

Sulphur as a Dynamic Minerals in Indian Soils

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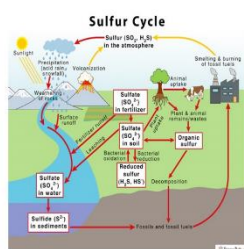
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Abstract

Sulphur is a non-metallic chemical element identified by the letter S. Sulphur occurs naturally in the environment and is the thirteenth most abundant element in the earth crust. It can be mined in its elemental form. In India, Presently there are no mineable elemental sulphur reserves. Sulphur combines directly with almost all the elements with the exception of gold, platinum and the noble gases. In its native form, sulphur is a yellow crystalline solid. Sulphur is essentially used for the production of sulphuric acid.

Introduction

All plants require 17th nutrient elements to complete their life cycle and an additional four elements have been identified as essential for some plants (Havlin *et al.*, 2005). With the exception of C, H and O which plants obtain from air and water, plants derive the remaining 14 elements from the soil or through fertilizers, manures and amendments (Parikh and James, 2012). The bulk of the soil solid fraction is constituted by soil minerals, which exert significant direct and indirect influences on the supply and availability of most nutrient elements. The main processes involved in the release and fixation of nutrient elements in soils include dissolution-precipitation and adsorption-desorption (Singh, 2015).



Minerals of Sulphur

Gypsum (CaSO₄.2H₂O)

Gypsum is a soft sulphate mineral composed of calcium sulphate dihydrate, with the chemical formula CaSO₄.2H₂O. The Mohr scale of mineral hardness defines gypsum as hardness value of 2 based on scratch hardness comparison.

Iron Pyrite/Pyrite/Fool's gold (FeS₂)

Pure pyrite (FeS₂) contains 46.67% iron and 53.33 % sulphur by weight. Pyrite occurs in large deposits in contact metamorphic rocks. Pyrite was used commercially as a source of sulphur, particularly for the production of sulfuric acid, but today sulphur is largely collected as a by-product of petroleum processing. Because of the availability of much better sources of iron, pyrite is not generally used as an iron ore.

Epsomite (MgSO₄.7H₂O)

Epsom salt is also known as magnesium sulphate. It's a chemical compound made up of magnesium, sulphur and oxygen. Magnesium sulphate is a chemical compound, a salt with the formula MgSO₄ consisting of magnesium cations Mg²⁺ (9.8% Magnesium) and Sulphate anions (SO₄²⁻) 13% sulphur.

Galena (PbS)

Galena is a lead sulphide mineral with a chemical composition of PbS. It is the world's primary ore of lead and is mined from a large number of deposits in many countries. Galena is soft with a Mohr hardness of 2.5+.

Anhydrite (CaSO₄)

Anhydrous calcium sulphate is a mineral with the chemical formula CaSO₄. Anhydrite is an evaporate mineral that occurs in extensive layered deposits in sedimentary basins where large volumes of sea water have been evaporated. It is typically interbedded with rocks that include halite, gypsum and limestone.

Sphalerite/Blende Zinc (ZnS)

Sphalerite is the major ore of zinc. Yellow to orange sphalerite is often called "golden sphalerite". Red shades of sphalerite are known as Ruby Blende or Ruby Jack. Sphalerite is the most important zinc ore. Approximately 95% of all primary zinc is extracted from sphalerite ores.



Gypsum



Pyrite



Epsomite



Galena



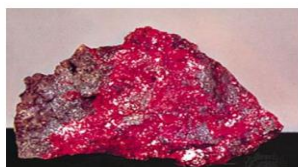
Anhydrite



Chalcopyrite



Sphalerite



Cinnabar



Arsenopyrite

Chalcopyrite (CuFeS_2)

Chalcopyrite is a brass-yellow mineral with a chemical composition of CuFeS_2 . It occurs in most sulphide mineral deposits throughout the world and has been the most important ore of copper for thousands of years.

Arsenopyrite/Mispickel (FeAsS)

Arsenopyrite is an iron arsenic sulphide with a chemical composition of an iron sulfoarsenide mineral

(FeAsS) the most common ore of arsenic. It is the most abundant arsenic-bearing mineral and the primary ore of arsenic metal.

Cinnabar (HgS)

Mercury sulphide (HgS), the chief ore mineral of mercury. It is commonly encountered with pyrite, marcasite and stibnite in veins near recent volcanic rocks and in hot-springs deposits.

Conclusion

Soil minerals serve as both sources and sinks of essential plant nutrients. These secondary minerals serve as sources of nutrients themselves or they precipitate or adsorb essential elements. Keeping them from being taken up readily by plants. In many cases, secondary minerals serve as important reservoirs where nutrients are held strongly enough to prevent leaching, yet weakly enough to draw on them to meet their nutritional needs. In some soils and in certain top soils, the soil organic matter contains and releases plant nutrient elements.

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