Solution B: 10 µL of the *Standard Lead Solution*, 10 µL of the *Sample Preparation*, 10 µL of the *Blank Solution*, and 5 µL of the *Modifier Working Solution*;
Solution C: 20 µL of the *Standard Lead Solution*, 10 µL of the *Sample Preparation*, and 5 µL of the *Modifier Working Solution*;
Solution D: 10 µL of the *Sample Preparation*, 20 µL of the *Blank Solution*, and 5 µL of the *Modifier Working Solution*.

Calculate the blank-corrected absorbances of Solutions B, C, and D by subtracting from each the absorbance measured for Solution A. Plot the blank-corrected absorbances of Solutions B, C, and D (y-axis) versus the quantity of lead, in nanograms, added to each solution (x-axis). These are equal to 0.1, 0.2, and 0 ng, respectively. Draw the best straight line through the points. Extrapolate the line to the x-axis intercept to obtain the quantity *C*, in nanograms, of lead in 10 µL of the *Sample Solution*. Calculate the concentration, in milligrams per kilogram, of lead in the sample taken by the formula

$$10C/W,$$

in which *W* is the weight, in grams, of the sample taken.

Optical (Specific) Rotation Determine as directed under *Optical (Specific) Rotation*, Appendix IIB, using a solution containing 2 g of sample in 100 mL of oxygen-free water.

Oxalic Acid Dissolve 1 g of sample in 10 mL of water and 2 mL of hydrochloric acid, transfer to a separator, and extract with two 35-mL portions of ether. Evaporate the combined ether extracts in a rotary evaporator or on a steam bath. Dissolve any residue in 10 mL of water, add 1 mL of glacial acetic acid and 1 mL of a 1:20 solution of calcium acetate. No turbidity develops in 5 min.

Sulfate Determine as directed in the *Sulfate Limit Test* under *Chloride and Sulfate Limit Tests*, Appendix IIIB. Any turbidity produced by a 20-mL portion of the solution prepared for the *Chloride Test* (above) does not exceed that shown in a control containing 200 µg of sulfate (SO_4).

Water Determine as directed under *Water Determination*, Appendix IIB, at 50°, using 100 mg of sample dissolved in a freshly prepared mixture of 20 mL of methanol and 20 mL of formamide.

Packaging and Storage Store in tight containers.

Ferrous Sulfate

$FeSO_4 \cdot 7H_2O$ Formula wt 278.02

CAS: [7782-63-0]

DESCRIPTION

Ferrous Sulfate occurs as pale, blue-green crystals or granules that are efflorescent in dry air. In moist air, it oxidizes readily to form a brown-yellow, basic ferric sulfate. A 1:10 aqueous solution has a pH of about 3.7. One gram dissolves in 1.5 mL of water at 25° and in 0.5 mL of boiling water. It is insoluble in alcohol.

Function Nutrient.

REQUIREMENTS

Identification A sample gives positive tests for *Ferrous Salts* (Iron) and for *Sulfate*, Appendix IIIA.
Assay Not less than 99.5% and not more than 104.5% of $FeSO_4 \cdot 7H_2O$.
Lead Not more than 2 mg/kg.
Mercury Not more than 1 mg/kg.

TESTS

Assay Dissolve about 1 g of sample, accurately weighed, in a mixture of 25 mL of 2 *N* sulfuric acid and 25 mL of recently boiled and cooled water, and immediately titrate with 0.1 *N* ceric sulfate, using orthophenanthroline TS as the indicator. Perform a blank determination (see *General Provisions*), and make any necessary correction. Each milliliter of 0.1 *N* ceric sulfate is equivalent to 27.80 mg of $FeSO_4 \cdot 7H_2O$.
Lead Determine as directed in the monograph for *Ferrous Gluconate*.
Mercury Determine as directed in *Method II* under *Mercury Limit Test*, Appendix IIIB.

Packaging and Storage Store in tight containers.

Ferrous Sulfate, Dried

$FeSO_4 \cdot xH_2O$ Formula wt, anhydrous 151.91

CAS: [7720-78-7]

DESCRIPTION

Ferrous Sulfate, Dried, occurs as a gray-white to buff colored powder consisting primarily of $FeSO_4 \cdot H_2O$, with varying amounts of $FeSO_4 \cdot 4H_2O$. It dissolves slowly in water, but is insoluble in alcohol.

Function Nutrient.

