Testing of PSAP – "Potassium salt of active phosphorus" a research molecule on sugarcane for Two crop season (2019-20 & 2020-21)

Directorate of Research

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Sugarcane is one of the major cash crop of India which is the home land of sugarcane cultivation and sugar production. Sugarcane cultivation and development of sugar industry runs parallel to the growth of human civilization and is as old as agriculture. In the present scenario, sugarcane and sugar continue to be important for Indian rural economy. Sugarcane (*Saccharum officinarum L.)* is the main sources of sugar in India and holds a prominent position as a cash crop.India is the world's largest consumer and the second largest producer of sugar. Cultivation of sugarcane in India dates back to the Vedic period. The earliest mention of sugarcane cultivation is found in Indian writings of the period 1400 to 1000 B.C. It is now widely accepted that India is the original home of *Saccharum* species. About 6 million sugarcane farmers and large number of agricultural labourers are involved in sugarcane cultivation and associated activities, constituting 7.5 per cent of rural population. Besides, the industry provides employment to 5 lakh skilled and semi-skilled workers in rural areas. India is one of the largest sugarcane producers in the world, producing around 300 million tonnes of cane per annum. Sugarcane productivity in India is around 67 t/ha. India also happens to be the second largest sugar producing country (after Brazil), contributing 15 per cent to white crystal sugar production. India is the only country that produces plantation white sugar unlike other countries that produce raw or refined sugar or both. "India is also largest consumer of sugar in the world and the Indian sugar industry is the second largest agro-industry located in urban India. With 526 operating sugar mills in different parts of the country, having a crushing capacity of 4125 tonnes per day, the Indian sugar industry has been a focal point for socio-economic development in the rural areas by mobilizing rural resources, generating employment and higher income, transport and communication facilities. It also produces ethanol, an eco-friendly and renewable energy for blending with petrol.

In India, sugarcane area and production are mainly concentrated in the states of Uttar Pradesh, Maharashtra, Tamil Nadu and Karnataka. Tamil Nadu is registered the highest yield in sugarcane production in India. Even though Uttar Pradesh is the largest producer of sugarcane in India. Although yield rate is lower when compared with all India average.In Tamil Nadu, sugarcane is cultivated mainly in irrigated condition the area under sugarcane is increasing over years in Tamilnadu. The production of sugarcane is concentrated mainly in the districts of Villupuram, Cuddalore, Erode, Pudukotai, Nammakal, Salem, Trichy and Coimbatore. The yield rate is higher in Nammakal and Erode. The sugarcane is preferred by the farmers as it gives remunerative price to the farmers. Sugarcane is rotated intercropped with other crops and one or two ratooning is practiced in major parts of the State.

The tropical sugarcane region consists of sugarcane agro climatic zone 4 (peninsular zone) and 5(Coastal zone) which includes the states of Maharashtra, Andhra Pradesh, Tamil Nadu, Karnataka, Gujarat, Madhya Pradesh, Goa, Pondicherry and Kerala.Maharashtra is the major sugarcane growing state covering about 9.4 lakh ha area with production of 61.32 Million ton, whereas the productivity of Tamil Nadu is highest in tropical zones. Uttar Pradesh is the highest sugarcane producing State in sub tropical zone having area about 22.77 Lakh ha with the production of 135.64 Million Ton cane.

Around 55 per cent of total cane area in the country is in the sub-tropics. U.P, Bihar, Haryana and Punjab comes under this region.Haryana has highest productivity of sugarcane in Sub tropical zone. It is expecting a better yield in 2020-21 due to further increase in area under the high yielding cane variety Co 0238. That will increase the sugarcane production and availability for crushing to sugar mills.

Sugarcane is able to grow over a prolonged season. Under warm humid conditions, it can continue its growth, unless terminated by flowering. Temperatures above 50° C arrest its growth while those below 20° C slow it down markedly and severe frost proves fatal. The crop does best in the tropical regions receiving a rainfall of 750-1200mm. For ripening, it needs a cool, dry season; but where rainfall is too heavy and prolonged, the quality of the juice tends

to be low, and where the weather remains comparatively. The different critical stages are germination, tillering, early growth, active growth and elongation. Optimum temperature for sprouting (germination) of stem cuttings is 32° to 38°c. It slows down below 25°, reaches plateau between 30°-34°. Temperatures above 38° reduce the rate of photosynthesis and increase respiration. For ripening, however, relatively low temperatures in the range of 12° to 14° are desirable.

