

MAGNESIUM SULFATE

(TENTATIVE)

Information required on

- *other functional uses of magnesium sulfate including their use levels, and*
- *the commercial use of anhydrous magnesium sulfate.*

New tentative specifications prepared at 63rd JECFA (2004), published in FNP 52 Add 12 (2004). No safety evaluation undertaken.

SYNONYMS

Epsom salt (heptahydrate), INS No.518

DEFINITION

Magnesium sulfate occurs naturally in sea water, mineral springs and in minerals such as kieserite and epsomite. It is recovered from them or by reacting sulfuric acid and magnesium oxide. It is produced with one or seven molecules of water of hydration or in a dried form containing the equivalent of between 2 and 3 waters of hydration.

Chemical names

Magnesium sulfate

C.A.S. number

Monohydrate: 14168-73-1
Heptahydrate: 10034-99-8
Dried: 15244-36-7

Chemical formula

Monohydrate: $\text{MgSO}_4 \cdot \text{H}_2\text{O}$
Heptahydrate: $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$
Dried: $\text{MgSO}_4 \cdot x\text{H}_2\text{O}$, where x is the average hydration value (between 2 and 3)

Formula weight

Monohydrate: 138.38
Heptahydrate: 246.47

Assay

Not less than 99.0 % on the ignited basis

DESCRIPTION

Colourless crystals, granular crystalline powder or white powder. Crystals effloresce in warm, dry air.

FUNCTIONAL USES

Nutrient

CHARACTERISTICS

IDENTIFICATION

Solubility (Vol. 4)

Freely soluble in water, very soluble in boiling water, and sparingly soluble in alcohol.

Test for Magnesium
(Vol. 4)

Passes test

Test for Sulfate (Vol. 4)

Passes test

PURITY

Loss on ignition (Vol. 4) Monohydrate: between 13.0 and 16.0 %; Heptahydrate: between 40.0 and 52.0 %, Dried: between 22.0 and 32.0 % (105°, 2hr, then 400° to constant weight)

pH (Vol. 4) Between 5.5 and 7.5 (1 in 20 soln.)

Chloride (Vol. 4) Not more than 0.03%
Test 1g of the sample as described in Volume 4, "Chloride Limit Test" using 0.9 ml of 0.01 N hydrochloric acid in the control

Arsenic (Vol. 4) Not more than 3 mg/kg (Method II)

Iron (Vol. 4) Not more than 20 mg/kg
Test as directed in Volume 4, "Iron Limited Test" using 1 ml of Iron Standard TS

Selenium (Vol. 4) Not more than 30 mg/kg
Test 200 mg of the sample as described in Volume 4, "Selenium Limit Test (Method II)"

Lead (Vol. 4) Not more than 2mg/kg
Determine using an atomic absorption technique appropriate to the specified level. The selection of sample size and method of sample preparation may be based on the principles of the method described in Volume 4, "Instrumental Methods".

METHOD OF ASSAY

Accurately weigh about 0.5 g of the ignited sample, dissolve in 5 ml of hydrochloric acid TS (dilute), dilute with water to 100 ml, and mix. Transfer 50 ml of this solution into a 250-ml conical flask, add 10 ml of ammonia-ammonium chloride buffer TS and 0.1 ml of eriochrome black TS. Titrate with 0.05 mol/l disodium ethylenediaminetetraacetate until the red-purple solution changes to blue in colour. Each ml of 0.05 mol/l disodium ethylenediaminetetraacetate is equivalent to 12.04 mg of MgSO₄.