REQUIREMENTS

Identification A sample gives positive tests for *Ferrous Salts* (Iron) and for *Sulfate*, Appendix IIIA.
Assay Not less than 86.0% and not more than 89.0% of $FeSO_4$.
Insoluble Substances Not more than 0.05%.
Lead Not more than 2 mg/kg.
Mercury Not more than 1 mg/kg.

TESTS

Assay Determine as directed under *Assay* in the monograph for *Ferrous Sulfate*. Each milliliter of 0.1 *N* ceric sulfate is equivalent to 15.19 mg of $FeSO_4$.
Insoluble Residue Dissolve 2 g of sample in 20 mL of freshly boiled 1:100 sulfuric acid, heat to boiling, and then digest in a covered beaker on a steam bath for 1 h. Filter through a tared filtering crucible, wash thoroughly, and dry at 105°. The weight of the insoluble residue does not exceed 1 mg.
Lead Determine as directed in the monograph for *Ferrous Gluconate*.
Mercury Determine as directed in *Method II* under *Mercury Limit Test*, Appendix IIIB.

Packaging and Storage Store in tight containers.

Fir Needle Oil, Canadian Type

Balsam Fir Oil

View IR

DESCRIPTION

Fir Needle Oil, Canadian Type, occurs as a colorless to faintly yellow liquid with a pleasant, balsamic odor. It is the volatile oil obtained by steam distillation from needles and twigs of *Abies balsamea* L., Mill (Fam. Pinaceae). It is soluble in most fixed oils and in mineral oil. It is slightly soluble in propylene glycol, but it is insoluble in glycerin.

Function Flavoring agent.

REQUIREMENTS

Identification The infrared absorption spectrum of the sample exhibits relative maxima at the same wavelengths as those of a typical spectrum as shown in the section on *Infrared Spectra*, using the same test conditions as specified therein.
Assay Not less than 8.0% and not more than 16.0% of esters, calculated as bornyl acetate ($C_{12}H_{20}O_2$).
Angular Rotation Between −19° and −24°.
Refractive Index Between 1.473 and 1.476 at 20°.
Solubility in Alcohol Passes test.
Specific Gravity Between 0.872 and 0.878.

TESTS

Assay Measure about 5 g of sample, accurately weighed, and proceed as directed in *Ester Determination* under *Esters*, Appendix VI, using 98.15 as the equivalence factor (*e*) in the calculation.
Angular Rotation Determine as directed under *Optical (Specific) Rotation*, Appendix IIB, using a 100-mm tube.
Refractive Index Determine as directed under *Refractive Index*, Appendix IIB, using an Abbé or other refractometer of equal or greater accuracy.
Solubility in Alcohol Determine as directed under *Solubility in Alcohol*, Appendix VI. One milliliter of sample dissolves in 4 mL of 90% alcohol, occasionally with haziness.
Specific Gravity Determine by any reliable method (see *General Provisions*).

Packaging and Storage Store in a cool place protected from light in full, tight containers that are made from steel or aluminum and that are suitably lined.

Fir Needle Oil, Siberian Type

Pine Needle Oil

View IR

DESCRIPTION

Fir Needle Oil, Siberian Type, occurs as an almost colorless or faintly yellow liquid with a piney, balsamic odor. It is the volatile oil obtained by steam distillation from needles and twigs of *Abies sibirica* Lebed. (Fam. Pinaceae). It is soluble in most fixed oils and in mineral oil. It is insoluble in glycerin and in propylene glycol.

Function Flavoring agent.

REQUIREMENTS

Identification The infrared absorption spectrum of the sample exhibits relative maxima at the same wavelengths as those of a typical spectrum as shown in the section on *Infrared Spectra*, using the same test conditions as specified therein.
Assay Not less than 32.0% and not more than 44.0% of esters, calculated as bornyl acetate ($C_{12}H_{20}O_2$).
Angular Rotation Between −33° and −45°.
Refractive Index Between 1.468 and 1.473 at 20°.
Solubility in Alcohol Passes test.
Specific Gravity Between 0.898 and 0.912.

TESTS

Assay Measure about 2 g of sample, accurately weighed, and proceed as directed in *Ester Determination* under *Esters*, Appendix VI, using 98.15 as the equivalence factor (*e*) in the calculation.
Angular Rotation Determine as directed under *Optical (Specific) Rotation*, Appendix IIB, using a 100-mm tube.
Refractive Index Determine as directed under *Refractive Index*, Appendix IIB, using an Abbé or other refractometer of equal or greater accuracy.
Solubility in Alcohol Determine as directed under *Solubility in Alcohol*, Appendix VI. One milliliter of sample dissolves in 1 mL of 90% alcohol. Occasionally the solution may become hazy on further dilution.