

Original Research Article

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**Effect of Foliar Application of Acetyl Salicylic Acid and Ascorbic Acid  
on Protein Content, Yield and Economics of Garden Pea  
(*Pisum sativum* L.) cv. Bonneville**

**T. Thomson\*, G.S. Patel, J.B. Thakar and K.S. Pandya**

Department of Vegetable Science, College of Horticulture, SD Agricultural University,  
Sardarkrushinagar – 385506, Gujarat, India

*\*Corresponding author*

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A field study was conducted at Horticulture Instructional Farm, CP College of Agriculture, SD Agricultural University, Sardarkrushinagar, Gujarat to find out the effect of foliar application of acetyl salicylic acid and ascorbic acid on growth and yield of garden pea (*Pisum sativum* L.) cv. Bonneville. Plants were sprayed with treatments viz. control, NAA (25 and 50 ppm), GA<sub>3</sub> (50 and 100 ppm), 2, 4-D (5 and 10 ppm), acetyl salicylic acid (100 ppm and 200 ppm), ascorbic acid (100 and 200 ppm) at 30 days after sowing. The results revealed that the antioxidant acetyl salicylic acid 200 ppm effective for maximum protein content whereas ascorbic acid 200 ppm has given best results yield per plot, yield per hectare and economics of garden pea.

**Introduction**

Amongst pulse crops, Pea (*Pisum sativum* L.) is a popular pulse crop with vernacular name 'Matar'. It belongs to the family Leguminosae. It is second important food legume of the world. Pea is native of South West Asia and is widely grown in temperate countries. India is a thickly populated country and most of the residents of this country are vegetarian. The population being increased without check is the main handicap in our progress, with the results of that food shortage, malnutrition and poverty occurs. The solution for control of these problems partly may be only the major source of

adoption of intensive cultivation of vegetable crops. Several kinds of vegetables are grown in India, out of them vegetable pea is one of the most important leguminous vegetable, having much more protein than others vegetables. Pea is highly nutritive containing high percentage of digestible protein along with carbohydrates (15.8 g), Vitamin A (139 I.U.), Vitamin C (9 mg), magnesium (34 mg) and phosphorus (139 mg) per 100 g of edible portion.

To see the malnutrition and protein deficient diet and low yield of pea, it is necessary to

increase pea production per unit area to meet the requirement of increasing population of our nation. Besides, good agronomic practices like growing high yielding varieties, providing proper spacing, irrigation, use of fertilizers, optimum sowing time and some advanced crop improvement techniques like application of antioxidants and appropriate plant protection measures ought to be essentially followed in order to increase the productivity. Increasing the production of peas green pods and dry seeds with high quality could be achieved through using the foliar application of antioxidants, i.e. Ascorbic Acid (AA), Salicylic Acid (SA). Ascorbic acid as an abundant component of plants functions as an antioxidant and an enzyme cofactor. It participates in a variety of processes including photosynthesis, cell wall growth and cell expansion, resistance to environmental stresses and synthesis of ethylene, gibberellins, anthocyanine and hydroxyl proline. SA is assigned diverse regulatory roles in the metabolism of plants. SA has direct involvement in plant growth, thermogenesis, flower induction and uptake of ions. It affects ethylene biosynthesis, stomatal movement and also reverses the effects of ABA on leaf abscission. Enhancement of the level of chlorophyll, photosynthetic rate and modifying the activity of some of the important enzymes are other roles assigned to SA.

### **Materials and Methods**

The present investigation were executed at Horticulture Instructional Farm, CP College of Agriculture, Sardarkrushinagar Dantiwada Agricultural University, Sardarkrushinagar, Gujarat during the year 2013 with eleven treatments *viz* NAA (25 and 50 ppm), GA<sub>3</sub> (50 and 100 ppm), 2, 4-D (5 and 10 ppm) and antioxidants acetyl salicylic acid (100 and 200 ppm) and ascorbic acid (100 and 200 ppm) along with control (water) sprayed after 30 days after sowing of pea variety Bonneville.

The experiment was laid out in a randomized block design with four replications. To raise the crop recommended package of practices was followed. The crop was sown in November 2013 during Rabi season. The effect of different treatments was studied and data recorded on protein, yield and economics of the crop on ten randomly selected plants. The mean data were subjected to statistical analysis following analysis of variance technique (Nigam and Gupta, 1979).

