

DIATOMACEOUS EARTH

Prepared at the 55th JECFA (2000) and published in FNP 52 Add 8 (2000), superseding tentative specifications prepared at the 21st JECFA (1977) and published in NMRS 57 (1977) and in FNP 52 (1992). No ADI was allocated the 21st JECFA (1977)

SYNONYMS

Diatomaceous silica, Diatomite

DEFINITION

Consists of the processed siliceous skeletons of diatoms; produced as a dried, natural powder, as a calcined powder or as a flux-calcined powder.

C.A.S. number

Natural and calcined powder 61790-53-2
Flux-calcined 68855-54-9

DESCRIPTION

Dried, natural powder: off-white to light grey.
Calcined powder: pink to light brown or light yellow to light orange.
Flux-calcined powder: white to pink or light brown.

FUNCTIONAL USES

Filtering aid

CHARACTERISTICS

IDENTIFICATION

Solubility (Vol. 4)

Insoluble in water, in acids (except hydrofluoric), and in dilute alkalis

Microscopy

When examined with 100x to 200x microscope, typical diatom shapes are observed

pH (Vol. 4)

Boil 10 g of sample with 100 ml of water for 1 h and filter through a fine-porosity sintered-glass filter or a suitable filter paper. Dilute filtrate to 100 ml. Natural and calcined powders, pH range: 5 to 10. Flux-calcined powders, pH range: 8 to 11.

Volatilization

Place 0.2 g of the sample in a platinum crucible, and add 5 ml of hydrofluoric acid. The sample is dissolved. When the solution is heated (Caution: Use draft oven), almost all of it volatilizes.

PURITY

Loss on drying (Vol. 4)

Natural powder: Not more than 10% (105°, 2 h)
Calcined and flux-calcined powder: Not more than 3% (105°, 2 h)

Loss on ignition (Vol. 4)

Natural powder: Not more than 7% on the dry basis
Calcined and flux-calcined powder: Not more than 2% on the dry basis.

Hydrofluoric acid-insoluble substances

Not more than 25%
Weigh accurately about 0.2 g of the dried sample in a platinum crucible previously ignited, cooled, and weighed. Add 5 ml of hydrofluoric acid and 2 drops of sulfuric acid (1 in 2), and evaporate gently to approximate

dryness on a water bath. Heat at 550° for 1 h, then raise the temperature gradually until it reaches 1000° to 1200°, and keep the temperature for 30 min. The residue does not exceed 50 mg.

Water-soluble substances

Not more than 0.5%

To 10 g of the dried sample, add 100 ml of water, and boil for 2 h, supplementing water with occasional shaking. Cool, then filter with suction using a filter paper for quantitative analysis. Repeat the filtration using the same filter paper to obtain a clear solution. Wash the residue on filter paper with a small amount of water. Combine washings to filtrate, evaporate the solution to dryness and dry further the residue at 105° for 2 h. The weight of the residue is not more than 50 mg.

Hydrochloric acid-soluble substances

Not more than 2.5%

To 2.0 g of the dried sample, add 50 ml of dilute hydrochloric acid TS, and heat at 50° for 15 min with shaking. Cool and filter, wash filter residue with a small amount of dilute hydrochloric acid TS. Combine washings to filtrate, add 5 ml of dilute sulfuric acid TS, evaporate to dryness, and ignite at 450-550° to constant weight. The weight of the residue is not more than 50 mg.

Arsenic (Vol. 4)

Not more than 10 mg/kg (Method II)

Lead (Vol. 4)

Not more than 10 mg/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".