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## Identification of biostimulant and microbicide compounds from *Streptomyces* sp. UC1A-3 for plant growth promotion and disease control

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**Abstract** The plant growth promotion and antagonistic potential of *Streptomyces* against phytopathogens was assessed. Total fourteen *Streptomyces* strains were derived from rhizosphere soil of *Capsicum annum* (Chilli) from the agricultural fields in Udthagamandalam, Nilgiris, Tamil Nadu, India. All strains were evaluated for plant growth promoting *in vitro* e.g. production of indole acetic acid, ammonia, siderophores, chitinase, cellulase, protease, amylase and inorganic phosphate solubilisation. In addition, antagonistic activity was also tested against *Ralstonia solanacearum*, *Xanthomonas oryzae*, *Fusarium oxysporum*, *Alternaria* sp., *Macrophomina* sp., and *Magnaporthe oryzae*. Further, bioactive compounds from the strain UC1A-3 was analyzed through gas chromatography–mass spectrometric technique. Three strains showed the highest level to promote plant growth promoting and antagonistic activity especially the strain UC1A-3 revealed maximum level of seed germination and increased shoot and root length in Chilli plants. Totally, twenty-nine compounds were detected, most of which were aromatic compound derivatives. In particular, Phthalic acid (C<sub>8</sub>H<sub>6</sub>O<sub>4</sub>), Pentadecanoic acid (C<sub>15</sub>H<sub>30</sub>O<sub>2</sub>), i-Propyl 12-methyltetradecanoate (C<sub>18</sub>H<sub>36</sub>O<sub>2</sub>), 1-(+)-Ascorbic acid 2,6-dihexadecanoate (C<sub>38</sub>H<sub>68</sub>O<sub>8</sub>), 1-Nonadecene (C<sub>19</sub>H<sub>38</sub>), 1-Heptacosanol (C<sub>27</sub>H<sub>56</sub>O) were reported as antimicrobial properties. Findings of the present study evidenced that *Streptomyces* strain UC1A-3 would be a promising candidate for agricultural crop improvement, since it has showed the potential *in-vitro* plant growth and biocontrol activities against the tested phytopathogens.

**Keywords:** *Streptomyces*; Bioactive metabolites; Plant growth promotion; Gas chromatography–mass spectrometry; Phthalic acid

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