The sugarcane productivity and juice quality are profoundly influenced by weather conditions prevailing during the various crop-growth sub-periods. Sugar recovery is highest when the weather is dry with low humidity; bright sunshine hours, cooler nights with wide diurnal variations and very little rainfall during ripening period. These conditions favor high sugar accumulation. The climatic conditions like very high temperature or very low temperature deteriorate the juice quality and thus affecting the sugar quality. Favorable climate like warm and humid climate also favor the insect pests and diseases, which cause much damage to the quality and yield of its juice and finally sucrose contents.

Studies have shown the main sugarcane nutrient requirements are nitrogen, phosphorus, magnesium, sulfur and silicon. The exact amounts of these nutrients depend upon availability in

soil, but at least it's a place to start. The soil pH will affect the plant's ability to absorb and added nutrients and must be 6.0 to 6.5 for optimal results. Other factors will affect the exact amount of nutrient absorbed, such as heavy soil, which can minimize uptake of nitrogen. If all factors are considered and amended, a general guideline on feeding sugarcane plants will help develop an annual fertilizer program. While two main macronutrients are very necessary for sugarcane production, potassium is not an issue of concern. As a grass, the number one nutrient necessary when fertilizing sugarcane is nitrogen. Just as with your lawn, sugarcane is a heavy nitrogen user. Nitrogen should be applied at 27 to 45 kilos/acre. The lower amount is for lighter soil while the higher amount is in heavy soils. Phosphorus is the other macronutrient sugarcane fertilizer should contain. The recommended amount is 23 kilo per acre. A soil test to pinpoint the actual rate is essential because excess phosphorus can cause rust.

For sugar synthesis and its translocation to the storage tissue, **potassium is highly** important. **Potassium** gives resistance to sugarcane against pests and disease attack and lodging and deficiency causes; Yellow-orange chlorosis of leaf borders & tips, Stalks slender, Older leaves brown or "fired", Spindles distorted producing "bunched top" or "fan' appearance. It has a balancing effect on both nitrogen and phosphorus.Deficiency of phosphorus causes Red and purple discoloration of tips and margins, Slender leaves, Short sand slender stalks and Poor or no tillering. It helps sugarcane under moisture stress by maintaining cell turgidity. To overcome the constrains of Phosphorus and Potash, present research project entitled "Testing of PSAP – "Potassium salt of active phosphorus" a research molecule on sugarcane for 2019-20 crop season " was proposed to be under taken at Crop Research Station Nawabganj, Chandra shekher Azad University of Agriculture & Technology, Kanpur with following objectives,

- To study the effect of PSAP on Sugarcane Quality and Yield..
- To find best recommendations of cost effective treatments based on study.
- To study the Soil Nutrients status as well as other soil parameters before and after experiments Studying the impact of PSAP on environment

Treatments:

S.No.	Treatment
1.	**T1** – 100 % R.D.F. (180:80:80)-Control
2.	**T2-** T1 + 5.0 kg PSAP /acre, (4 Foliar spray -60, 75, 90 & 120 D.A.P.)
3.	**T3-** T1 + 5.0 kg PSAP /acre (3 Foliar spray -60, 90 & 120 D.A.P.)
4.	**T4-** 50 % R.D.F. of P & K (180:40:40)-Control
5.	**T5-** T4 + 5.0 kg PSAP /acre (4 Foliar spray -60, 75, 90 & 120 D.A.P.)
6.	**T6-** T4 + 5.0 kg PSAP /acre (3 Foliar spray- 70 & 120 D.A.P.)

