Effects of Potassium on the Growth, Yield and Physico-chemical Properties of Three Garden Pea (\textit{Pisum sativum}) Varieties

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Authors’ contributions

This work was carried out in collaboration among all authors. Author NA designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors M. M. Ali and M. M. Akter managed the analyses of the study. Author MAK managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

An experiment was conducted at the Horticulture Research Farm, Hajee Mohammad Danesh Science and Technology University, Dinajpur, Bangladesh during November 2015 to March 2016 to find out the effects of potassium on the growth, yield and physico-chemical properties of three garden pea (\textit{Pisum sativum}) varieties. The experiment comprise three Garden pea varieties viz. $V_1$ = IPSA Motorshuti-3, $V_2$ = Broad Bean Master Piece and $V_3$ = BARI Motorshuti-1 and four levels of potassium viz. $K_0$ (Control), $K_1$ (25 kg ha\textsuperscript{-1}), $K_2$ (50 kg ha\textsuperscript{-1}) and $K_3$ (75 kg ha\textsuperscript{-1}), respectively. The experiment was laid out in a randomized complete block design with three replications. The results of the experiment reviled that K nutrition and genotypic variation significantly ($p < 0.05$) determined the yield of the garden pea. Different levels of potassium had significant influences on
almost all the parameters studied these three varieties. Maximum plant height (166.67 cm), branches plant⁻¹ (7.00), pods plant⁻¹ (39.00), sugar content (15.40%) was obtained from V₁K₂ (IPSA Motorshuti-3 with 50 kg K₂O ha⁻¹) treatment. Whereas highest pod length (8.53 cm), pod breadth (9.47 mm), number of seeds pod⁻¹ (8.67), green seed weight (305.00 g), Magnesium content, (0.29%) was obtained under the treatment V₂K₁ (Broad Bean Masterpiece with 50 kg K₂O ha⁻¹). The maximum green pod yield (12.78 t ha⁻¹), calcium content (0.20%), vitamin- A (1.03 mg/kg), was obtained from V₁K₂ (BARI Motorshuti-1 with 50 kg K₂O ha⁻¹).

Keywords: Garden pea; varieties; growth and yield; potassium.

1. INTRODUCTION

Garden pea (Pisum sativum L.) is a wide spread legume crop belonging to the family Fabaceae. It is a cold climate crop but also be grown in tropical countries during the winter [1]. It maintains soil fertility through biological nitrogen fixation along with symbiotic rhizobium prevalent in its root nodules [2]. Hence, it has been considered a valuable crop in the grass rotations and a biological source for nitrogen fixation in soil [3]. It is commonly used in human diet throughout the world and it is rich in protein (21-25%), carbohydrates, vitamins A and C, Ca, phosphorous and has high levels of amino acids: lysin and tryptophan [4]. Cultivation of this crop is highly profitable and attractive to farmers for its short duration. It takes 55 to 75 days from sowing for its green pods and 75 to 100 days for matured seeds. In Bangladesh the average yield of garden pea is very low (3.49 t/ha) compared to other countries [5]. Maynard et al. [6] reported that per hectare yield of pea can be increased by growing high yielding, pest and disease resistant varieties with proper fertilizer application [6].

The increasing cropping intensity to meet the demands for food for a swelling population has led to mining out the inherent plant nutrients from the crop fields thereby fertility status of the soils severely declined in Bangladesh over the years [7,8]. Especially the K content is low to very low in the soil of Bangladesh [9]. Whereas potassium plays a vital role in plant life for fat and potent synthesis. It helps the formation of mechanical tissues in legumes and also helps in the formation of grain. Potassium plays a vital role in photosynthesis by directly increases growth, leaf area index and stomata opening [10]. Evidently, management of K has become now very important in sustaining or increasing crop yield. Therefore, this study was under taken to see the effect of different level of potassium on the growth, yield and physico-chemical properties of three garden pea (pisum sativum) varieties.

