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**REPORT  
ON  
PRODUCT TESTING**

**“Effect of PSAP-Potassium Salt of Active  
Phosphorus (potassium salt of complex and  
polymerized phosphorus) on Yield and Quality  
of Sugarcane and Soil Nutrient Status”**

**Soil Science and Agricultural Chemistry**

**2014-15**

**Submitted By**

**Central Sugarcane Research Station  
Padegaon- 415 521  
Tal. Phaltan, Dist. Satara.(M.S)**



# Report on Product Testing of PSAP-Potassium Salt of Active Phosphorus on sugarcane

1. **Name of the scheme/ Department** : Soil Science and Agril. Chemistry Section,  
Central Sugarcane Research Station,  
Padegaon-415 521, Tal- Phaltan,  
Dist-Satara
2. **a) Name of implementing Officer** : Dr. D.H.Phalke, Soil Physicist  
**b) Associated scientists** : Dr. S.M.Pawar, Sugarcane Specialist  
Shri. D.S.Potdar, Sr.Res.Asstt  
Shri. S.U.Deshmukh, Jr.Res.Asstt.  
Shri. B.G.Rathod, Jr.Res.Asstt.
3. **Name of the Company** : M/s. Isha Agro India, Pune
4. **Product** : PSAP-Potassium Salt of Active Phosphorus  
(Potassium salt of complex and polymerized phosphorus).
5. **Crop and Season** : Suru Sugarcane (Cv. CoM 0265)
6. **Type of study** : Effect of PSAP-Potassium Salt of Active Phosphorus (potassium salt of complex and polymerized phosphorus) on yield and quality of sugarcane and soil nutrient status.
7. **Pest/Disease/weed/testing of seed/etc.** : No.
8. **Amount received** : 1,10,000/-  
DD No.710572, 710573 and 710574  
dtd.29.11.2015
9. **10 % institutional charges** : Check No.027638, dtd.31.03.2014
10. **Acceptance letter of DOR office.** : No.DOR/ADR/DDR-3/T3/Test/2947/2013,  
dtd.08.11.2013

  
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## 11. Methodology

- a) Title of project** : Effect of PSAP-Potassium Salt of Active Phosphorus (potassium salt of complex and polymerized phosphorus) on yield and quality of sugarcane and soil nutrient status.
- b) Objective** : 1. To study the effect of PSAP on growth, yield and quality parameters of sugarcane.  
2. To study the role of PSAP on residual soil available nutrient status.
- c) Season** : *Suru*
- d) Variety** : CoM 0265 (Phule 265)
- e) Location** : Central Sugarcane Research Station  
Padegaon-415 521, Tal- Phaltan,  
Dist-Satara (MS), India.
- f) Soil type** : Medium deep black (Inceptisol )
- g) Date of planting** : 20.02.2014
- h) Design** : RBD
- i) Replications** : Three
- j) Plot Size** : **Gross-** 6.00 m x 10.00 m  
**Net-** 3.60 m x 8.00 m
- k) Row spacing** : 1.20 m
- l) Date of Harvesting** : 22.02.2015

### m) Treatment details:

- T<sub>1</sub> : Control (100 % RDF soil application)
- T<sub>2</sub> : 100 % RDF through fertigation
- T<sub>3</sub> : 75 % RD P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O through soil application
- T<sub>4</sub> : 75 % RD P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O through fertigation
- T<sub>5</sub> : 50 % RD P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O through soil application
- T<sub>6</sub> : 50 % RD P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O through fertigation
- T<sub>7</sub> : 75 % RD P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O through soil application + PSAP 3.75 kg ha<sup>-1</sup> (through foliar spray @ 0.2 % from 30 to 120 days after planting at 15 days interval)
- T<sub>8</sub> : 75 % RD P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O through soil application + PSAP 7.5 kg ha<sup>-1</sup> (through foliar spray @ 0.4 % from 30 to 120 days after planting at 15 days interval)
- T<sub>9</sub> : 50 % RD P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O through soil application + PSAP 3.75 kg ha<sup>-1</sup> (through foliar spray @ 0.2 % from 30 days after planting to 120 days at 15 days interval)
- T<sub>10</sub> : 50 % RD P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O through soil application + PSAP 7.5 kg ha<sup>-1</sup> (through foliar spray @ 0.4 % from 30 to 120 days after planting at 15 days interval)
- T<sub>11</sub> : 75 % RD P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O through fertigation + PSAP 15 kg ha<sup>-1</sup> (through drip irrigation at one month interval from 30 days after planting)
- T<sub>12</sub> : 50 % RD P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O through fertigation + PSAP 15 kg ha<sup>-1</sup> (through drip irrigation at one month interval from 30 days after planting)

