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Feed additive - Inositol

饲料添加剂 肌醇

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Feed additive - Inositol

1 Scope

This standard specifies the technical requirements, test methods, inspection rules, labeling, packaging, transportation, storage, etc. of the feed additive inositol.

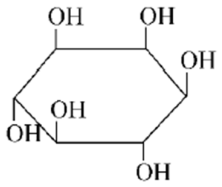
This standard applies to inositol produced by hydrolysis of phytic acid or calcium (magnesium) phytate, which is used as a nutritional feed additive in the feed industry.

Chemical Name: Inositol

Molecular formula:$C_6H_{12}O_6$

Relative molecular mass: 180.16 (according to the 2007 International Relative Atomic Mass)

Structural formula:



2 Normative references

The provisions in the following documents become the provisions of this standard through reference in this standard. For the dated references, the subsequent amendments (excluding corrections) or revisions do not apply to this standard, however, parties who reach an agreement based on this standard are encouraged to study if the latest versions of these documents are applicable. For undated references, the latest edition of the referenced document applies to this standard.

GB/T 6682 Water for analytical laboratory use - Specification and test methods

GB 10648 Feed label

GB/T 14699.1 Animal feeding stuffs - Sampling

2005 Edition of the Pharmacopoeia of the People's Republic of China

4.2.1 Gravimetric method

4.2.1.1 Method principle

Inositol reacts with acetic anhydride under acidic conditions to form hexaacetyl inositol, which is soluble in chloroform and insoluble in water, and the mass of hexaacetyl inositol formed is then converted into the mass of inositol.

4.2.1.2 Reagents and solutions

4.2.1.2.1 Acetic anhydride dilute sulfuric acid solution: Add 1 mL of acetic anhydride to 50 mL of 0.1 mol/L sulfuric acid solution.

4.2.1.2.2 Chloroform.

4.2.1.3 Instruments and equipment

4.2.1.3.1 General laboratory equipment.

4.2.1.3.2 Rotary evaporator.

4.2.1.4 Determination method

Weigh about 0.2 g of the sample (the weight shall be accurate to 0.0001 g) into a 250 mL beaker, add 5 mL of acetic anhydride dilute sulfuric acid solution (4.2.1.2.1), cover it with a watch glass, and heat and dissolve in a water bath for 20 min; take it out to cool, slowly add 100 mL of water, heat to boil for 20 min, and let it cool. Transfer it to a separating funnel, wash the beaker with a little chloroform (4.2.1.2.2), pour the washing liquid into the separating funnel; shake and extract 5 times with chloroform (4.2.1.2.2), and the dosages of chloroform are 30 mL, 25 mL, 20 mL, 15 mL, and 10 mL, respectively. Wash the separatory funnel with 10 mL of chloroform, then wash once with 10 mL of water, filter the chloroform layer with absorbent cotton, and wash the water layer, filter and absorbent cotton with 10 mL of chloroform; combine the filtrate and washing liquid in a pear-shaped flask with known weight (105°C), then evaporate it on a rotary evaporator to remove the chloroform, and dry it at 105°C to constant weight.

4.2.1.5 Calculation of results

Inositol content w_1, in terms of mass fraction, is calculated according to the formula (1):

$$w_1 = \frac{(m_1 - m_2) \times 0.416\ 7}{m} \times 100\% \qquad \cdots\cdots(1)$$

where:

m_1 --- the mass sum of the pear-shaped flask and hexa-acetyl inositol after drying to constant weight, in grams (g);

m_2 --- The constant weight of the pear-shaped flask after drying, in grams (g);

m --- The mass of the sample, in grams (g);

0.4167 --- The coefficient of conversion from hexaacetyl inositol into inositol.

4.2.1.6 Repeatability

The difference between the absolute values of the two parallel determination results shall be not more than 2.0%.

