

BENEDICT'S REAGENT

IVD In vitro diagnostic medical device



For detecting glucose in urine

For use in clinical chemistry

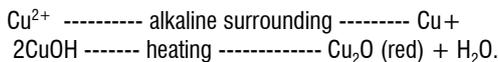
INSTRUCTIONS FOR USE

REF Product code: BNR-OT-100 (100 mL) BNR-OT-250 (250 mL) BNR-OT-500 (500 mL) BNR-OT-1L (1000 mL)

Introduction

Benedict's reagent is a bright blue solution used for detecting glucose in urine. Urine normally does not contain glucose (or it is present in traces), and it cannot be detected using regular test. If urine contains sugar, it is most frequently glucose, which is indicative of diabetes or other disorder in blood glucose level regulation.

Benedict's reagent's activity is based on copper that is complexly bound as cupric citrate (Cu^{2+}) in the reagent. Cupric citrate is reduced with glucose in alkaline surrounding and it is isolated as yellow cupric hydroxide (Cu^+), that turns into red cupric oxide (Cu^+) when heated - precipitate insoluble in water.



The method described is non-specific because other reducing sugars may be found in urine (lactose, fructose), as well as some other reducing compounds (creatinine and uric acid) that may result in false positive reaction. In that case the test may be conducted with urine being diluted in water in 1 : 1 ratio. This lowers the concentration of interfering matter, while glucose may be detected because the reaction to glucose is more sensitive than to other reducing compounds. In case of positive glucose reaction, it is necessary to conduct further tests. Benedict's reagent may also be used as crude quantitative test in which appearance of the test solution depends on glucose concentration.

Product description

- **Benedict's reagent** - Sodium carbonate, sodium citrate and copper(II) sulfate solution.

Material and accessories required for testing:

- Fresh morning urine (conduct the test during first 2 hours of sampling)
- Benedict's reagent
- Test tube
- Pipette for measuring the volume of urine
- Pipette for measuring the volume of Benedict's reagent
- Water bath
- Tube gripper

Test procedure

1.	Pour 5 ml of Benedict's reagent into the tube
2.	Add 0.5 ml of urine
3.	Mix well
4.	Heat for 2-3 minutes on flame or for 5 minutes in hot water bath
5.	Remove the tube from the water bath and let it cool
6.	Read the result

Note

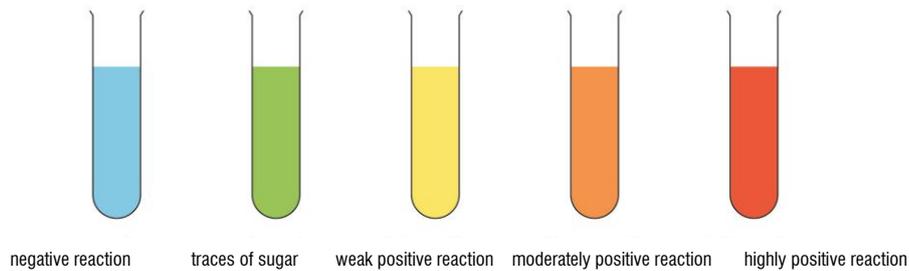
For control testing of Benedict's reagent we recommend first testing the samples that are confirmed to contain glucose. It is recommended to prepare test solutions with various concentrations of glucose and conduct the procedure.

Result

Blue color of the reagent turns green in presence of low amounts of glucose; reddish precipitate forms with passing of time. Higher glucose concentrations result in precipitate ranging from yellow to red during heating. Reaction intensity may be approximately marked in the following manner:

Result	Sample appearance
–	negative reaction; the presence of glucose has not been proven (the color of the reagent has not changed)
±	traces of sugar; no change in color during heating, and cooling causes green coloration and some precipitate
+	weak positive reaction; reduction appears after 1 minute of heating (up to 56 mmol/L); yellow
++	moderately positive reaction; reduction appears after 10-15 seconds of boiling of the solution (>56 mmol/L); orange
+++	highly positive reaction; reduction appears immediately if urine is added to the hot reagent (>110 mmol/L); red-brown

Image :



Preparing the samples and diagnostics

Use appropriate accessories for collecting and preparing the samples. Clearly mark the samples. Follow the manufacturer's instructions for use. In order to avoid mistakes, the procedure and diagnostics should only be conducted by authorized and qualified personnel.

Safety at work and environmental protection

Handle the product in accordance with safety at work and environmental protection guidelines. Used solutions and out of date solutions should be disposed of as special waste in accordance with national guidelines. Chemicals used in this procedure could pose danger to human health. Act in accordance with signs and warnings notices printed on the product's label, as well as in BioGnost's material safety data sheet.

Storing, stability and expiry date

Keep Benedict's reagent in a tightly closed original package at temperature between 15°C and 25°C. Do not keep in cold places, do not freeze and avoid exposing to direct sunlight. Date of manufacture and expiry date are printed on the product's label.

References

1. Benedict, S. R. (1 January 1909). "A Reagent For the Detection of Reducing Sugars". J. Biol. Chem. 5 (6): 485-487.
2. Robert D. Simoni, Robert L. Hill, and Martha Vaughan (2002). "Benedict's Solution, a Reagent for Measuring Reducing Sugars: the Clinical Chemistry of Stanley R. Benedict". J. Biol. Chem. 277 (16): 10-11. doi:10.1074/jbc.M110516200. PMID 11773074.

BNR-OT-X, V1-EN1, 16 October 2014, IŠP/VR

	Refer to the supplied documentation		Storage temperature range		Number of tests in package		Product code		European Conformity
	Refer to supplied instructions		Keep away from heat and sunlight		Valid until		Lot number		Manufacturer
	For <i>in vitro</i> diagnostic use only		Keep in dry place		Caution - fragile				

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