2. MATERIALS AND METHODS

The experiment was set-up at the Research Farm of Horticulture Department, Hajee Mohammad Danesh Science and Technology University, Dinajpur, Bangladesh during November 2015 to March 2016. The experimental site was at 25°39’ N latitude and 88°41’ E longitude with an elevation of 37.58 meter above the sea level. The experimental field was a medium high having sandy loam soil with pH 6.20. The experiment comprise three garden pea varieties viz: V₁ = IPSA Motorshuti-3, V₂ = Broad Bean Master piece and V₃ = BARI Motorshuti-1 and four levels of potassium viz. K₀ (Control), K₁ (25 kg ha⁻¹), K₂ (50 kg ha⁻¹) and K₃ (75 kg ha⁻¹), respectively. So the treatments combination was V₁K₀, V₁K₁, V₁K₂, V₁K₃, V₂K₀, V₂K₁, V₂K₂, V₂K₃, V₃K₀, V₃K₁, V₃K₂ and V₃K₃, respectively. The experiment was laid out in a randomized complete block design with three replications. Data were collected on different growth, yield and quality contributing characteristics i.e. plant height (cm), number of primary branches plant⁻¹, number of flowers plant⁻¹, number of pods plant⁻¹, number of seeds pod⁻¹, pod length (cm), pod breadth (mm),1000 seed weight (g), green pod yield (t ha⁻¹). Dried Seed were analyzed chemically for the following: dry matter, calcium, magnesium, potassium, vitamin C, vitamin A and total sugar content. Finally the data were analyzed by using MSTAT - C [11].

3. RESULTS AND DISCUSSION

3.1 Yield and Yield Attributing Characters

3.1.1 Plant height

The maximum plant height (161.50 cm) was observed in V₁ and the minimum plant height...
(101.58 cm) from V₂ (Table 1). It was evident that plant height significantly differed from variety to variety. Hossain et al. [12] stated that IPSA motorshuti-3 produced them highest plant. Rahman [13] observed a quite high degree of variability in plant height among different pea varieties. In case of the different level of potassium plant height increased with the increasing rates of potassium. The tallest plant (135.55 cm) was obtained in K₀ (Control) treatment (Table 2). Akhter et al. [14] reported that plant height increased with increasing rates of potassium. These results are in accordance with Leghari et al. [15], who found that increasing of potassium markedly increased the growth of peas. The interaction effect of different levels of potassium and varieties were statistically significant affect the plant height. The maximum plant height (166.67 cm) was obtained from the treatment of V₂K₂ treatment which was statistically similar with V₁K₂ while the minimum plant height (92.33 cm) was observed in treatment (Table 3).

3.1.2 Branches/plant

The highest number of primary branch plant⁻¹ (6.08) found V₁ whereas V₂ produced the lowest number of primary branch plant⁻¹ (5.33) (Table 1). Akhter [16] also noted differences in branch number in his study. In case of potassium the highest number of primary branches plant⁻¹ (6.67) was recorded from the treatment of K₂ and lowest (4.89) from K₀ treatment (Table 2). Patel et al. [17] stated that pea’s cv. “Arbel” significantly increased in number of branches plant⁻¹ when applied @ 40 kg K₂O ha⁻¹ [17]. However, the combined effect of variety and potassium on the number of primary branches plant⁻¹ was statistically non-significant (Table 3). Leghari et al. [15], showed their study that interaction effect of variety and potassium was insignificant.

3.1.3 Flowers/plant

It was observed that V₁ produced maximum (37.42) number of flowers plant⁻¹ and V₂ produced minimum (35.83) number of flowers plant⁻¹ (Table 1). It was evident that flowers/plant significantly differed from variety to variety. Hossain et al. [12] stated that IPSA motorshuti-3 produced highest number of flower plant⁻¹. In case of potassium the highest (38.33) number of flower plant⁻¹ was obtained in K₀ and the lowest (33.78) number of flower plant⁻¹ was obtained in K₀ (Control) treatment (Table 2). Interaction effect was statistically significant (1%). The maximum (39.33) number of flower plant⁻¹ was obtained from the treatment combination of V₁K₂ which was statistically similar with V₂K₂ while the minimum (30.00) number of flower plant⁻¹ was observed in V₃K₀ (Table 3).