Details of Treatments

S.No. Treatment

1. **T1** **100 % R.D.F. (180:80:80)-Control**
2. **T2** **T1 + 5.0 kg PSAP /acre**
   - Four Spray @ 0.6.5 % i.e. 6.5gm PSAP / Liter of water i.e. 200 gm PSAP dissolve in 30 liter water and spray from 60 to 120 days after planting at 15 day In 1ST spray apply 150 Liters P SAP solution per Acre
     - In 1ST spray apply 165 Liters P SAP solution per Acre
     - In 2nd Spray Apply 180 Liter PSAP solution per Acre
     - In 3rd Spray apply 210 Liters PSAP solution per Acre.
     - In 4th Spray apply 240 Liters PSAP solution per Acre.
3. **T3** **T1 + 5.0 kg PSAP /acre (3 Foliar spray -60, 90 & 120 D.A.P.)**
   - Three Sprays Through foliar @ 1.33 % i.e. gram PSAP/litre of water i.e. 200 PSAP dissolve in 15 litre water & spray from 70 to 120 days after planting @ 30 days interval
     - In 1ST spray apply 165 Liters P SAP solution per Acre
     - In 2nd Spray Apply 210 Liter PSAP solution per Acre
     - In 3rd Spray apply 210 Liters PSAP solution per Acre
4. **T4** **50 % R.D.F. of P & K (180:40:40)-Control II**
5. **T5** **T4 + 5.0 kg PSAP /acre (4 Foliar spray -60, 75, 90 & 120 D.A.P.)**
   - Spray @ 0.6.5 % i.e. 6.5gm PSAP / Liter of water i.e. 200 gm PSAP dissolve in 30 liter water and spray from 60 to 120 days after planting at 15 day
     - In 1ST spray apply 150 Liters P SAP solution per Acre
     - In 2nd Spray Apply 180 Liter PSAP solution per Acre
     - In 3rd Spray apply 210 Liters PSAP solution per Acre.
     - In 4th Spray apply 240 Liters PSAP solution per Acre
6. **T6** **T4 + 5.0 kg PSAP /acre (3 Foliar spray- 70 & 120 D.A.P.)**
   - Three Sprays Through foliar @ 1.33 % i.e. 8 gram PSAP/litre of water i.e. 200 PSAP dissolve in 15 litre water & spray from 70 to 120 days after planting @ 30 days interval
     - In 1ST spray apply 165 Liters P SAP solution per Acre
     - In 2nd Spray Apply 210 Liter PSAP solution per Acre
     - In 3rd Spray apply 210 Liters PSAP solutions per Acre.

Design of Experiment: Randomized Block Design (RBD)

1.	**No. of treatments**	:	6
2.	**No. of replications**	:	**3**
3.	**Total No. of Plots**	:	6x3=18
4.	**Plot size**	:	5X5m =25 m2
5.	**Net area**	:	450m2
6.	**Variety**	:	Co-0238

Observation to be recorded:

A. Yield Parameters:

1. Number of Sugarcane per Plot
2. Average Cane Length
3. Average No. of Internodes
4. Average Cane Diameter
5. Average Cane Weight
6. Whole Plot Cane Weight
7. Yield (T/ha)

B. Quality Parameters:

1. BRIX %
2. Sucrose
3. Juice Purity
4. CCS %
5. RS%

C. Soil nutrients:

Soil Parameters before and after trials

Results & Discussion

The mean analyzed data pertaining to effects of various treatments on sugarcane yield and quality parameters are presented in table 1 and 2 respectively. The results are described as under.

