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**Short communication**

## Sulphate behaviour from dissolution of gypsum in organic acids

 M. K. Baruah <sup>a</sup>, P. C. Gogoi<sup>a</sup> and P. Kotoky<sup>b</sup>
<sup>a</sup> Department of Chemistry, NNS College, Titabar-785630, Assam, India

<sup>b</sup> Geoscience Division, Regional Research Laboratory, Jorhat 785006, Assam, India

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**Abstract**

The solubility of gypsum in organic acids namely acetic, oxalic, tartaric and succinic acids at low temperature (30°C) was studied. The results show that sulphate sulphur content increases with increasing acid concentration from 0.1 to 0.25 M and decreases again at higher concentration. It is suggested that different behaviour of the acids beyond 0.25 M solution could be due to incorporation of sulphate into the co-ordination sphere of calcium-organic complexes. It is suggested that the occurrence of free and fixed sulphate in the solution is highly pH dependent. The nature of incorporation of sulphate in a system containing calcium species and natural organic matter has also been studied. Humic acids, extracted from forest and tea-garden soils, were treated with a solution of gypsum (CaSO<sub>4</sub>·2H<sub>2</sub>O) at room temperature and the infrared spectra of the gypsum treated samples reveal that sulphate has been incorporated into the calcium complex as a monodentate ligand. Further an inorganic-sulphur free high-sulphur coal when treated with the gypsum solution, incorporated sulphate as bidentate ligand. It is concluded that the nature of the


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organic matter plays an important role for the occurrence of various fixed sulphates either as monodentate or bidentate ligand in natural systems. This work is a novel breakthrough for the occurrence of varying sulphate content in some of the natural environments and has considerable environmental and geochemical interest.

**Author Keywords:** Gypsum; Solubility; Sulphate; Coordination; Organic matter

## Article Outline

1. Introduction
2. Experimental
3. Results and discussion
  - 3.1. Effect of organic acid on the extent of free sulphate formation
  - 3.2. Spectroscopic evidence of sulphate incorporation
  - 3.3. Effect of acidity in the system
  - 3.4. Sulphate behaviour in natural systems

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