3.1.4 Pods/plant

The number of pods plant⁻¹ ranged from 23.41 to 28.00. The highest number of pods plant⁻¹ (28.00) was recorded in V₁ and the lowest number of pods plant⁻¹ (23.41) was recorded in V₂ (Table 1). Alam et al. [3] obtained the highest number of pods plant⁻¹ in the variety. BARI Motorsuti-1 in a similar study. Such variation for number of pods per plant among various lentil varieties was also witnessed by early workers [18]. The effect of potassium is significantly differing for different treatment. The number of pods plant⁻¹ ranged from 22.56 to 27.22. The highest number of green pods plant⁻¹ (27.22) was found in the control treatment (Table 2). Akhter et al. [14] Stated that application of K₂O to the crop up to the dose of 100 kg ha⁻¹ had significant positive effect on the number of pods plant⁻¹. The number of pods plant⁻¹ ranged from 20.67 to 39.00. The maximum number of pods plant⁻¹ (39.00) was obtained under the treatment combination of V₁K₂ and the minimum number of pods plant⁻¹ (20.67) was obtained under the treatment combination of V₂K₀ treatment (Table 3).

3.1.5 Pod length (cm)

The length of pods ranged from 6.17 to 8.17 cm. The highest pod length (8.17 cm) was measured in the variety V₂ whereas the lowest pod length (6.17 cm) measured in V₁ (Table 1). Hossain et al. [12] observed similar result in different types of pea. In case of potassium, the highest pod length (7.86 cm) was recorded from the treatment of K₂ @ 50 kg K ha⁻¹ and the lowest pod length (6.88 cm) was found in the control treatment (0 kg K ha⁻¹) (Table 2). Kanaujia et al. [19] reported that increase in pod length of French bean with increasing K₂O up to 60 kg ha⁻¹. The combined effect of different variety and potassium on the pod length was significant (Table 3). The length of pods ranged from 5.50 cm to 8.53 cm. The highest pod length (8.53 cm) was recorded from the combined treatment of V₃K₂ (Broad Bean Masterpiece with 50 kg K ha⁻¹). The lowest pod length (5.50 cm) was found
in the combined treatment $V_1K_1$ (control treatment.)

3.1.6 Pod breadth

The pod breadth was significantly (1%) influenced by variety (Table 1). The widest pod (9.23 mm) was measured in the variety of $V_5$ and the lowest pod breadth (8.59 mm) was measured in $V_1$. Hossain et al. [12] observed similar result in different types of pea. In response to different level of potassium, the highest pod breadth (9.27 mm) was recorded from the treatment of $K_3$ @ 50 kg K$_2$O ha$^{-1}$ and the lowest pod breadth (8.80 mm) was found in the $K_0$ treatment (75 kg K$_2$O ha$^{-1}$) (Table 2). Kanaujia et al. [19] reported that increase in pod breadth of French bean with increasing K$_2$O up to 60 kg ha$^{-1}$. The combined effect of different variety and potassium on the pod breath was significant (1%) (Table 3). The length of pods ranged from 9.47 mm to 8.17 mm. The highest pod breadth (9.47 mm) was recorded from the combined treatment of $V_3K_2$ (Broad Bean Masterpiece with 50 kg K$_2$O ha$^{-1}$) which was statistically similar with $V_3K_1$. The lowest pod breadth (8.17 mm) was found in the combined treatment $V_1K_0$ (IPSA Motorshuti-3 with 75 kg K$_2$O ha$^{-1}$ treatment.)

3.1.7 Number of seeds pod$^{-1}$

The highest number of seeds pod$^{-1}$ (7.83) was recorded in $V_2$ and the lowest number of seeds pod$^{-1}$ (5.83) was in $V_1$. Similar results were reported by Silim et al. [20] in field pea. In case of different levels of potassium application, the maximum number of seeds pod$^{-1}$ (8.00) was found under the treatment $K_2$ and the lowest number of seed pod$^{-1}$ (6.33) was obtained in the control treatment. Sinha et al. [21] also reported that seeds pod$^{-1}$ increased with the application of 100 kg K$_2$O ha$^{-1}$. Combined effect of variety and potassium played a significant role on the number of seeds pod$^{-1}$ (Table 3). Treatment consisting of variety combined with potassium at higher level was statistically similar and recorded higher number of seeds pod$^{-1}$ compared to control. The maximum number of seeds pod$^{-1}$ (8.67) was found in the treatment combination $V_2K_2$ (Broad Bean Masterpiece with 50 kg K$_2$O ha$^{-1}$) and the minimum number of seeds pod$^{-1}$ (5.00) was found in the treatment combination $V_1K_0$.