Table 1: Effect of PSAP on sugarcane yield and yield attributing parameters

Treatments	Number of Sugarcane per Plot	Cane Length (cm)	Number of inter nodes 10 cane	Cane Diameter (cm)	Cane weight (gm)	Cane yield (t/ha)
T1- 100 % R.D.F. (180:80:80)-Control	130.67	235.00	24.20	8.73	1311.33	68.60
T2- 100 % R.D.F. (180:80:80) + 12.5kg/ha of PSAP (4 Foliar spray- 60, 75, 90 & 120 D.A.P.)	162.33	279.00	26.67	9.90	1585.67	102.90
T3- 100 % R.D.F. (180:80:80) + 12.5kg/ha of PSAP (3 Foliar spray- 60, 90 & 120 D.A.P.)	151.33	256.33	25.20	9.13	1519.83	92.00
T4- 50 % R.D.F. of P & K (180:40:40)-Control	127.00	216.00	21.57	8.10	1203.17	61.20
T5- 50 % R.D.F. of P & K (180:40:40) + 12.5kg/ha of PSAP (4 Foliar spray - 60, 75, 90 & 120 D.A.P.)	155.67	237.50	23.83	8.80	1368.17	85.20
T6- 50 % R.D.F. of P & K (180:40:40) + 12.5kg/ha of PSAP (3 Foliar spray- 60, 90 & 120 D.A.P.)	153.00	229.00	23.43	8.50	1278.50	79.50
S.E.	3.76	5.22	0.80	0.12	54.69	6.01
C.D. %	10.38	14.42	2.21	0.29	150.95	16.59

Table 2 :Effect of PSAP on sugarcane yield and yield attributing parameters 2ND year

Treatments	Number of Sugarcane per Plot	Cane Length (cm)	Number of inter nodes/ cane	Cane Diameter (cm)	Cane weight (gm)	Cane yield (t/ha)
T1- 100 % R.D.F. (180:80:80)-Control	135.70	239.40	27.10	9.95	1356.25	70.76
T2- 100 % R.D.F. (180:80:80) + 12.5kg/ha of PSAP (4 Foliar spray- 60, 75, 90 & 120 D.A.P.)	167.30	285.10	33.63	11.10	1650.25	107.65
T3- 100 % R.D.F. (180:80:80) + 12.5kg/ha of PSAP (3 Foliar spray- 60, 90 & 120 D.A.P.)	158.20	265.40	33.30	11.00	1633.30	98.10
T4- 50 % R.D.F. of P & K (180:40:40)-Control	130.09	222.10	25.60	9.90	1245.15	65.35
T5- 50 % R.D.F. of P & K (180:40:40) + 12.5kg/ha of PSAP (4 Foliar spray - 60, 75, 90 & 120 D.A.P.)	165.10	255.60	28.40	9.90	1430.25	92.10
T6- 50 % R.D.F. of P & K (180:40:40) + 12.5kg/ha of PSAP (3 Foliar spray- 60, 90 & 120 D.A.P.)	162.30	235.15	28.15	9.80	1335.46	81.15
S.E.	1.5	1.1	2.2	1.2	97.6	3.2
C.D. %	3.34	2.45	4.90	2.67	217.45	7.13

Yield Parameters

No. of Sugarcanes per plot:

During 1st year of experiment maximum number of sugarcane per plant was recorded in **T_2**- 100 % R.D.F. (180:80:80) + 12.5kg/ha of PSAP) **162.33** followed by **T_5**- 50 % R.D.F. of P & K (180:40:40) + 12.5kg/ha of PSAP) **155.67** and **T_6**-50 % R.D.F. of P & K (180:40:40) + 12.5kg/ha of PSAP (3 Foliar spray- 60, 90 & 120 D.A.P.) **153.00** respectively.

During 2nd year experiments number of Sugarcane per plot revealed that maximum canes/plot in the cane of 167.30 was recorded in **T_2**. 100 % R.D.F. (180:80:80) + 12.5kg/ha of PSAP) followed by **T_5**. 50 % R.D.F. of P & K (180:40:40) + 12.5kg/ha of PSAP) 165.10 canes and **T_6**-50 % R.D.F. of P & K (180:40:40) + 12.5kg/ha of PSAP (3 Foliar spray- 60, 90 & 120 D.A.P.) 162.30 canes respectively. All the treatments differ significantly and superior over control.

Cane Length (cm):

The mean data on cane length in cm as observed in various treatments (table-1) revealed that it was maximum in the tune of **279.00** cm in **T_2**- 100 % R.D.F. (180:80:80) + 12.5kg/ha of PSAP) followed by **T_3**- 100 % R.D.F. (180:80:80)+ 12.5kg/ha of PSAP) **256.33 cm**. Lowest cane length was noted in **T_4**-50 % R.D.F. of P & K (180:40:40)-Control) **216.00 cm** and **T_1**- 100 % R.D.F. (180:80:80)-Control) **235.00 cm**.

