Denitrification Encyclopedia Article

Denitrification

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Denitrification

Denitrification is the conversion of nitrates to gaseous nitrogen. It is carried out by several genera of free-living soil bacteria. Denitrifying bacteria are especially active in waterlogged, anaerobic soils where they tend to deplete soil nitrates, forming free atmospheric nitrogen. Organic matter in the soil tends to promote denitrification when oxygen from the nitrate ion is used to oxidize the organics in the absence of atmospheric oxygen. Denitrification, thus, supports active anaerobic growth of the denitrifying organisms. In agricultural soils denitrifying bacteria can reduce soil fertility and lessen agricultural productivity by removing growth promoting nitrate from the soil before plants are able to utilize it. In swampy soils, denitrifiers may reduce the amount of soil nitrogen by as much as 50%. Some of the microbial forms involved in denitrification include *Thiobacillus denitrificans*, *Micrococcus denitrificans*, and species of *Serratia*, *Pseudomonas*, and *Achromobacter*. Denitrification has its positive side, however. The process helps to reduce the amount of nitrogen salts that might otherwise accumulate in oceans and lakes. Nitrates are highly soluble and readily leached from soil to aquifers, streams, and lakes, where they might accumulate to toxic levels. Converting this over supply of nitrate to the nontoxic nitrogen gas removes the threat to plants and animals that might otherwise be harmed.