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Alumina, Magnesia, and Calcium Carbonate Chewable Tablets

DEFINITION

Alumina, Magnesia, and Calcium Carbonate Chewable Tablets contain NLT 90.0% and NMT 110.0% of the labeled amounts of aluminum hydroxide $[\text{Al}(\text{OH})_3]$, magnesium hydroxide $[\text{Mg}(\text{OH})_2]$, and calcium carbonate (CaCO_3) .

IDENTIFICATION

• A. [IDENTIFICATION TESTS—GENERAL, Calcium\(191\)](#).

Sample solution: To 3 g of finely powdered Chewable Tablets add 25 mL of water and 25 mL of 2 N sulfuric acid, stir, and heat on a steam bath for 10 min. Cool, add 50 mL of alcohol, stir, and place in an ice bath for 30 min. Filter while cold, retaining the filtrate for *Identification* test B. Wash the precipitate with 50 mL of 0.75 N sulfuric acid, and discard the washings. Dissolve the precipitate in 3 N hydrochloric acid, filter, and use the filtrate.

Acceptance criteria: Meet the requirements

• B. [IDENTIFICATION TESTS—GENERAL, Aluminum\(191\)](#).

Sample solution: To the filtrate obtained in *Identification* test A add 5 drops of methyl red TS, and heat to boiling. Add 6 N ammonium hydroxide until the color of the solution changes to deep yellow, continue boiling for 2 min, and filter through hardened filter paper. (Retain the filtrate for *Identification* test C.) Wash the precipitate with 350 mL of a hot solution containing 20 mg/mL of ammonium chloride, discarding the washings. Dissolve the precipitate so obtained in 3 N hydrochloric acid.

Acceptance criteria: Meet the requirements

• C. [IDENTIFICATION TESTS—GENERAL, Magnesium\(191\)](#).

Sample solution: The filtrate obtained in *Identification* test B

Acceptance criteria: Meet the requirements

ASSAY

• ALUMINUM HYDROXIDE

Edetate disodium titrant: Prepare and standardize as directed in *Reagents, Volumetric Solutions, Edetate Disodium, Twentieth-Molar (0.05 M)*.

Sample solution: Weigh and finely powder NLT 20 Chewable Tablets. Transfer a portion of the powder, equivalent to 600 mg of aluminum hydroxide, to a beaker, add 20 mL of water, and slowly add 40 mL of 3 N hydrochloric acid, with mixing. Heat the mixture to boiling, cool, and filter into a 200-mL volumetric flask. Wash the beaker with water, adding the washings to the filter. Add water to volume.

Analysis: Pipet 10 mL of the *Sample solution* into a 250-mL beaker, add 20 mL of water, then add, in the order named and with continuous stirring, 25.0 mL of *Edetate disodium titrant* and 20 mL of acetic acid–ammonium acetate buffer TS, and heat the solution near the boiling temperature for 5 min. Cool, add 50 mL of alcohol and 2 mL of dithizone TS, and mix. Titrate the excess edetate disodium with 0.05 M zinc sulfate VS until the color changes from green-violet to rose-pink. Perform a blank determination, substituting 10 mL of water for the *Sample solution*, and make any necessary correction. Each mL of *Edetate disodium titrant* consumed is equivalent to 3.900 mg of aluminum hydroxide $[\text{Al}(\text{OH})_3]$.

Acceptance criteria: 90.0%–110.0%

• MAGNESIUM HYDROXIDE

Sample solution: Prepare as directed in the *Assay for Aluminum Hydroxide*.

Analysis: Pipet a volume of the *Sample solution*, equivalent to 40 mg of magnesium hydroxide, into a 400-mL beaker, add 200 mL of water and 20 mL of triethylamine, and mix. Add 50 mL of ammonia–ammonium chloride buffer TS and 2 drops of an eriochrome black indicator solution (prepared by dissolving 200 mg of eriochrome black T in a mixture of 15 mL of triethylamine and 5 mL of dehydrated alcohol, and mixing). Cool the solution to between 3° and 4° by immersing the beaker in an ice bath, and titrate with 0.05 M edetate disodium VS until the color changes to pure blue. Perform a blank determination, substituting 10 mL of water for the *Sample solution*, and make any necessary correction. From the volume of 0.05 M edetate disodium consumed, subtract the volume of 0.05 M edetate disodium consumed in the *Assay for Calcium Carbonate*. Each mL of 0.05 M edetate disodium is equivalent to 2.916 mg of magnesium hydroxide $[\text{Mg}(\text{OH})_2]$.

Acceptance criteria: 90.0%–110.0%

• CALCIUM CARBONATE

Sample solution: Prepare as directed in the *Assay for Aluminum Hydroxide*.

Analysis: Pipet a volume of the *Sample solution*, equivalent to 50 mg of calcium carbonate, into a 400-mL beaker, and add 200 mL of water, 5 mL of sodium hydroxide solution (1 in 2), and 250 mg of hydroxy naphthol blue. Stir with a magnetic stirrer, and titrate immediately with 0.05 M edetate disodium VS until the solution is distinctly blue. Each mL of 0.05 M edetate disodium is equivalent to 5.004 mg of calcium carbonate (CaCO_3) .

Acceptance criteria: 90.0%–110.0%

PERFORMANCE TESTS

- [DISINTEGRATION \(701\)](#)

Time: 45 min

Acceptance criteria: Meet the requirements

- [UNIFORMITY OF DOSAGE UNITS \(905\)](#): Meet the requirements for [Weight Variation](#) with respect to aluminum hydroxide, to magnesium hydroxide, and to calcium carbonate.

SPECIFIC TESTS

- [ACID-NEUTRALIZING CAPACITY \(301\)](#)

Acceptance criteria: The acid consumed by the minimum single dose recommended in the labeling is NLT 5 mEq, and NLT the number of mEq calculated by the formula:

$$\text{Result} = 0.55 \times (F_A \times A) + 0.8 \times (F_M \times M) + 0.9 \times (F_C \times C)$$

F_A = theoretical acid-neutralizing capacity of aluminum hydroxide $[\text{Al}(\text{OH})_3]$, 0.0385 mEq

A = amount of aluminum hydroxide $[\text{Al}(\text{OH})_3]$ in the specimen tested, based on the labeled quantity (mg)

F_M = theoretical acid-neutralizing capacity of magnesium hydroxide $[\text{Mg}(\text{OH})_2]$, 0.0343 mEq

M = amount of magnesium hydroxide $[\text{Mg}(\text{OH})_2]$ in the specimen tested, based on the labeled quantity (mg)

F_C = theoretical acid-neutralizing capacity of calcium carbonate (CaCO_3) , 0.02 mEq

C = amount of calcium carbonate (CaCO_3) in the specimen tested, based on the labeled quantity (mg)

ADDITIONAL REQUIREMENTS

- **PACKAGING AND STORAGE:** Preserve in well-closed containers.
- **LABELING:** Label the Chewable Tablets to indicate that they are to be chewed before being swallowed. Chewable Tablets prepared using dried aluminum hydroxide gel may be labeled to state the aluminum hydroxide content in terms of the equivalent amount of dried aluminum hydroxide gel, on the basis that each mg of dried gel is equivalent to 0.765 mg of aluminum hydroxide $[\text{Al}(\text{OH})_3]$.

Auxiliary Information - Please [check for your question in the FAQs](#) before contacting USP.

Topic/Question	Contact	Expert Committee
ALUMINA, MAGNESIA, AND CALCIUM CARBONATE CHEWABLE TABLETS	Documentary Standards Support	SM32020 Small Molecules 3
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