During 2nd year in case of cane length, all the treatments differed significantly and numerically as well **T_2**. 100 % R.D.F. (180:80:80) + 12.5kg/ha of PSAP) recorded maximum cane length (285.10cm.) followed by **T_3**-100 % R.D.F. (180:80:80)+ 12.5kg/ha of PSAP) 265.40cm. and **T_5**. 50 % R.D.F. of P & K (180:40:40) + 12.5kg/ha of PSAP) 255.60cm. respectively. **T_6**- 50 % R.D.F. of P & K (180:40:40) + 12.5kg/ha of PSAP (3 Foliar spray- 60, 90 & 120 D.A.P.) recorded lowest cane length (235.15cm.) while **T_1**.100 % R.D.F. (180:80:80)- (control) showed 239.40cm cane length.

Number of Internodes/ cane:

Statistically significant higher number of internodes per cane was recorded in **T2** (100 % R.D.F. (180:80:80) + 12.5kg/ha of PSAP) with 4 Foliar spray- 60, 75, 90 & 120 days after planting **26.67** over the minimum as recorded in **T4**-50 % R.D.F. of P & K (180:40:40)-Control) **21.57**. Other treatments showed non-significant variations in respect to this.

No. of internodes/cane indicated that **T_2**.100 % R.D.F. (180:80:80) + 12.5kg/ha of PSAP) showed maximum internodes (33.63) followed by **T_3**.100 % R.D.F. (180:80:80)+ 12.5kg/ha of PSAP) 33.30 and **T_5**.50 % R.D.F. of P & K (180:40:40) + 12.5kg/ha of PSAP) 28.40 respectively.

Cane diameter:

The cane diameter was also noted significantly superior in **T_2**.100 % R.D.F. (180:80:80) + 12.5kg/ha of PSAP) with 4 Foliar spray- 60, 75, 90 & 120 days after planting **(9.90cm)** closely followed by **T_3**- 3 Foliar spray- 60, 90 & 120 D.A.P.) **9.13 cm** and **T_5**- 50 % R.D.F. of P & K (180:40:40) + 12.5kg/ha of PSAP with 4 Foliar spray - 60, 75, 90 & 120 days after planting **(8.80 cm).**

During 2nd year of experiment cane diameter between treatments were also differed significantly. Higher cane diameter was noted in **T_2**.100 % R.D.F. (180:80:80) + 12.5kg/ha of PSAP) with 4 Foliar spray- 60, 75, 90 & 120 days after planting (11.10cm.) followed by T_3 (11.00cm.) and **T_5**- 50 % R.D.F. of P & K (180:40:40) + 12.5kg/ha of PSAP with 4 Foliar spray - 60, 75, 90 & 120 days after planting 10.00 cm. respectively. While it was only 9.95 cm in control plot.

Cane weight (g):

Numerically highest cane weight was noted in T_2.100 % R.D.F. (180:80:80) + 12.5kg/ha of PSAP) with 4 Foliar spray- 60, 75, 90 & 120 days after planting **(1585.67gm)** which was statistically at par with T_3- 3 Foliar spray- 60, 90 & 120 days after planting **(1519.83**gm). However, both were significantly higher over control and rest of the treatments.

Cane weight in g revealed that in combination T_2.100 % R.D.F. (180:80:80) + 12.5kg/ha of PSAP) with 4 Foliar spray- 60, 75, 90 & 120 days after planting highest cane weight in the tune of 160.25 g followed by T_3- 3 Foliar spray- 60, 90 & 120 days after planting (1633.30g) and T_5- 50 % R.D.F. of P & K (180:40:40) + 12.5kg/ha of PSAP with 4 Foliar spray - 60, 75, 90 & 120 days after planting (1430.25g) respectively. It was 1356.25 gm in control plot i.e. T_1.100 % R.D.F. (180:80:80)- (control)

