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Invert Syrup

General Notices

DEFINITION

Invert Syrup is a mixture of glucose and fructose prepared by hydrolysing a 66.7% w/w solution of Sucrose with a suitable mineral acid, such as hydrochloric acid, and neutralising the resulting solution using, for example, calcium carbonate or sodium carbonate. The degree of inversion is at least 95%.

The syrup complies with the requirements stated under Oral Liquids and with the following requirements.

Content of reducing sugars, expressed as invert sugar

Not less than 67.0% w/w.

CHARACTERISTICS

A clear, colourless to pale straw-coloured syrupy liquid.

Miscible with *water*, producing a clear solution; it dissolves in *ethanol (96%)* with the formation of an insoluble residue.

IDENTIFICATION

A. Heat 1 g with 10 mL of *water* and 5 mL of *cupri-tartaric solution*. A red precipitate is produced.
B. A solution in *water* is laevorotatory.

TESTS

Acidity

pH, 5.0 to 6.0, Appendix V L.

Arsenic

To 4.0 g add 50 mL of *water* and 10 mL of *brominated hydrochloric acid*, allow to stand for 5 minutes and remove the excess of bromine by adding *tin(II) chloride solution AsT* and dilute to 100 mL with *water*. 25 mL of the resulting solution complies with the *limit test for arsenic*, Appendix VII (1 ppm).

Lead

Prepare two solutions as follows. For solution (1) add 5 mL of 6M *acetic acid* to 12 g of the syrup. For solution (2) add 5 mL of 6M *acetic acid* and 2 mL of *lead standard solution (10 ppm Pb)* to 2.0 g of the syrup. Make solutions (1) and (2) alkaline with 5M *ammonia*, if necessary, and to each add 1 mL of *potassium cyanide solution PbT*. The solutions should not be

more than faintly opalescent. If the colours of the solutions differ, equalise by the addition of a few drops of a highly diluted solution of burnt sugar or other non-reactive substance. Dilute each solution to 50 mL with *water*, add 0.1 mL of a 10% w/v solution of *sodium sulfide* to each and mix thoroughly. When viewed against a white background, the colour produced in solution (1) is not more intense than that produced in solution (2) (2 ppm).

Refractive index

1.4608 to 1.4630, Appendix V E.

Sulfur dioxide

Not more than 70 ppm, Appendix IX B.

Weight per mL

1.338 to 1.344 g, Appendix V G.

Sulfated ash

Not more than 0.1%, Appendix IX A.

ASSAY

Dilute the syrup so that the volume of the diluted solution required in the following method is between 15 and 50 mL. Add 10.00 mL of *cupri-tartaric solution R1* to a 300 mL conical flask, add from a burette 15 mL of the diluted solution, heat to boiling over wire gauze covered with insulating material and continue adding the diluted solution in quantities of about 5 mL at 15-second intervals until the colour of the mixture indicates that the reduction appears to be almost complete. Boil for 2 minutes, add 0.2 mL of a 1% w/v solution of *methylene blue* and continue the titration until the blue colour is discharged. Repeat the operation, but, before heating, add almost the full quantity of the diluted solution required to reduce all the copper and then boil moderately for 2 minutes. Without removing the flask from either the gauze or the flame during the remainder of the titration, add 0.2 mL of the methylene blue solution and continue the titration so that it is just complete in a total boiling time of exactly 3 minutes; the end point is indicated by the disappearance of the blue colour, the solution becoming orange. From the Table calculate the content of reducing sugars (expressed as invert sugar) in 100 mL of the diluted solution and hence the percentage weight in weight in the substance being examined.

STORAGE

Invert Syrup should be stored at a temperature of 35° to 45°.

Quantity of prepared solution required ml	Invert sugar factor*	Quantity of invert sugar per 100 ml mg	Quantity of prepared solution required ml	Invert sugar factor*	Quantity of invert sugar per 100 ml mg
15	50.5	336.0	33	51.7	156.6
16	50.6	316.0	34	51.7	152.2
17	50.7	298.0	35	51.8	147.9
18	50.8	282.0	36	51.8	143.9
19	50.8	267.0	37	51.9	140.2
20	50.9	254.5	38	51.9	136.6
21	51.0	242.9	39	52.0	133.3
22	51.0	231.8	40	52.0	130.1
23	51.1	222.2	41	52.1	127.1
24	51.2	213.3	42	52.1	124.2
25	51.2	204.8	43	52.2	121.4
26	51.3	197.4	44	52.2	118.7
27	51.4	190.4	45	52.3	116.1
28	51.4	183.7	46	52.3	113.7
29	51.5	177.6	47	52.4	111.4
30	51.5	171.7	48	52.4	109.2
31	51.6	166.3	49	52.5	107.1
32	51.6	161.2	50	52.5	105.1

* mg of invert sugar corresponding to 10.00 mL of *cupri-tartaric solution R1*.