

# CHEMISTRY OF ACID SOILS OF THE TROPICS AND RICE GROWTH

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## ABSTRACT

Rice is grown in a wide range of acid soils that vary genetically, morphologically, chemically, physically, and climatically. The principal soil orders include Entisols, Inceptisols, Ultisols, Oxisols, and Histosols. This paper deals with the chemistry of soils that are intermittently or continuously wet and rice growth.

A wet soil is practically devoid of molecular oxygen except in a thin surface layer 1-2 mm thick and the rhizosphere of aquatic plants.

Absence of molecular oxygen causes soil reduction in roughly thermodynamic sequence. Nitrate is absent, manganese, iron, and sulphur are present in their reduced forms, and an array of organic substances is produced. Aluminium toxicity is reduced in strongly acid soils because of the pH increase following soil reduction.

Transport of air through the shoot enables rice roots to metabolize and grow in an anaerobic matrix. However, in strongly acid soils excess water-soluble iron, aluminium, hydrogen sulfide and organic substances, specially fatty acids may hinder rice growth. The commonest nutritional disorder of rice on acid wet soils is iron toxicity. The increase in availability of nitrogen, phosphorus, silicon, and molybdenum benefit rice, but zinc deficiency may depress rice growth.