Cane Yield (t/ha): Significantly highest cane yield per hectare as **102.90** tone was noted in T2 (100 % R.D.F. (180:80:80) + 12.5kg/ha of PSAP) with 4 Foliar spray- 60, 75, 90 & 120 days after planting followed by T3- 100 % R.D.F. (180:80:80) + 12.5kg/ha of PSAP with 3 Foliar spray- 60, 90 & 120 days after planting **(92.00 t)** and T5- 50 % R.D.F. of P & K (180:40:40) + 12.5kg/ha of PSAP with 4 Foliar spray - 60, 75, 90 & 120 days after planting **(85.20 t)/ha.**

Cane yield t/ha also followed the similar pattern. Maximum cane yield was recorded in T_2.100 % R.D.F. (180:80:80) + 12.5kg/ha of PSAP) with 4 Foliar spray- 60, 75, 90 & 120 days after planting (107.65t/ha) followed by T_3 (98.10t/ha) and T_5- 50 % R.D.F. of P & K (180:40:40) + 12.5kg/ha of PSAP with 4 Foliar spray - 60, 75, 90 & 120 days after planting (92.10t/ha) respectively.

Sucrose: The sucrose content was numerically higher in **T_6-** 50 % R.D.F. of P & K (180:40:40) + 12.5kg/ha of PSAP with 3 Foliar spray- 60, 90 days after planting **(15.65)** and **T_3-** 100 % R.D.F. (180:80:80) + 12.5kg/ha of PSAP With 3 Foliar spray- 60, 90 & 120 days after planting **(15.61).** It was lowest in **T_4-** 50 % R.D.F. of P & K (180:40:40)-Control (**13.38**).

During 2nd year the Sucrose content in juice ranged between 19.09% (**T_5-**50 % R.D.F. of P & K (180:40:40) + 12.5kg/ha of PSAP (4 Foliar spray - 60, 75, 90 & 120 D.A.P.)) to 20.35% (**T_6-**50 % R.D.F. of P & K (180:40:40) + 12.5kg/ha of PSAP (3 Foliar spray- 60, 90 & 120 D.A.P.)). **T_6** showed maximum and significantly higher Sucrose content followed by **T_2-** 100 % R.D.F. (180:80:80) + 12.5kg/ha of PSAP (4 Foliar spray- 60, 75, 90 & 120 D.A.P.) (19.91%) and **T_3-**100 % R.D.F. (180:80:80) + 12.5kg/ha of PSAP (3 Foliar spray- 60, 90 & 120 D.A.P.) 19.43% respectively. **T_5-**50 % R.D.F. of P & K (180:40:40) + 12.5kg/ha of PSAP (4 Foliar spray - 60, 75, 90 & 120 D.A.P.) 19.09% showed minimum Sucrose level.

Purity: The purity in quality was highest in **T_6-**50 % R.D.F. of P & K (180:40:40) + 12.5kg/ha of PSAP with 3 Foliar spray- 60, 90 & 120 days after planting 78.79 followed by **T_5-** 50 % R.D.F. of P & K (180:40:40) + 12.5kg/ha of PSAP 78.1 and in **T_3** 100 % R.D.F. (180:80:80) + 12.5kg/ha of PSAP (3 Foliar spray- 60, 90 & 120 D.A.P.) 76.47 respectively.

During 2nd year the juice purity indicated that **T_6-**50 % R.D.F. of P & K (180:40:40) + 12.5kg/ha of PSAP with 3 Foliar spray- 60, 90 & 120 days after planting **91.79%** was highest purity value while it was minimum in **T_2-** 100 % R.D.F. (180:80:80) + 12.5kg/ha of PSAP (4 Foliar spray- 60, 75, 90 & 120 D.A.P.) **91.27%.** All these treatments differ significantly from control, The **T_1-** 100 % R.D.F. (180:80:80)-Control which had **91.41**% purity.

CCS%: The CCS % as noted and presented in above Table no. 2 indicated that it was highest in **T_6** -50 % R.D.F. of P & K (180:40:40) + 12.5kg/ha of PSAP with 3 Foliar spray- 60, 90 days after planting **10.20** closely followed by **T_5**- 50 % R.D.F. of P & K (180:40:40) + 12.5kg/ha of PSAP **9.57** and **T_3 10.05** per cent respectively while it was lowest in **T_4-**50 % R.D.F. of P & K (180:40:40)-Control **7.92** and **T_1.**100 % R.D.F. (180:80:80)-Control **9.02** per cent.

