POTASSIUM ALUMINIUM SILICATE

Prepared at the 79th JECFA (2014), published in FAO Monographs 16 (2014), superseding the specifications prepared at the 77th JECFA (2013), published in FAO Monographs 14 (2013). A PTWI of 2 mg/kg bw for total aluminium was established at the 74th JECFA (2011). The PTWI applies to all aluminium compounds in food, including food additives.

SYNONYMS Mica, Muscovite, INS No. 555

DEFINITION Potassium aluminium silicate is mined from natural sources and then further purified.

Chemical name Potassium aluminium silicate

C.A.S. number 12001-26-2

Chemical formula $KAl_2[AlSi_3O_{10}](OH)_2$ (Idealized)

Formula weight 398.31

Assay Not less than 98%

DESCRIPTION Light grey to white crystalline platelets or powder.

FUNCTIONAL USES Anticaking agent

CHARACTERISTICS

IDENTIFICATION

Solubility (Vol. 4) Practically insoluble or insoluble in water, dilute acids and alkali and organic solvents

Test for aluminium and silicon Passes test
See description under TESTS

PURITY

Loss on Drying (Vol. 4) Not more than 0.5% (105°, 2 h)

Impurities soluble in 0.5 M hydrochloric acid

Antimony:	Not more than 20 mg/kg
Arsenic:	Not more than 3 mg/kg
Barium:	Not more than 25 mg/kg
Cadmium:	Not more than 2 mg/kg
Chromium:	Not more than 100 mg/kg
Copper:	Not more than 25 mg/kg
Lead:	Not more than 5 mg/kg
Mercury:	Not more than 1 mg/kg
Nickel:	Not more than 50 mg/kg
Zinc:	Not more than 25 mg/kg

See description under TESTS

TESTS

IDENTIFICATION TESTS

Test for aluminium and silicon

Use the test solution as shown under method of assay. Analyze aluminium and silica in the test solution by ICP-AES technique (Volume 4). Set instrument parameters as specified by the instrument manufacturer, use the analytical lines for Al (396.15 nm) and Si (251.611 nm).

PURITY TESTS

Impurities soluble in 0.5 M hydrochloric acid

Extract 20 g of finely ground sample under reflux conditions (to prevent loss of mercury) with 100 ml of 0.5 M hydrochloric acid (spectroscopic grade) for 30 min. Let solution cool, then filter through a 0.1 µm membrane filter. Wash the filter twice with hot 0.5 M hydrochloric acid. Combine the filtrate and wash solution in a 200 ml volumetric flask and make up to volume with 0.5 M hydrochloric acid.
Determine arsenic using an AAS (Hydride generation) technique; antimony, barium, chromium, copper, nickel and zinc by an ICP-AES technique; lead and cadmium using an AAS (Electrothermal atomization) technique; and mercury using an AAS (Cold vapour generation) technique. See “Metallic impurities” in the Combined Compendium of Food Additive Specifications (Volume 4).

METHOD OF ASSAY

Weigh about 0.5 g of the sample to the nearest 0.1 mg, in a platinum or nickel crucible, add 5 g potassium hydroxide and 2 g boric acid, mix and melt completely using a torch burner (alkali fusion) and allow to stand at room temperature. Place the reaction product along with crucible in a 250-ml PTFE beaker, add 150 ml hot deionized water and dissolve residue by agitation. Wash the crucible with a small amount of hot water and add the washings to the beaker. Add 50 ml hydrochloric acid and transfer the contents into a 250-ml volumetric flask. Wash the beaker three times with hot water, transfer the washings to the volumetric flask and make up to volume (Solution A). Prepare the test solution by diluting Solution A with 2% hydrochloric acid solution to get the solution within the linear dynamic range of the analyzer. Analyze aluminium in the test solution using ICP-AES (Vol. 4). Set instrument parameters as specified by the instrument manufacturer and use the analytical line for aluminium (396.152 nm). Determine the concentration (as µg/ml) of aluminium from the respective standard curve. Calculate the percentage of potassium aluminium silicate in the sample from aluminium using the formula below.

$$\text{Potassium Aluminium Silicate (\%)} = \frac{4.92 \times C_{Al} \times 250 \times DF}{W \times 10^6}$$

Where:
C = Concentration of Al in the test solution, µg/ml
DF = Dilution factor (dilution of Solution A to get test solution)
W = Weight of sample, g