The Measurement of Magnesium in Esomeprazole Magnesium Pills by PERSEE Atomic Absorption Spectrophotometer

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Application Note

Metal element in medicinal pills

Introduction

This application note describes the method for testing the concentration of Magnesium in Magnesium Esomeprazole pill samples by PERSEE atomic absorption spectrophotometer A3 model, using flame atomization method

Range of usage

This method is suitable for mass contents of magnesium between 0.064-6.4% in Esomeprazole Magnesium pills and tablets.

Introduction

This method is established to test magnesium content in Esomeprazole Magnesium pills or tablets. Atomic absorption spectrophotometry-flame atomization method is applied. In general, the sample is digested by acid first. Then, Lanthanum solution is added as deionization agent to get a testing solution. The testing standards and testing solution are injected to the atomic absorption spectrophotometer to get the absorbance values. The linear range of the standards is 0.003-0.3ug/ml.

Equipment and Reagent

Equipment and apparatus:

1. PERSEE atomic absorption spectrophotometer A3F, equipped with air/acetylene gas supply. PERSEEmagnesiumhollow cathode lamp.
2. Analytical balance

Reagent (analytical grade):

1. Lanthanum oxide,
2. Hydrochloric acid,
3. 25% Hydrochloric acid: add about 50ml of water in a 100ml volumetric flask. Then, add 25ml of hydrochloric acid in the bottle. Constant volume to 100ml with water.
4. 1.0mol/L hydrochloric acid: add around 50ml of water in a 100ml volumetric flask. Then, add 8.3ml of hydrochloric acid carefully and mix well. Add water to constant volume to 100ml.
5. Magnesium standard solution (1000ug/ml),
6. Ultra pure water,
7. Omeprazole materials

Lanthanum solution (as a deionization agent):

1. Weigh 5.87g Lanthanum oxide and put it in 100ml plastic volumetric flask. Add water to moisturize.
2. Carefully add 25ml hydrochloric acid. Mix the solution until all components are completely dissolved. Let cool to ambient temperature.
3. Add water to constant the volume to 100ml.

Magnesium standard solution making:

1. **Magnesium standard stock solution (2ug/ml)**
   a) Carefully take 1ml of [Magnesium standard solution (1000ug/ml)] and put it into a 50ml volumetric flask.
   b) Add [1.0mol/L hydrochloric acid] 5ml and constant volume to 50ml and mix well.
   c) Carefully take 10ml of the solution in the last step and put it in 100ml volumetric flask and add water to constant volume to 100ml.
2. **Magnesium standard testing solution (contain magnesium 0. 1ug/ml, 0. 15ug/ml, 0. 2ug/ml, 0. 25ug/ml, 0. 3ug/ml):**
   a) Carefully take 5ml, 7.5ml, 10ml, 12.5ml and 15ml of [Magnesium standard stock solution (0.2ug/ml)]

respectively and put each one of them into a 100ml volumetric flask.

b) Add 4ml of [Lanthanum solution] in each flask

c) Constant volume to 100ml for each flask by water

Sample treatment:

1. Carefully take 125mg of Esomeprazole Magnesium pill sample and put it in 100ml volumetric flask.
2. Add 20ml of 1.0mol/L hydrochloric acid to dissolve sample and constant volume to 100ml by water. Mix well.
3. Let sit at room temperature for 30min.
4. Take 5ml of last solution and put it in 100ml volumetric flask. Add water to 100ml mark and mix well.
5. Take 10ml of the solution from the last step and dilute to 100ml.
6. Take 10ml of the solution from the last step and put it in a 100ml volumetric flask. Add 4ml of [Lanthanum solution].
7. Constant volume to 100ml by water. Use this solution as testing solution.

Instrumental preparation:

1. Apply Mg hollow cathode lamp to the A3F atomic absorption spectrophotometer. Preheat for 30min.
2. Adjust lamp energy to 100%
3. Set wavelength to 285.2nm, search peak to make sure that the lamp and instrument is in normal functioning.
4. Ignite with air-acetylene.
5. Inject the magnesium standard solution of the highest concentration. Adjust gas flow and burner head height to obtain the maximum absorbance.
6. Then, inject water and select [auto zero].

Equipment Condition

Instrument Working Parameters:

Elements	Magnesium
Wavelength (nm)	285.2
Bandwidth (nm)	0.4
Lamp Current (mA)	2
Filter efficient	0.3
Integrating time (s)	3
Height of burning head (mm)	6
Flame type	Air-acetylene
Pressure of acetylene (MPa)	0.05
Flow rate of acetylene (ml/min)	1500
Reading Method	Peak Area
Measurement Method	Std. curve

Table 1. Instrument Working Parameters.

Experiment Procedure

Standard Curve of aluminum and running

Run [Magnesium standard testing solution (contain magnesium 0. 1ug/ml, 0. 15ug/ml, 0. 2ug/ml, 0. 25ug/ml, 0. 3ug/ml)] and then make a standard curve using the results.

Run samples prepared above and calculate the results using AAWIN software.

Calculation:

The mass fraction of magnesium, w_{Al} , expressed as a percentage, is calculated to four decimal places using Formula below:

$$w_{Mg} = \frac{\rho_{Mg} \times 200}{m} \times 100\%$$

where:

$\rho_{Mg}$is the mass concentration, in micrograms per ml (ug/ml), of magnesium in the final test solution;

m is the mass, in milligrams, of sample taken in [sample treatment] step 1

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