During 2nd year the commercial cane sugar (CCS %) as calculated as CCS %={ sucrose%- (Brix%- Sucrose %)*0.4}*0.74 where, 0.4 is multiplication factor and 0.74 is crusher factor. In the experiment conducted during 2nd year it varied between13.42 to 14.33. All the treatments had significantly higher values except **T_5-**50 % R.D.F. of P & K (180:40:40) + 12.5kg/ha of PSAP 13.42, **T_4-**50 % R.D.F. of P & K (180:40:40)-Control 13.49. Highest CCS was noted in T6 (14.33) while it was lowest in T5 (13.42) and at par with control.

RS%: Highest RS per cent was noted in **T_6** -50 % R.D.F. of P & K (180:40:40) + 12.5kg/ha of PSAP with 3 Foliar spray- 60, 90 & 120 days after planting **(0.38%)** followed byT5 (0.32%) and **T_1.**100 % R.D.F. (180:80:80)-Control (0.31%) per cent. It was lowest in **T_4**- 50 % R.D.F. of P & K (180:40:40)-Control (0.27%) per cent.

Conclusion:

An experiment consisting six treatments namely T1- 100 % R.D.F. (180:80:80)-Control ,T2- 100 % R.D.F. (180:80:80) + 12.5kg/ha of PSAP (4 Foliar spray- 60, 75, 90 & 120 D.A.P.) ,T3- 100 % R.D.F. (180:80:80) + 12.5kg/ha of PSAP (3 Foliar spray- 60, 90 & 120 D.A.P.) ,T4- 50 % R.D.F. of P & K (180:40:40)-Control ,T5- 50 % R.D.F. of P & K (180:40:40) + 12.5kg/ha of PSAP (4 Foliar spray - 60, 75, 90 & 120 D.A.P.) and T6- 50 % R.D.F. of P & K (180:40:40) + 12.5kg/ha of PSAP (3 Foliar spray- 60, 90 & 120 D.A.P.) including control was conducted during two consecutive years i.e.2019-20 and 2020-21. The crop

was sown in equal plot size 5x5 m with sugarcane variety CO-0238. All the recommended package of practices were adopted to grow good crop except treatments. The data were recorded on growth and yield parameters as usual while cane juice quality was measured in the laboratory of ICAR-IISR, Lucknow for both the year.

The results both the years are presented in respective tables and described on the basis of results and experiments it was found that the application of **PSAP @ 12.5kg/ha with 100 % R.D.F. (180:80:80)** as foliar application on standing crop at 60, 75, 90 & 120 Days after planting gave significantly superior cane yield.

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THE SUGAR TECHNOLOGISTS' ASSOCIATION OF INDIA

Recognised by the Ministry of Science & Technology, Government of India as Scientific & Industrial Research Organisation

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President

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TO WHOM IT MAY CONCERN

This is to certify that **M/s Isha Agro Sciences Pvt Ltd** is participating and displaying its products in 79th Annual Convention and International Sugar Expo from **4TH -5TH October 2021** at **National Sugar Institute Kalyanpur Kanpur-208017 (UP) Jointly** organized by **The Sugar Technologists' Association of India (STAI) and National Sugar Institute (NSI)**

STAI is a Scientific & Industrial Research Organization approved by Ministry of Science & Technology, Govt. of India. It provides Research Development activities for the sugar and allied industries. The copy of the letter issued by Ministry of Science & Technology, Govt. of India, along with the copy of the brochure of the event is appended herewith for information.

M/s Isha Agro Sciences Pvt Ltd may be permitted to take their equipments, brochures and other display materials etc. free of octroi and other taxes for display and free distribution among the delegates participating in the 79th Annual Convention and International Sugar Expo. Their items are not meant for sale or re-sale and have no commercial value involved in them.

AUTHORIZED SIGNATORY

THE SUGAR TECHNOLOGISTS' ASSOCIATION OF INDIA New Delhi

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