acid along with recommended dose of fertilizers recorded significantly higher dry matter production during different growth stages. The lower dry matter production of 238 kg ha<sup>-1</sup>, 293 kg ha<sup>-1</sup> and 328 kg ha<sup>-1</sup> was obtained with control (T<sub>1</sub>) at 15 DAS, 30 DAS and 45 DAS respectively.

**Table 1:** Effect of foliar spray of Fish amino acid and Egg amino acids on Grain yield, Haulm yield and Harvest Index of green gram

Treatments	Plant height (cm)		
	15 DAS	30 DAS	45 DAS
T <sub>1</sub> -Control	3.5	6.45	28
T <sub>2</sub> - Egg Amino Acid 0.5 %	4.2	11.5	29.2
T <sub>3</sub> - Egg Amino Acid 1.0 %	4.8	12.2	30.3
T <sub>4</sub> - Egg Amino Acid 1.5 %	5.1	12.9	30.7
T <sub>5</sub> - Fish Amino Acid 0.5 %	5.4	13.1	31.8
T <sub>6</sub> - Fish Amino Acid 1.0 %	7.2	15.4	34.8
T <sub>7</sub> - Fish Amino Acid 1.5 %	6.1	13.3	32.7
T <sub>8</sub> - DAP 2 %	6.6	14.5	33.1
SEd	0.15	0.35	0.74
CD(P=0.05)	0.32	0.76	1.58

### Yield parameters of green gram

Foliar spray of fish amino acid 1.0% (T<sub>6</sub>) recorded higher grain yield of 930 kg ha<sup>-1</sup> (Table 2). Quick absorption and assimilate of more nitrogen, phosphorus, potassium and micro nutrients present in the egg amino acid and fish amino acid through foliar spray at 15 DAS, 30 DAS and 45 DAS would have improved the metabolic activity and cell division resulting in higher plant height, more number of leaves, more chlorophyll content which consequently increased the photosynthetic activity which in turn yield attributes and higher grain yield of green gram. These results are in accordance with the findings of Abbasi *et al.* (2003)[8] reported that foliar spray of fish emulsion increased the total yield of tomato and peppers.

**Table 2:** Effect of foliar spray of Fish amino acid and Egg amino acids on Grain yield, Haulm yield and Harvest Index of green gram

Treatments	Grain yield(kg ha <sup>-1</sup> )	Halum yield(kg ha <sup>-1</sup> )	Harvest index
T <sub>1</sub> -Control	246	452	1.54
T <sub>2</sub> - Egg Amino Acid 0.5 %	725	1340	1.54
T <sub>3</sub> - Egg Amino Acid 1.0 %	504	987	1.51
T <sub>4</sub> - Egg Amino Acid 1.5 %	513	1013	1.50
T <sub>5</sub> - Fish Amino Acid 0.5 %	350	712	1.48
T <sub>6</sub> - Fish Amino Acid 1.0 %	930	1800	1.51
T <sub>7</sub> - Fish Amino Acid 1.5 %	755	1412	1.53
T <sub>8</sub> - DAP 2 %	860	1623	1.52
SEd	15.84	25.75	0.035
CD(P=0.05)	33.98	55.25	0.076

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