3.1.8 1000- Seed weight (fresh mass)

The garden pea varieties differed widely in weight of 1000 (Fresh mass) seeds (Table 1). The green seed weight ranged from 265.75 to 302.92 g. The highest green seed weight (302.92 g) was recorded in $V_3$. The lowest green seed weight (265.75 g) was recorded in $V_1$. Alam et al. [3] obtained the highest 1000- seed weight (Fresh mass) in the variety BARI Motorsuti-1 in a similar study. The effect of different levels of potassium on 1000 green seed weight was non-significant (Table 2). The highest weight of 1000 green seed were found (289.89) in the treatment of $K_3$ and lowest weight of 1000 green seed were found (285.56) in the treatment $K_1$. Amjad et al. [22] stated that 1000 green seed weight was highest in the application of 100 kg K$_2$O ha$^{-1}$. Different varieties in association with different levels of potassium increased 1000 green seed weight as compared to control. The maximum green seed weight (305.00 g) was obtained under the treatment combination of $V_3K_2$ treatment and the minimum seed weight (255.67 g) was obtained under the treatment combination of $V_1K_1$ (Table 3).

3.1.9 Green pod yield (t ha$^{-1}$)

The green pod yield was significantly (1%) influenced by different varieties (Fig. 1). The green pod yield ranged from 11.73 to 7.74. The highest (11.73) pod yield was recorded in $V_3$. The lowest (7.74) pod yield was recorded in $V_1$. Alam et al. [3] obtained the highest green pod yield in the variety BARI Motorsuti-1. The green pod yield hectare$^{-1}$ was significantly (1%) influenced by different levels of potassium (Fig. 2). The highest (10.66 t ha$^{-1}$) green pod yield was obtained when the crop was fertilized with 50 kg K$_2$O ha$^{-1}$. The lowest (9.21 t ha$^{-1}$) green pod yield was found in control treatment where no potassium was applied. From these results it was found that potassium fertilizer increased vegetative growth as well as pod yield. All the treatments produced significantly higher pod yield over control treatment. Patel et al. (1998) stated that pea's cv. “Arbel” significantly increased in green pod yield when applied @ 40 kg K$_2$O ha$^{-1}$ [17]. Variety and potassium interact significantly on yield (Fig. 3). Different varieties in association with different levels of potassium increased green pod yield compare to control. The maximum green pod yield (12.78 t ha$^{-1}$) was obtained under the treatment combination of $V_3K_2$ (BARI Motorsuti-1 with 50 kg K$_2$O ha$^{-1}$) and the minimum green pod yield (7.48 t ha$^{-1}$) was obtained under the treatment combination of $V_1K_0$ (IPSA- Motorshuti-3 with 0 kg K$_2$O ha$^{-1}$) which was statistically similar with $V_1K_0$, $V_1K_2$ and $V_1K_3$ treatment (Table 3).
Table 1. Effect of variety on yield and yield contributing parameters of garden pea

| Treatments | Plant height (cm) | Branches / plant (no.) | Flowers / plant (no.) | Pods / plant (no.) | Pod length (cm) | Pod breadth (mm) | Seeds / pod (no.) | 1000–(fresh) seed wt. (gm) |
|------------|-------------------|------------------------|-----------------------|-------------------|-----------------|-----------------|-----------------|------------------|
| V₁         | 161.5 a           | 6.08 a                 | 35.83 c               | 28.00 a           | 6.17 b          | 8.59 c          | 5.83 b          | 265.75 b         |
| V₂         | 101.58 c          | 6.08 a                 | 36.67 b               | 23.42 b           | 8.17 a          | 9.11 b          | 7.83 a          | 295.50 b         |
| V₃         | 113 b             | 5.33 b                 | 37.42 a               | 24.08 b           | 8.03 b          | 9.23 a          | 7.67 a          | 302.92 a         |
| LSD        | 2.76              | 0.89                   | 2.27                  | 0.89              | 0.23            | 0.10            | 0.26            | 9.93             |
| CV%        | 3.31              | 5.22                   | 7.63                  | 4.22              | 0.36            | 4.49            | 4.16            |                  |

