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Qualitative Analysis of Urine Constituents

Experiment 3 - Practical Notes

Name: _____ Roll no.: _____ Date: _____

Aim

To identify selected normal and abnormal constituents in approved urine controls and record the limitations of screening reactions.

Principle

Urine normally contains water, urea and dissolved electrolytes. Glucose, increased protein, ketones, blood and bilirubin are clinically relevant screening targets. Reagent-strip chemistry detects particular reactions; it must be interpreted with specimen quality and the manufacturer reading times.

Requirements

- Teacher-provided synthetic urine and positive/negative controls; approved urine reagent strips.
- Clean disposable containers, timer, colour chart and supervised demonstration reagents for chloride, urea and protein.

Procedure

1. Describe the material

Record appearance and assigned specimen identifier. Do not smell biological material directly or use an actual patient name.

2. Normal constituents

Demonstrate chloride precipitation with the assigned silver reagent on a separate portion. Demonstrate urea with the laboratory urease method, observing the associated pH change; use a negative control.

3. Strip procedure

Immerse the strip for its specified interval, remove excess fluid as directed and start the timer. Compare each pad at its own manufacturer-specified reading time.

4. Screening targets

Record pH, specific gravity, glucose, protein, ketones, blood and bilirubin when supported by that strip. Do not infer tests from pads that are absent.

5. Confirmation

If a teaching protein confirmation is assigned, use the prepared reagent on a separate aliquot and compare with a blank. Record a discordance rather than forcing agreement.

6. Interpret

Distinguish a negative screen from proof of absence. Ketone strips predominantly detect acetoacetate and may miss beta-hydroxybutyrate; blood pads do not distinguish intact cells from free pigment.

Observations and Record

Constituent / property	Observed reaction / strip result	Interpretation or limitation
Urea / chloride	_____	Normal constituents demonstrated
Glucose / protein	_____	Screen; confirm as indicated
Ketones / blood	_____	Method-specific detection
Bilirubin / pH / specific gravity	_____	Record pad and reading time

Worked Example

The numbers below are illustrative; enter your own observations in the record.

- A urine-control glucose pad positive at the correct reading time supports urinary glucose in that control. It does not by itself diagnose diabetes.

Result

Record the observed outcome and calculated value, with units. State whether the stated laboratory specification was met; do not copy the worked example as your result.

Precautions

- Use fresh assigned material and follow the laboratory specimen-handling policy. Do not share urine specimens between classmates.
- Strips must be in date and protected from moisture. Delayed reading can produce misleading colours.

Viva Questions and Answers

1. Why time each pad?

The colours develop at different rates and the assigned reading windows are part of the method.

2. Does a blood pad prove red cells?

No. Haemoglobin and myoglobin may also cause a positive reaction.

3. Does negative protein exclude all urinary proteins?

No. The response is strongest to albumin and sensitivity depends on the strip.

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