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A brief study on pathogenic and denitrifying *Pseudomonas* spp. isolated from various agricultural fields of West Bengal, India

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Denitrification is a natural biochemical process where nitrate (NO_3^-) is converted to nitrogen (N_2) gases that are lost to the atmosphere. Denitrification occurs when soil bacteria use nitrate for their respiration in the place of oxygen in the air. In our study, *Pseudomonas* species were isolated from soil samples collected from agricultural lands with leguminous cultivation in the districts of North 24 Parganas and Hoogly of West Bengal, India. A total of 63 soil samples were pooled. The samples were assessed for heterotrophic bacterial count and denitrifying properties. 80% of the samples were positive for *Pseudomonas* spp., confirmed by bacteriological and biochemical analysis. 57% of the samples were oxidase, catalase, citrate, mannitol positive and negative for indole, MR-VP, urease, glucose, lactose, and maltose suggesting the presence of *Pseudomonas* spp. 46% were other associated species which were *Pseudomonas* negative. Significant co-relation was observed between soil quality parameters like TOC, Phosphorus, DO, salinity and pH to the number of positive samples $p \leq 0.05$, correlation coefficient $R=0.82$. The samples showed infections in the experimental zebra fishes significant at $p \leq 0.01$. Molecular confirmation was done by 16SrRNA amplification showing bands at 1500 bp, confirming the presence of *Pseudomonas* spp., and evolutionary analysis using MEGA6 confirmed the species as *Pseudomonas otitidis*. The pathogens having denitrifying properties were largely obtained from the Hoogly district followed by North 24 Parganas district. The species are ubiquitous microflora of the system and play an important role in the nitrification process. The *Pseudomonas* positive samples showed high degree of denitrification, significant at $p \leq 0.05$. *Pseudomonas otitidis* have high denitrifying property and can be used for industrial treatment of waste waters, with modification of the pathogenic trait, if cultivated on a large scale in the state of West Bengal. Our study focuses on quality traits of some animal pathogens, which will be studied further and is the first report of its kind from these districts.

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