In a column, figure bearing same or no letter (S) do not differ significantly at 5% level of significant by DMRT.

Table 2. Effect of potassium on yield and yield contributing parameters of garden pea

| Treatments | Plant height (cm) | Branches /plant (no.) | Flowers / plant (no.) | Pods / plant (no.) | Pod length (cm) | Pod breadth (mm) | Seeds / pod (no.) | 1000–fresh seed wt. (gm) |
|------------|-------------------|------------------------|-----------------------|-------------------|-----------------|-----------------|-----------------|------------------|
| K₀         | 116.89 c          | 4.89 d                 | 33.78 b               | 25.56 c           | 6.88 c          | 8.81 c          | 6.33 d          | 287.00           |
| K₁         | 122.44 bc         | 6.11 b                 | 36.22 ab              | 27.53 b           | 7.70 a          | 9.04 b          | 7.33 b          | 285.56           |
| K₂         | 126.56 b          | 6.67 a                 | 38.33 a               | 27.22 a           | 7.86 a          | 9.27 a          | 8.00 a          | 289.78           |
| K₃         | 135.55 a          | 5.67 c                 | 35.56 b               | 25.56 b           | 7.39 b          | 8.80 c          | 6.78 c          | 289.89           |
| LSD        | 5.52              | 0.29                   | 2.26                  | 1.02              | 0.27            | 0.11            | 0.31            | 11.47            |
| CV%        | 3.31              | 5.22                   | 7.63                  | 4.22              | 1.36            | 4.49            | 4.16            |                  |

In a column, figure bearing same or no letter (S) do not differ significantly at 5% level of significant by DMRT.

Table 3. Interaction effect of Variety and Potassium on yield and yield contributing parameters of garden pea

| Treatments | Plant height (cm) | Branches /plant (no.) | Flowers / plant (no.) | Pods / plant (no.) | Pod length (cm) | Pod breadth (mm) | Seeds /pod (no.) | 1000–fresh Seed wt. (gm) |
|------------|-------------------|------------------------|-----------------------|-------------------|-----------------|-----------------|-----------------|------------------|
| V₁K₀       | 153.33 ab         | 5.00                   | 37.00bc               | 25.67 bc          | 5.50 g          | 8.47f           | 5.00 g          | 285.33 ab         |
| V₁K₁       | 160 a             | 6.33                   | 38.00ab               | 27.00 ab          | 6.53 e          | 8.73e           | 6.00 f          | 255.67 c         |
| V₁K₂       | 166.67 a          | 7.00                   | 39.33a                | 39.00 a           | 6.63 e          | 9.00d           | 7.00 e          | 260.00 c         |
| V₁K₃       | 166.00 a          | 6.00                   | 37.00ab               | 29.33 a           | 6.00 f          | 8.17g           | 5.33 g          | 262.00 c         |
| V₂K₀       | 92.33 c           | 5.00                   | 34.33abc              | 21.33 de          | 7.77 cd         | 9.07cd          | 7.00 e          | 272.67bc          |
| V₂K₁       | 104 c             | 6.33                   | 37.00ab               | 24.00b-d          | 8.37 ab         | 9.10b-d         | 8.00 bc         | 300.00 a         |
| V₂K₂       | 107.67 c          | 7.00                   | 39.00a                | 25.67 bc          | 8.53 a          | 9.33a           | 8.67 a          | 305.00 a         |
| V₂K₃       | 102.33 c          | 6.00                   | 36.33ab               | 22.67 c-e         | 8.00 bc         | 8.97d           | 7.67 cd         | 304.33 a         |
| Treatments | Plant height /plant (cm) | Branches /plant (no.) | Flowers / plant (no.) | Pods / Plant (no) | Pod length (cm) | Pod breadth (mm) | Seeds /pod (no.) | 1000 –fresh Seed wt. (gm) |
|------------|--------------------------|-----------------------|-----------------------|------------------|----------------|----------------|----------------|------------------------|
| V₃K₀       | 105 c                    | 4.67                  | 30.00 c               | 20.67 e          | 7.37 d         | 8.90 de        | 7.00 e         | 303.00 a               |
| V₃K₁       | 103.33 c                 | 5.67                  | 33.67 bc              | 25.00 bc         | 8.20 a-c       | 9.30 ab        | 8.00 bc        | 301.00 a               |
| V₃K₂       | 105 c                    | 6.00                  | 36.67 ab              | 26.00 b          | 8.40 ab        | 9.47 a         | 8.33 ab        | 304.33 a               |
| V₃K₃       | 138.33 c                 | 5.00                  | 33.33 bc              | 24.67 bc         | 8.17 a-c       | 9.27 abc       | 7.33 de        | 303.33 a               |
| LSD        | 13.69                    | 0.51                  | 4.55                  | 1.76             | 0.46           | 0.20           | 0.53           | 19.87                  |
| CV%        | 8.23                     | 5.22                  | 7.63                  | 4.22             | 3.75           | 1.36           | 4.49           | 4.16                   |

