

Public Abstract

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Title:INDIVIDUAL AND COMPETITIVE ADSORPTION OF MSMA AND PHOSPHATE ONTO IRON AND NON-IRON SOIL

Monosodium monomethylarsenate (MSMA (V)) is a common constitute in herbicides and pesticides used widely in the world, and yet its mobility and transport properties are still a relatively understudied area. Knowledge of the MSMA (V) sorption process is a key to understanding the properties.

This research investigated the adsorption of MSMA (V) of soil samples collected at the USDA-ARS Dale Bumpers National Rice Research Center located near Stuttgart, Arkansas. Batch experiments were performed to evaluate the effect of Fe, phosphate, and pH conditions on MSMA (V) adsorption.

The results indicate: 1) MSMA (V) was strongly adsorbed onto the whole soil (no Fe removed), implying that adsorption is an important process controlling the MSMA (V) mobility in environments; 2) the reductive removal of iron minerals from the soil effectively eliminated MSMA (V) adsorption indicating that iron oxides in the soil are primarily responsible for MSMA (V) adsorption; 3) the presence of phosphate in aqueous solutions inhibited MSMA (V) adsorption as a result of competitive adsorption between phosphate and MSMA (V); and 4) MSMA (V) adsorption and apparent adsorption extent were strongly influenced by pH indicating that surface complexation on amphoteric sorption sites in the soil was responsible for MSMA (V) adsorption.