  
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**Note :**

- 100 % Recommended dose of N and 20 t ha<sup>-1</sup> FYM was common to all the treatments.
- Water quantity used for spraying was 100 - 200 lit ha<sup>-1</sup>
- Recommended dose of fertilizers: 250 : 115 : 115 N : P<sub>2</sub>O<sub>5</sub> : K<sub>2</sub>O kg ha<sup>-1</sup> + 20 t ha<sup>-1</sup> FYM,

**n) Introduction of the product : PSAP-Potassium Salt of Active Phosphorus**

PSAP (potassium salt of complex and polymerized phosphorus) consist of activated phosphorus by catalytic process and potash which is attached with phosphorus by split technology. The activated phosphorus from PSAP helps to produce additional energy may be in the form of phosphate bond of ATP/ADP in cane. Advancement of various synthesis in presence of active potash from PSAP produces more sugar in cane. The potassium translocated the synthesized sugar from source to sink.

**7. Results:****a) Germination and tillering ratio :**

The data pertaining to the effect of different treatments on germination and tillering ratio are presented in Table 1. The data on germination percentage and tillering ratio was non significant. However, numerically the higher germination percentage was recorded in treatment T<sub>3</sub>, receiving 75 % recommended dose of P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O + 100 % recommended dose of nitrogen through soil application (73.67 %).

Tillering ratio was recorded numerically higher in treatment T<sub>2</sub> receiving 100 % recommended dose of N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O through fertigation (1.83).

**b) Average cane weight (ACW), and number of millable canes (NMC)**

The data pertaining to the effect of different treatments on yield contributing parameters *viz.* average cane weight (ACW) and number of millable canes (NMC) are presented in Table 1. The highest significant average cane weight and number of millable canes was recorded in the treatment T<sub>2</sub> receiving 100 % recommended dose of fertilizers through fertigation (2.11 kg and 99.30 thousand ha<sup>-1</sup>) and found at par with all other treatment except treatment T<sub>5</sub> (1.79 kg and 72.29 thousand ha<sup>-1</sup>).

**c) Cane and CCS yield**

The data pertaining to the effect of different treatments on cane yield and CCS yield are presented in Table 1. The treatment T<sub>2</sub>, receiving 100 % recommended dose of fertilizers through fertigation recorded significantly higher cane and CCS yield (210.3 t ha<sup>-1</sup> and 29.1 t ha<sup>-1</sup>). It was statistically at par with all the treatments except T<sub>1</sub>, T<sub>3</sub>, T<sub>5</sub>, T<sub>7</sub>, T<sub>9</sub> and T<sub>10</sub> respectively for cane yield and commercial cane sugar yield.

  
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**d) Nutrient uptake:**

The total uptake of nitrogen, phosphorus and potassium were significantly influenced by various treatments of  $P_2O_5$  and  $K_2O$  offorstation through soil application alone and with PSAP through foliar application. The highest nitrogen uptake was observed in  $T_2$  treatment ( $228 \text{ kg ha}^{-1}$ ). However, it was statistically at par with treatment  $T_4$ ,  $T_7$ ,  $T_8$ ,  $T_{11}$  and  $T_{12}$  ( $215$ ,  $215$ ,  $215$ ,  $217$ ,  $218$  and  $215 \text{ kg ha}^{-1}$  respectively). The phosphorus uptake was found significant by sugarcane and the highest phosphorus uptake of maximum ( $42.8 \text{ kg ha}^{-1}$ ). Whereas, it was statistically at par with all the treatments. The total potassium uptake by sugarcane was significantly higher in  $T_2$  treatment ( $255 \text{ kg ha}^{-1}$ ) and statistically on par with treatment  $T_4$  ( $248 \text{ kg ha}^{-1}$ ).

**e) Residual soil fertility status :**

The soil pH and organic carbon content at harvest of sugarcane did not influenced by the various treatments of offorstation of  $P_2O_5$  and  $K_2O$  fertilizers through soil and foliar application. However, electrical conductivity was significantly increased in all the treatments over initial value of electrical conductivity ( $0.29 \text{ dSm}^{-1}$ ). It was significantly higher in treatment  $T_{11}$  ( $0.52 \text{ dS m}^{-1}$ ) and statistically at par with  $T_{12}$ ,  $T_6$ ,  $T_4$  and  $T_2$  ( $0.51, 0.50, 0.48$  and  $0.45 \text{ dS m}^{-1}$  respectively).

The soil available nitrogen, phosphorus and potassium content was significantly influenced by various treatments. The treatment  $T_6$  built up the residual soil available nitrogen significantly ( $272 \text{ kg ha}^{-1}$ ) over other treatments and statistically on par with treatment  $T_{12}$ ,  $T_{11}$ ,  $T_4$  and  $T_2$  ( $270$ ,  $267$ ,  $266$  and  $258 \text{ kg ha}^{-1}$  respectively). The residual soil available phosphorus content was significantly influenced by various treatments and are statistically on par with each other except treatment  $T_3$  and  $T_5$ . The residual soil available potassium content was significantly higher and statistically on par with each other were found in treatment  $T_2$ ,  $T_4$  and  $T_{11}$  ( $293, 289$  and  $283 \text{ kg ha}^{-1}$  respectively).

