



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB 1886.141-2016

National Food Safety Standard -- Food Additives -- D-ribose

食品安全国家标准 食品添加剂 d-核糖

(English Translation)

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1 Scope

This standard applies to glucose as raw material by fermentation method of food additives d-ribose.

2.1 Chemical name

(3R, 4R, 5R) -5- (hydroxymethyl) tetrahydrofuran-2,3,4-triol

2.2 Molecular formula

C₅H₁₀O₅

2.4 Relative molecular mass

150.13 (according to 2007 international relative atomic mass)

3.1 Sensory requirements

Sensory requirements shall comply with the requirements of Table 1.

Table 1 sensory requirements

The project requires a test method Color white to yellowish State crystalline powder Place the sample on a clean white paper and observe it visually

3.2 Physical and chemical indicators

Physical and chemical indicators should be consistent with the provisions of Table 2.

Table 2 Physical and chemical indicators

Item Index Test Method d-ribose content, w /% 97.0 to 103.0 Appendix A, A.2 Melting point/°C 80.0 ~ 90.0 Appendix A A.3 Specific rotation (20 ° C) - 21.0 ° ~ -19.0 ° GB/T 14454.5a Dry reduction, w /% ≤ 2.0 Appendix A A.4 Burning residue, w /% ≤ 0.2 Appendix A A.5 Solution Transmittance /% ≥ 95.0 Appendix A A.6 Lead (Pb)/(mg/kg) ≤ 0.1 GB 5009.12 or GB 5009.75 Arsenic (As)/(mg/kg) ≤ 1.0 GB 5009.11 or GB 5009.76 a sample concentration. 4% (mass fraction) aqueous solution.

3.3 Microbial limits

Microbiological limits should be in accordance with Table 3.

Table 3 Microbial limits

Project limit test method Total number of colonies/(CFU/g) ≤ 100 GB 4789.2 Mold, yeast/(CFU/g) ≤ 100 GB 4789.15 Escherichia coli/(CFU/g) ≤ 10 GB 4789.3 Salmonella/25g should not be detected GB 4789.4 Appendix A Testing method A.1 General provisions the reagents and water used in this standard, when not specified in other requirements, refer to the analysis of pure reagents and GB/T 6682 provides three levels of water. test the standard solution, impurity standard solution, preparation and article used in the test shall be classified according to GB/T 601, GB/T 602 and GB/T 603. The solution used in the experiment, when not specified with the preparation of the solvent, refers to the aqueous solution.

A.2 Determination of d-ribose content A.2.1 Methodological Summary A chromatographic method was used to separate the specified mobile phase into a column packed with a filler by means of a high pressure infusion pump.

The injected sample is brought into the column by the mobile phase. The components are separated in the column and enter the detector in turn, either by the integrator or the data processing system Record and process chromatographic signals.

A.2.2 Instruments and equipment A.2.2.1 High performance liquid chromatograph.

A.2.2.2 ShodexKS-801 or other equivalent column.

A.2.2.3 10 µL dosing ring.

A.2.2.4 Electronic analytical balance (one ten thousandth).

A.2.3 Analysis requirements A.2.3.1 Related Impurities. The main peak of the arabinose and d-ribose main peak to achieve complete separation.

A.2.3.2 Identification. Record the chromatogram, the retention time of the main peak of the reference solution and the retention time of the main peak of the sample solution should be consistent.

A.2.3.3 System adaptability. separation degree ≥ 1.2 , relative standard deviation $\leq 0.5\%$, symmetry factor ≤ 1.3 , theoretical plate number ≥ 2500 .

A.2.4 Chromatographic conditions A.2.4.1 Flow rate. 1.0 mL/min.

A.2.4.2 Column temperature. 80 ° C.

A.2.4.3 Detector temperature. 40 ° C.

A.2.4.4 Detector. Refractive detector.

A.2.4.5 Injection volume. 10 μ L.

A.2.4.6 Run time. 15min.

A.2.4.7 Mobile phase. water.

A.2.5 Preparation of the solution A.2.5.1 Preparation of mobile phase solution Using chromatographic grade distilled water, the mobile phase was filtered with 0.45 μ m aqueous filter and ultrasonically 15min.

A.2.5.2 Preparation of impurity solutions Accurately weigh 5 mg of arabinose in a 25 mL volumetric flask, dilute with 2% d-ribose solution and set the volume to a scale.

A.2.5.3 Contrast liquid Accurately weighed three copies of the reference substance 0.5g (accurate to 0.0002g) placed in a 25mL volumetric flask, dissolved with mobile phase and constant volume Degree, shake to be used.

A.2.5.4 Sample solution Accurately weighed the two samples of the 0.5g (accurate to 0.0002g) placed in a 25mL volumetric flask, dissolved with mobile phase and fixed to the scale, Shake up stand-by.

The sample and reference solution need to be filtered through a 0.45 μ m water phase filter and injected.

A.2.6 Analysis steps A.2.6.1 System adaptability Press the liquid chromatograph to test the operating procedures, open the instrument and make the instrument to a steady state, the first into a needle (quantitative ring 10 μ L) related Impurities (arabinose) solution requires arabinose separation of ≥ 1.2 , d-ribose main peak symmetry factor ≤ 1.3 , d-ribose main peak theory the number of plates ≥ 2500 to verify the main peak before the relevant impurities and d - ribose peak to achieve complete separation. After a needle blank, to verify the main peak Before the relevant impurities no residual peaks. Finally, the three

reference solutions were sequentially pipetted with the same volume of syringe (chromatographic 10 μ L), each reference substance were two needles, a total of six knots, respectively, to calculate the correction factor $f_1 \sim f_6$, using the correction factor according to formula (A.1) calculated $RSD \leq 0.5\%$.

Relative standard deviation RSD, calculated according to formula (A.1).

$RSD =$

$f_i - f$

$\times 100\%$ (A.1)

Where.

f_i - i -th needle reference to the work of the correction factor, is the corresponding work reference weight and area ratio;

f --- the average correction factor for the work reference;

n --- continuous take n needle work reference correction factor, $n \geq 6$.

A.2.6.2 Determination According to the preparation of the sample solution, on the basis of the system adaptability verification, the sample solution is used to clean the syringe and the injector, the solution was injected into the chromatogram (10 μ L of the loop) in the same manner, and each sample was mixed in two directions, and finally, the corresponding solution is drift, the specific injection according to Table A.1 injection order.

Table A.1 Injection sequence

No.	Name	Injection number	Injection volume
1	impurity solution	1	10 μ L
2	blank solution	1	10 μ L
3	Control solution	1 2	10 μ L

4 Control solution 2 2 10 μ L

Table A.1 (continued)

No.	Name	Injection number	Injection volume
4	Control solution	2 2	10 μ L

7 Sample solution 2 2 10 μ L

8	Sample solution	2 2	10 μ L
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Note 1: When only a batch of samples, after the end of the batch after the end of the needle to enter the two needle No. 8 reference substance, the two goods in front of the sample with the four for the calculation of the goods together, f $RSD \leq 0.5\%$.

Note 2: When there are multiple batches of samples, each batch of samples from the number 8