4.2.2 High-performance liquid chromatography (arbitration method)

4.2.2.1 Reagents and solutions

4.2.2.1.1 Double-distilled water: It shall meet the first-grade water specified in GB/T 6682.

4.2.2.1.2 Standard solution: Weigh 1.0 g (the weight shall be accurate to 0.0001 g) of inositol dry reference substance (the purity shall be ≥98.5%) into a 100 mL volumetric flask, add an appropriate amount of distilled water, dissolve it with ultrasonic waves, and then use distilled water to dilute it to the mark and shake well.

4.2.2.2 Instruments and equipment

4.2.2.2.1 General laboratory equipment.

4.2.2.2.2 Ultrasonic cleaner.

4.2.2.2.3 High-performance liquid chromatograph.

4.2.2.3 Preparation of sample solution

Weigh about 1.0 g of the sample (the weight shall be accurate to 0.0001 g) into a 100 mL volumetric flask, add an appropriate amount of distilled water, dissolve it by ultrasonication, then dilute to the mark with distilled water, and shake well for later testing.

4.2.2.4 Determination

4.2.2.4.1 Chromatographic conditions

Chromatographic column: a strong cation exchange column (calcium ion type).

4.5 Determination of heavy metals (by Pb)

The determination shall be carried out according to the regulations of "Heavy metal inspection method - Method I", Appendix VIII H of Part 2 of the 2005 edition of "Pharmacopoeia of the People's Republic of China".

4.6 Determination of arsenic (As)

The determination shall be carried out according to the regulations of "Arsenic salt inspection method", Appendix VIII J of Part 2 of the 2005 edition of "Pharmacopoeia of the People's Republic of China".

4.7 Determination of melting point

The determination shall be carried out according to the regulations of "Melting point determination method", Appendix VI C of Part 2 of the 2005 edition of "Pharmacopoeia of the People's Republic of China".

5 Inspection rules

5.1 Sampling method

Sampling shall be carried out according to GB/T 14699.1.

5.2 Factory inspection

5.2.1 Batch formation

Products with the same raw material, same formula, and same shift are regarded as a batch, and each batch of products is subject to factory inspection.

5.2.2 Factory inspection items

Sensory characteristics, loss on drying, inositol content, melting point.

5.2.3 Judgment method

Based on the relevant test methods and requirements of this standard, the selected samples shall be inspected according to the factory inspection items. If one of the indicators of the inspection results does not meet the requirements of this standard, re-inspection shall be carried out by sampling from double packaging units. If there is still any one of the re-inspection results that does not meet the requirements of the standard, the batch of products shall be judged as unqualified and cannot leave the factory.

5.3 Type inspection

5.3.1 In one of the following situations, type inspection shall be carried out:

a) The formula or production process is changed;

b) During every six months of normal production; or, when the production resumes after six months of suspension;

c) When the national technical supervision department requests an inspection.

5.3.2 Type inspection includes all items in Chapter 3 of this standard.

5.3.3 Judgment method: Based on the relevant test methods and requirements of this standard, the selected samples shall be inspected according to the type inspection items. If one of the indicators of the inspection results does not meet the requirements of this standard, re-inspection shall be carried out by sampling from double packaging units. If there is still any one of the re-inspection results that does not meet the requirements of this standard, the type inspection shall be judged as unqualified.

6 Labeling, packaging, transportation, and storage

6.1 Labeling

The labeling shall be carried out according to GB 10648.

6.2 Packaging

The inner packaging of this product shall be made of food-grade polyethylene film, and the products shall be sealed in an appropriate container. The packaging shall meet the requirements of transportation and storage. The quality of each packaging shall be able to be determined according to customer requirements.

6.3 Transportation

Exposure to sun, rain, heat, and impact shall be avoided. It shall be handled with care when loading and unloading and not be mixed with toxic, harmful, or other polluting items during packing and transportation.

6.4 Storage

This product shall be stored in a ventilated, dry, and pollution-free place.

Under the specified storage conditions, the product has a shelf life of 48 months in the original package (after being opened, it shall be used as soon as possible to avoid deterioration).

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