**Conclusion:**

The application of 100 % recommended dose of fertilizers through fertigation was found superior in respect of significant increase in the cane and CCS yield of sugarcane ( $210.30$  and  $29.10 \text{ t ha}^{-1}$ ) however the 75 %  $P_2O_5$  and  $K_2O$  through fertigation + PSAP  $15 \text{ kg ha}^{-1}$  through drip irrigation at one month interval from 30 days after planting was found at par with recommended dose of fertilizer. The application of PSAP do not influenced residual soil fertility after harvest of sugarcane.

  
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**Table 1. Effect of different treatments on growth, yield and quality of Sugarcane.**

Treatment	Germination (%)	TR	ACW (kg)	NMC (000ha <sup>-1</sup> )	Cane yield (tha <sup>-1</sup> )	CCS %	CCS (tha <sup>-1</sup> )
T <sub>1</sub>	63.65	1.62	1.95	83.08	186.70	13.57	25.32
T <sub>2</sub>	69.02	1.83	2.11	99.30	210.30	13.84	29.10
T <sub>3</sub>	73.67	1.59	1.89	81.24	176.27	13.56	23.89
T <sub>4</sub>	70.37	1.78	2.05	98.96	203.19	13.71	27.85
T <sub>5</sub>	68.59	1.56	1.79	72.29	163.59	13.54	22.16
T <sub>6</sub>	68.90	1.75	1.97	94.79	195.72	13.68	26.76
T <sub>7</sub>	70.96	1.71	1.92	92.50	187.54	13.77	25.83
T <sub>8</sub>	71.99	1.75	1.92	94.16	191.92	13.82	26.53
T <sub>9</sub>	70.13	1.64	1.84	88.50	181.15	13.79	24.99
T <sub>10</sub>	73.24	1.67	1.85	91.75	184.48	13.80	25.46
T <sub>11</sub>	71.12	1.76	2.07	97.89	206.20	13.71	28.26
T <sub>12</sub>	68.62	1.77	2.00	96.95	199.44	13.68	27.28
SE <sub>±</sub>	4.71	0.07	0.07	4.69	4.87	0.12	0.67
CD at 5%	NS	NS	0.28	18.55	19.26	NS	2.66

**Table 2. Effect of different treatments on total nutrient uptake by Sugarcane.**

Treatment	Total nutrient uptake (kg ha <sup>-1</sup> )		
	N	P	K
T <sub>1</sub>	209	42.6	238
T <sub>2</sub>	228	42.8	255
T <sub>3</sub>	201	39.4	223
T <sub>4</sub>	215	39.6	248
T <sub>5</sub>	194	37.2	205
T <sub>6</sub>	209	39.0	226
T <sub>7</sub>	215	39.7	228
T <sub>8</sub>	217	40.0	232
T <sub>9</sub>	206	38.6	217
T <sub>10</sub>	211	38.8	221
T <sub>11</sub>	218	41.6	251
T <sub>12</sub>	215	40.2	237
SE <sub>±</sub>	4.07	1.62	3.99
CD at 5%	16.09	6.40	15.79

  
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**Table 3. Effect of different treatments on Soil chemical properties at harvest of sugarcane**

Treatment	pH (1.2.5)	EC (dSm <sup>-1</sup> )	Org. C %	Soil available nutrients (kg ha <sup>-1</sup> )		
				N	P	K
Initial	7.73	0.29	0.69	251	20.4	281
T <sub>1</sub>	7.81	0.39	0.76	222	19.9	253
T <sub>2</sub>	7.86	0.45	0.80	258	23.4	293
T <sub>3</sub>	7.82	0.42	0.74	236	17.6	226
T <sub>4</sub>	7.87	0.48	0.78	266	22.4	289
T <sub>5</sub>	7.83	0.44	0.73	245	16.7	214
T <sub>6</sub>	7.89	0.50	0.78	272	20.9	268
T <sub>7</sub>	7.83	0.39	0.73	232	21.1	267
T <sub>8</sub>	7.84	0.42	0.74	229	21.3	269
T <sub>9</sub>	7.84	0.42	0.72	238	19.6	248
T <sub>10</sub>	7.83	0.39	0.72	236	20.5	259
T <sub>11</sub>	7.86	0.52	0.79	267	22.5	283
T <sub>12</sub>	7.86	0.51	0.77	270	20.7	262
SE <sub>±</sub>	0.03	0.02	0.03	5.01	1.06	5.41
CD at 5%	NS	0.07	NS	19.81	4.20	21.42

  
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