

### The phosphate-solubilization potential of microbes

Phosphate-solubilization test was conducted qualitatively by inoculating the bacteria in NBRIP media plates containing precipitated tricalcium phosphate with bromocresol purple dye shown in Figure 1. Tricalcium phosphates solubilization changes the pH. The plates were incubated at  $28 \pm 2^\circ\text{C}$  for 6 days, and then colour change and halo formation were observed. A clear yellow zone indicates organic acid production which solubilizes the insoluble phosphorus. The *Bacillus megaterium* has higher P solubilizing activity than *Pseudomonas aeruginosa*.

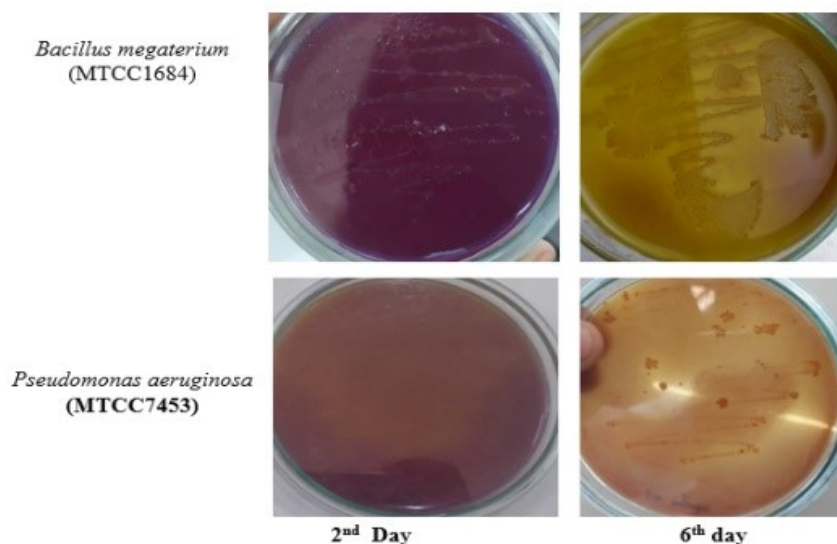


Figure 1 Solubilization of Tri-calcium phosphate on NBRIP media with bromocresol purple dye

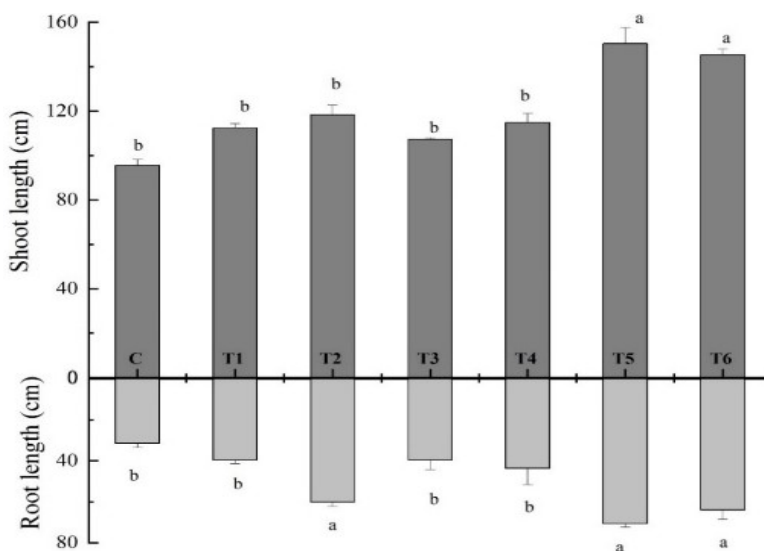


Figure 2 Sole and combined treatment of synthesized fertilizer and Biofertilizer on root and shoot length of Cannabis sativa L. crop.

Table 1 IUPAC name, Chemical formula, Retention time (RT), and Similarity index (SI) of identified compounds are given in table




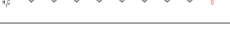









Sr. No.	Identified compound	IUPAC name	Chemical Formula	Chemical Structure	RT	CAS number	SI
1	Palmitic acid, methyl ester	Hexadecanoic acid, methyl ester	C <sub>17</sub> H <sub>34</sub> O <sub>2</sub>		25.822	112-39-0	96%
2	Linoleic acid, methyl ester	9,12-Octadecadienoic acid (Z, Z)-, methyl ester	C <sub>19</sub> H <sub>34</sub> O <sub>2</sub>		28.154	112-63-8	94%
3	Methyl Elaidate	9-Octadecenoic acid, methyl ester, (E)-	C <sub>19</sub> H <sub>36</sub> O <sub>2</sub>		28.246	1937-62-8	96%
4	Methyl stearate	Octadecanoic acid, methyl ester	C <sub>19</sub> H <sub>38</sub> O <sub>2</sub>		28.590	112-61-8	95%
5	Cannabidivarine	2-((1S,6S)-3-methyl-6-(prop-1-en-2-yl) cyclohex-2-enyl)-5-propylbenzene-1,3-diol	C <sub>19</sub> H <sub>26</sub> O <sub>2</sub>		30.106	24274-48-4	95%
6	cis-Methyl 11-eicosenoate	cis-Methyl 11-eicosenoate	C <sub>21</sub> H <sub>40</sub> O <sub>2</sub>		30.815	2390-09-2	95%
7	Δ <sup>9</sup> Tetrahydrocannabinol	(6aR,10aR)-6,6,9-trimethyl-3-propyl-6a,7,8,10a-tetrahydrobenzo[c]chromen-1-ol	C <sub>19</sub> H <sub>26</sub> O <sub>2</sub>		31.117	31262-37-0	90%
8	Cannabispiran	4-hydroxy-6-methoxy Spiro[1,2-dihydroindene-3,4'-cyclohexane]-1'-one	C <sub>15</sub> H <sub>18</sub> O <sub>3</sub>		31.753	61262-81-5	90%
9	Cannabidiol	2-[(1R,6R)-6-Isopropenyl-3-methylcyclohex-2-en-1-yl]-5-pentylbenzene-1,3-diol	C <sub>21</sub> H <sub>30</sub> O <sub>2</sub>		32.334	13956-29-1	90%
10	Cannabichromene	2-Methyl-2-(4-methylpent-3-enyl)-7-pentyl-5-chromenol	C <sub>21</sub> H <sub>30</sub> O <sub>2</sub>		32.468	20675-51-8	95%
11	Glycidyl Oleate	9-Octadecenoic acid (Z)-, oxiranylmethyl ester	C <sub>21</sub> H <sub>38</sub> O <sub>3</sub>		32.868	5431-33-4	91%
12	Methyl erucate	13-Docosenoic acid, methyl ester, (Z)-	C <sub>23</sub> H <sub>44</sub> O <sub>2</sub>		33.263	1120-34-9	91%
13	Methyl nervonate	15-Tetracosenoic acid, methyl ester, (Z)-	C <sub>25</sub> H <sub>48</sub> O <sub>2</sub>		35.393	2733-88-2	93%

