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Calcium benzoate

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CALCIUM BENZOATE

Prepared at the 92nd JECFA (2021) published in FAO JECFA MONOGRAPHS 27 (2021) superseding specifications prepared at the 46th JECFA (1996), published in FNP 52 Add 4 (1996). Metals and arsenic specifications were revised at the 63rd JECFA (2004). A group ADI of 0 - 5 mg/kg bw for benzoic acid and its calcium, potassium and sodium salts, expressed as benzoic acid, was established at the 27th JECFA (1996). Benzyl alcohol was evaluated at the twenty-third and forty-sixth meetings (Annex 1, references 50 and 122); benzyl acetate was evaluated at the eleventh, twenty-seventh, twenty-ninth, thirty-first, thirty-fifth, forty-first, and forty-sixth meetings (Annex 1, references 14, 62, 70, 77, 88, 107, and 122); benzyl benzoate was evaluated at the fifteenth and forty-sixth meetings (Annex 1, references 26 and 122); benzaldehyde was evaluated at the eleventh and forty-sixth meetings (Annex 1, references 14 and 122); and benzoic acid was evaluated at the sixth, ninth, seventeenth, twenty-seventh, and forty-sixth meetings (Annex 1, references 6, 11, 32, 62, and 122). At its forty-sixth meeting, the Committee evaluated the five benzyl derivatives as a group and maintained the group ADI of 0 - 5 mg/kg bw as benzoic acid equivalents (Annex 1, reference 122). At its nighty-second meeting the group ADI of 0 - 5 mg/kg bw was withdrawn and re-established to 0 – 20 mg/kg bw for benzoic acid, its salts (calcium, potassium and sodium), benzaldehyde, benzyl acetate, benzyl alcohol and benzyl benzoate, expressed as benzoic acid equivalents (2021).

SYNONYMS

Calcium dibenzoate, calcium salt of benzenecarboxylic acid, calcium salt of phenolcarboxylic acid, INS No. 213

DEFINITION

Chemical names

Calcium benzoate

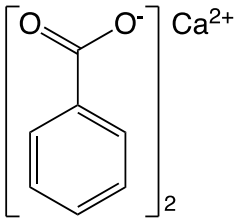
C.A.S. number

532-25-3 (anhydrous)

Chemical formula

$C_{14}H_{10}CaO_4$ (anhydrous)
$C_{14}H_{10}CaO_4 \bullet H_2O$ (monohydrate)
$C_{14}H_{10}CaO_4 \bullet 3H_2O$ (trihydrate)

Structural formula



Formula weight

282.31 (anhydrous)
300.32 (monohydrate)
336.36 (trihydrate)

Assay	Not less than 99.0% on the dried basis
DESCRIPTION	White or colourless crystals, or white powder
FUNCTIONAL USES	Antimicrobial preservative
CHARACTERISTICS	
IDENTIFICATION	
Solubility (Vol. 4)	Sparingly soluble in ethanol
Test for benzoate (Vol. 4)	Passes test
Test for calcium (Vol. 4)	Passes test
PURITY	
Loss on drying (Vol. 4)	Not more than 17.5% (105 ˚C, 4h)
Water insoluble matter	Not more than 0.3% Dissolve 10 g of the sample, weighed to the nearest mg, in 100 ml of hot water. Filter through a Gooch crucible, tared to an accuracy of ±0.2 mg, and wash any residue with hot water. Dry the crucible for 2 hours at 105 ˚C. Cool, weigh and calculate as percentage.
Acidity or alkalinity	Passes test Dissolve 2 g of the sample, weighed to the nearest mg, in 20 ml of freshly boiled water. Not more than 0.5 ml of either 0.1 N sodium hydroxide or 0.1 N hydrochloric acid should be required for neutralization, using phenolphthalein TS as indicator.
Fluoride (Vol. 4)	Not more than 10 mg/kg Weigh 5 g of the sample to the nearest mg and proceed as directed in the Limit Test (Method I or III).
Chlorinated organic compounds (Vol. 4)	Not more than 0.07% (as Cl_2) Test 0.25 g of the sample using 0.5 ml of 0.01 N hydrochloric acid in the control.
Readily oxidizable substances	Passes test Add 1.5 ml of sulfuric acid to 100 ml of water, heat to boiling and add 0.1 N potassium permanganate, dropwise, until the pink colour persists for 30 sec. Dissolve 1 g of the sample, weighed to the nearest mg, in the heated solution, and titrate with 0.1 N potassium permanganate to a pink colour that persists for 15 sec. Not more than 0.5 ml should be required.

Lead (Vol. 4)

Not more than 2 mg/kg
Determine using a method 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

Weigh accurately 0.6 g of the dried sample, dissolve in a mixture of 20 ml of water and 2 ml of dilute hydrochloric acid TS, and dilute to 100 ml with water. While stirring (preferably with a magnetic stirrer) add about 30 ml of 0.05 M disodium ethylenediaminetetraacetate from a 50-ml buret, then add 15 ml of sodium hydroxide TS, 40 mg of murexide indicator preparation (an alternative indicator is hydroxynaphthol blue, of which 0.25 g is used - in this case the naphthol green TS is omitted) and 3 ml of naphthol green TS, and continue the titration until the solution is deep blue in colour.

Each ml of 0.05 M disodium ethylenediamine tetraacetate is equivalent to 14.116 mg of $C_{14}H_{10}CaO_4$.