### **Results and Discussion**

#### **Protein content**

Maximum protein content (23.75 %) was recorded with the treatment application of acetyl salicylic acid 200 ppm and was found to be superior over ascorbic acid concentrations. Minimum protein content was recorded with the treatment application of control. The results have been given in the table 1.

Similar results were also reported by Akram (2007) in broad bean, Amal and Amira (2007) in common bean, Amal and Amira (2009) in pea.

#### **Yield / Plot (kg)**

Maximum yield per plot (2.024 kg) was recorded with the treatment application of ascorbic acid 200 ppm and was found to be superior over acetyl salicylic acid concentrations. Minimum yield per plot was recorded with the treatment application of control. The results have been given in the table 2.

Similar results were also reported by Akram (2007) in broad bean, Amal and Amira (2007) in common bean, Amal and Amira (2009) in pea. Anitha *et al.*, (1999) in pea, Azooz *et al.*, (2011) in broad bean, Nour *et al.*, (2012) in broad bean.

**Table.1** Effect of foliar application of acetyl salicylic acid and ascorbic acid on protein content, yield per plot and yield per hectare of garden pea (*Pisum sativum* L.) cv. Bonneville

Treatments	Protein content %	Yield / Plot (kg)	Yield / Hectare (q)
Control	22.76	1.715	73.29
NAA 25 ppm	23.13	1.855	79.27
NAA 50 ppm	23.48	1.865	79.70
GA <sub>3</sub> 50 ppm	23.60	2.031	86.79
GA <sub>3</sub> 100 ppm	24.14	2.094	89.48
2,4-D 5 ppm	23.75	2.668	114.01
2,4-D 10 ppm	23.56	1.922	82.13
Acetyl Salicylic acid 100 ppm	23.04	1.918	81.96
Acetyl Salicylic acid 200 ppm	23.75	1.971	84.23
Ascorbic acid 100 ppm	23.16	1.982	84.70
Ascorbic acid 200 ppm	23.49	2.024	86.49
S.Em. ±	0.40	0.06	2.82
CD at 5 %	1.17	0.19	8.17

**Table.2** Effect of foliar application of acetyl salicylic acid and ascorbic acid on economics of garden pea (*Pisum sativum* L.) cv. Bonneville

Treat. No.	Cost of cultivation ₹/ha	Yield per hectare (q)	Gross income ₹ /ha	Net income ₹/ha	B:C Ratio
T <sub>1</sub>	50606	73.29	1,46,580	95,974	2.89:1
T <sub>2</sub>	50935	79.27	1,58,540	1,07,605	3.11:1
T <sub>3</sub>	51514	79.70	1,59,400	1,07,886	3.09:1
T <sub>4</sub>	62306	86.79	1,73,580	1,11,274	2.78:1
T <sub>5</sub>	74256	89.48	1,78,960	1,04,704	2.41:1
T <sub>6</sub>	50378	114.01	2,28,020	1,77,642	4.52:1
T <sub>7</sub>	50400	82.13	1,64,260	1,13,860	3.25:1
T <sub>8</sub>	50595	81.96	1,63,920	1,13,325	3.23:1
T <sub>9</sub>	50833	84.23	1,68,460	1,17,627	3.31:1
T <sub>10</sub>	50890	84.70	1,69,400	1,18,510	3.32:1
T <sub>11</sub>	51423	86.49	1,72,980	1,21,557	3.36:1

### Yield/Hectare (q)

Maximum yield per hectare (86.49 q) was recorded with the treatment application of ascorbic acid 200 ppm and was found to be superior over acetyl salicylic acid concentrations. Minimum yield per plot was recorded with the treatment application of

control. The results have been given in the table 2. Similar results were also reported by Akram (2007) in broad bean, Amal and Amira (2007) in common bean, Amal and Amira (2009) in pea. Anitha *et al.*, (1999) in pea, Azooz *et al.*, (2011) in broad bean, Nour *et al.*, (2012) in broad bean.

## Economics

The results summarized indicates that maximum net realization among various concentrations of ascorbic acid and acetyl salicylic acid studied reveals that Rs. 1,21,557 ha<sup>-1</sup> and highest net BCR (3.36:1) was obtained with treatment ascorbic acid 200 ppm. The minimum net realization of Rs. 95,974 ha<sup>-1</sup> obtained with T<sub>1</sub> (Control).

From the investigations it can be concluded that the antioxidant acetyl salicylic acid 200 ppm effective for maximum protein content whereas ascorbic acid 200 ppm has given best results yield per plot, yield per hectare and economics of garden pea.

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