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Growth inhibition of *Bacillus subtilis and Klebsiella* sp by *Allium sativum* L

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Over the past few decades, there has been increasing interest on investigations of natural antibacterial agents. In the present study an effort was made to investigate the antibacterial effect of *Allium sativum*. Bulb powder of this plant was consecutively extracted using different solvents with increasing polarity viz. dichloromethane (DCM), ethyl acetate (EA), methanol and aqueous and each filtrate was concentrated. Each extract was tested against *Bacillus subtilis* and *Klebsiella* sp by agar well diffusion method. The 15 ml of nutrient agar medium was mixed with 1x 10^6cells/ml of the inoculum, poured into the petri plate and allowed to set. The well was punctured with the help of a sterile cork-borer and 40mg of the each solvent crude extract was introduced into the well. The mixture of acetone and DMSO at ratio 1:1 was used as solvent control and streptomycin (50µg) was used as standard. The intensity of inhibition was observed by measuring the diameter of zone of inhibition in mm excluding well at various time points such as 24, 48, and 72 hours at 37 ^{0}C. Triplicate test was carried for each solvent extract. The data were analysed by one-way analysis of variance (ANOVA), at $P< 0.05$. Mean values were compared by Least Significant Difference (LSD). The results revealed a significant ($P<0.05$) difference among the test solvent extracts against *B.subtilis* and *Klebsiella* sp. The methanol extract had significantly ($P<0.05$) higher inhibitory effect on *B.subtilis* (16.5 ± 0.5mm) and *Klebsiella* sp (16.4 ± 0.6mm) than other solvent extracts. The DCM extract exhibited higher inhibition zone in *B.subtilis* (7.5 ± 0.4 mm) than *Klebsiella* sp (2.8 ± 0.40mm). The experiment with standard revealed that streptomycin had higher inhibitory effect than all solvent extracts of *A.sativum B.subtilis* (24.0±0.1mm) than *Klebsiella* sp (16.5 ± 0.2mm). Almost similar effect was noted by aqueous extract on *B.subtilis* (5.3 ± 0.4mm) and *Klebsiella* sp (5.6 ± 0.2mm). Control experiment revealed that the solvent mixture did not affect the growth of pathogens. There was no change in the inhibitory effect after 24 hours and it remains unchanged until 72 hours. Bioassay guided isolation and characterization of active compound/s will lead to develop new lead molecule which can act against a wide range of target pathogens.

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