In a column, figure bearing same or no letter (S) do not differ significantly at 5% level of significant by DMRT
### Table 4. Effect of variety on physico-chemical properties of garden pea

| Treatments | Dry matter (%) | Ca (%) | Mg (%) | K (%) | Vit-A (mg/kg) | Vit-C (mg/kg) | Total sugar (%) |
|------------|----------------|--------|--------|-------|---------------|---------------|-----------------|
| V₁         | 35.05 a        | 0.18b  | 0.24 b | 1.47 b| 0.63 c        | 101.33b       | 14.14 b         |
| V₂         | 29.53 b        | 0.18 b | 0.29 a | 1.69 a| 0.67 b        | 124.67 a      | 15.30 a         |
| V₃         | 30.80 b        | 0.19a  | 0.24 b | 1.47 b| 0.83 a        | 75.76c        | 15.40 a         |
| LSD        | 2.01           | 0.009  | 0.008  | 0.181 | 0.02          | 5.39          | 0.182           |
| CV%        | 7.65           | 3.71   | 3.77   | 3.11  | 2.31          | 4.47          | 3.58            |

In a column, figure bearing same or no letter (S) do not differ significantly at 5% level of significant by DMRT

### 3.2 Physico-Chemical Properties

Different Physico-chemical properties, of garden pea was significantly (1%) influenced by variety (Table 4). The highest amount of dry matter (35.05%) content was found in V₁, whereas the maximum Potassium (1.69), Magnesium (0.29) and Vit-C (124.67) found in V₂ but the highest amount Calcium (124.67), Vit-A (0.83) and total sugar (15.40) were found in V₃. In case of different levels of potassium application, the highest dry matter content of pea (33.51%) was
4. CONCLUSION

In respect of different growth, yield attributing and physico-chemical parameters. So it can be concluded that variety BARI Motorsuti-1 with potassium at the rate of 50 kg ha$^{-1}$ is a promising practice for the highest yield of garden pea.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Table 5. Effect of potassium on physico-chemical properties of garden pea

| Treatments | Dry Matter (%) | Ca (%) | Mg (%) | K (%) | Vit-A (mg/kg) | Vit-C (mg/kg) | Total Sugar (%) |
|------------|----------------|--------|--------|-------|---------------|---------------|----------------|
| $K_0$      | 30.73 b        | 0.19 b | 0.25 b | 1.44 b | 0.62 d        | 101.33        | 14.14 c        |
| $K_1$      | 33.51 a        | 0.18 c | 0.26 a | 1.58 a | 0.75 b        | 100.33        | 15.30 a        |
| $K_2$      | 32.40 ab       | 0.20 a | 0.26 a | 1.58 a | 0.80 a        | 101.33        | 15.40 a        |
| $K_3$      | 30.55 b        | 0.16 d | 0.26 a | 1.44 b | 0.69 c        | 100.33        |                |
| LSD        | 2.32           | 0.001  | 0.001  | 0.11  | 0.03          | 5.52          | 0.182          |
| CV%        | 7.65           | 3.71   | 3.77   | 3.11  | 2.31          | 3.31          | 3.58           |