Table 2 Semi- quantitative data (% Relative peak area value) of the compound in Hemp extracts <sup>a</sup>

Sr. No.	Compound Name	% Relative peak area						
		Control	T1	T2	T3	T4	T5	T6
1.	Hexadecanoic acid, methyl ester	2.77 <sup>b</sup>	2.1±0.06	1.69 <sup>b</sup>	1.99 <sup>b</sup>	3.4 <sup>b</sup>	1.98±0.3	3.98 <sup>b</sup>
2.	(9,12-Octadecadienoic acid (Z,Z)-, methyl ester)	1.54 <sup>b</sup>	1.2 <sup>b</sup>	1.19±0.1	1.11 <sup>b</sup>	2.23 <sup>b</sup>	1.02 <sup>b</sup>	2.19±0.18
3.	(9-Octadecenoic acid, methyl ester, (E)-)	13.11 <sup>b</sup>	9.78 <sup>b</sup>	9.17 <sup>b</sup>	8.84±0.19	17.09±0.09	9.04±0.06	19.28±0.09
4.	Methyl stearate	2.06 <sup>b</sup>	1.53 <sup>b</sup>	1.22 <sup>b</sup>	1.42 <sup>b</sup>	2.31±0.1	1.44±0.09	3.17 <sup>b</sup>
5.	cis-Methyl 11-eicosenoate	14.56 <sup>b</sup>	1.59 <sup>b</sup>	1.57 <sup>b</sup>	9.57 <sup>b</sup>	2.98±0.1	1.66 <sup>b</sup>	22.15±0.13
6.	9-Octadecenoic acid (Z)-, oxiranylmethyl ester	48.7±0.17	8.32 <sup>b</sup>	0.99 <sup>b</sup>	0.96 <sup>b</sup>	16.63 <sup>b</sup>	1.27 <sup>b</sup>	2.84±0.11
7.	13-Docosenoic acid, methyl ester, (Z)-	7.87 <sup>b</sup>	57.7±0.2	54.7±0.2	52.64±0.09	9.18 <sup>b</sup>	58.07 <sup>b</sup>	12.31±0.18
8.	15-Tetracosenoic acid, methyl ester, (Z)-	9±0.09	2.88 <sup>b</sup>	2.75 <sup>b</sup>	2.7±0.09	5.49 <sup>b</sup>	3.01±0.07	6.65±0.17
9.	Cannabispiran	0	0	0	0.48 <sup>b</sup>	0.68±0.06	0.54 <sup>b</sup>	0.6 <sup>b</sup>
10.	Cannabichromene	0	0.9±0.07	2.21 <sup>b</sup>	1.2 <sup>b</sup>	2.25 <sup>b</sup>	1.35 <sup>b</sup>	0.98 <sup>b</sup>
11.	Cannabidivarin	0	0.6 <sup>b</sup>	0.27 <sup>b</sup>	0.74 <sup>b</sup>	3.67±0.1	1.97±0.14	0.56±0.11
12.	$\Delta^9$ -Tetrahydrocannabivarin	9.26 <sup>b</sup>	2.39 <sup>b</sup>	4.7±0.2	4.87 <sup>b</sup>	7.65±0.2	3.83±0.15	14.33±0.06
13.	Cannabidiol	0	3.29 <sup>b</sup>	0.05 <sup>b</sup>	3.7±0.2	13.1 <sup>b</sup>	7 <sup>b</sup>	0.27 <sup>b</sup>
14.	$\Delta^9$ -Tetrahydrocannabidiol	9.23 <sup>b</sup>	7.6 <sup>b</sup>	19.34±0.2	9.63 <sup>b</sup>	13.06 <sup>b</sup>	7.63±0.19	10.33±0.11

<sup>a</sup>Data are presented as mean± SD (n=3). <sup>b</sup>SD<0.05 level. Treatments:1) Control, 2) T1- Urea, 3) T2-Synthesized Urea Hydroxyapatite Nanofertilizer (UHAPF), 4) T3-*Bacillus megaterium* (B1), 5) T4-*Pseudomonas aeruginosa* (B2), 6) T5-B1+UHAPF, 7) T6- B2+UHAPF