

# 3<sup>RD</sup> WORLD BIOTECHNOLOGY CONGRESS

December 03-04, 2018 Sao Paulo, Brazil

## Statistical analysis for the production of secondary metabolites and its chemical characterization from *Streptomyces parvulus* C5-5Y

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**Introduction:** The needs for an increase in novel drugs urged to discover and develop new antibiotics with biopotential. The natural products have been developed from medicinal plants and the recent research has mainly focused on the microbial sources for novel antibiotics with bioactivities and this is economical in the state. In this investigation, we have developed a new bioactive compound with maximum antioxidant and antimicrobial activities.

**Methodology:** In order to increase the metabolite production as well as the organism's growth we aimed to optimize the medium with economical parameters and sources rapidly. The investigation followed the one factor at a time, Plackett-Burman design and Box Behnken design to get the optimized medium for the enhanced metabolites production. Stat-Ease design expert software was used for this investigation. On purification, the secondary metabolite which was exhibiting maximum activity at a minimum concentration was taken for structural elucidation analysis through UV-VIS, FTIR, NMR and HPLC MS/MS analysis.

**Results:** The bioactive compound was elucidated from *Streptomyces parvulus*. The maximum growth and pigment production were evaluated with the standard formula and the production was higher in optimal pH, temperature, carbon and nitrogen sources. The carbon sources are found to increase the growth of the organism, especially in starch. The mass production was obtained in the optimized medium and the extracted pigments were subjected to HPLC analysis where the peak 4 was eluted and found to contain bioactivity through antimicrobial assessment. The compound AP<sub>4</sub> was structurally elucidated with raw data, finally, the AP<sub>4</sub> was 4-MHA (4-Methyl 3-Hydroxy anthranilic acid) pentapeptide lactone and it represents the half actinomycin structure with antioxidant properties. Further studies will be focused on two-dimensional NMR spectroscopy to confirm the structure and application of pigment as pharma product in *in vivo* studies.

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