In a column, figure bearing same or no letter (S) do not differ significantly at 5% level of significant by DMRT.

Table 6. Interaction effect of variety and potassium on physico-chemical properties of garden pea

| Treatments | Dry Matter (%) | Ca (%) | Mg (%) | K (%) | Vit-A (mg/kg) | Vit-C (mg/kg) | Total Sugar (%) |
|------------|----------------|--------|--------|-------|---------------|---------------|----------------|
| $V_1K_0$   | 33.30 a-c      | 0.20 a | 0.24 c | 1.50 b | 0.58 g        | 101.35b       | 14.98 c        |
| $V_1K_1$   | 37.30 a        | 0.16 c | 0.24 c | 1.50 b | 0.64 e        | 101.35a       | 15.30 a        |
| $V_1K_2$   | 36.73 ab       | 0.20 a | 0.24 c | 1.50 b | 0.65 e        | 101.35b       | 15.40 a        |
| $V_1K_3$   | 32.90 bc       | 0.16 c | 0.24 c | 1.39 b | 0.65 e        | 101.35b       | 15.23 a        |
| $V_2K_0$   | 29.76 cd       | 0.17 b | 0.27 b | 1.41 b | 0.62 f        | 124.67a       | 13.59 f        |
| $V_2K_1$   | 31.80 cd       | 0.20 a | 0.29 a | 1.75 a | 0.68 d        | 124.67a       | 14.57 d        |
| $V_2K_2$   | 29.37 cd       | 0.20 a | 0.29 a | 1.75 a | 0.69 d        | 124.67a       | 14.98 c        |
| $V_2K_3$   | 27.20 b        | 0.16 c | 0.29 a | 1.52 b | 0.69 d        | 124.67a       | 14.19 e        |
| $V_3K_0$   | 29.13 cd       | 0.20 a | 0.24 c | 1.48 b | 0.65 e        | 75.00c         | 14.98 c        |
| $V_3K_1$   | 31.42 cd       | 0.20 a | 0.24 c | 1.48 b | 0.92 b        | 75.00c         | 14.91 b        |
| $V_3K_2$   | 31.10 cd       | 0.20 a | 0.24 c | 1.48 b | 1.03 a        | 78.00c         | 15.41 a        |
| $V_3K_3$   | 31.56 cd       | 0.16 c | 0.24 c | 1.42 b | 0.74 c        | 75.00c         | 14.10 e        |
| LSD        | 4.03           | 0.01   | 0.166  | 0.1816| 0.524         | 5.52          | 0.182          |
| CV%        | 7.65           | 3.71   | 3.77   | 3.11  | 2.31          | 3.31          | 3.58           |

In a column, figure bearing same or no letter (S) do not differ significantly at 5% level of significant by DMRT.

recorded from the treatment of $K$, whereas the Calcium (0.20), Potassium (1.58), Magnesium (0.26) Vit.-A (0.80), Vit-C (101.33) and total sugar content(15.40) found in higher in Treatment $K_2$ (Table 5). The combined effect of variety and potassium levels on the dry matter content of pea was statistically significant, the maximum dry matter content of pea (37.30%) was obtained in treatments combination of $V_1K_1$ and the minimum dry matter content of pea (27.20%) was obtained under the treatment combination of $V_2K_3$(Table 6). The maximum Calcium (0.20), Potassium (1.75), Magnesium (0.29) and Vit-C (124.67) was found from $V_2K_2$ whereas Vit.-A (1.03) and total Sugar content (15.41) in $V_3K_2$ treatment combination (Table 6).
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