Manual procedure

D-Xylose
Colorimetric test, Phloroglucinol method

**Test Principle**
The pentoses form, by reaction with phloroglucinol in an acid medium, a complex that can be determined by spectrophotometry.

**Concentrations in the test**

<table>
<thead>
<tr>
<th>Reagent R1</th>
<th>Acetic acid</th>
<th>18 mmol/L</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCl Conc.</td>
<td>5 mol/L</td>
<td></td>
</tr>
</tbody>
</table>

| Reagent R2 | Phloroglucinol | 36 mmol/L |

**Standard**: The concentration is indicated on the vial.

**Stability and preparation of working reagent**
**Reagent R1**: liquid.
**Reagent R2**: powder.

**Standard**: liquid, ready to use. For serum D-Xylose assay.

**Working Reagent:**
Add 11 ml of bottle R1 into bottle R2 and mix gently until complete dissolution.
The solution is stable for 5 days at 2-8°C in the darkness.

**D-Xylose dosage:**
**Adults**: 25 g of xylose dissolved in approximately 250 ml water.
**Children**: 0.5 g xylose / kg (up to 25 g) as a 5% water solution.

Patient should drink approximately 250 ml of water during the period of xylose administration and blood sample collection.

**Specimen collection and handling**
1. Serum before the dose, for sample blank.
2. Keep the patient resting during the period of sample collection.
3. A single blood specimen is usually taken 2 hours after the dose, although a blood sample at 1 hour increases diagnostic discrimination in children.
4. Don’t use hemolyzed sample.
5. All urine passed during the 5 hours after ingestion is collected.
6. 5-hours collected urine: Measure the urine volume with no additives (e.g. thymol, isopropanol). Centrifuge and dilute urine sample 1/100. (10 µl urine + 990 µl distilled water).
7. Stability: In Serum & urine: 24 hours at 4°C, Samples are stable for several weeks at 2-8°C.

**Standard**
D-Xylose STD. Cat. No. 16241

**Quality control**
MED-Xylose N Cat. No. 15261
MED-Xylose P Cat. No. 15271

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**Procedure**

<table>
<thead>
<tr>
<th>Wavelength</th>
<th>Spectrophotometer</th>
</tr>
</thead>
<tbody>
<tr>
<td>555 nm</td>
<td></td>
</tr>
</tbody>
</table>

**Cuverte**: 1 cm light path

**Temperature**: 100 °C

**Measurement**: against reagent blank end point

**Assay**

<table>
<thead>
<tr>
<th>Blank</th>
<th>Sample blank</th>
<th>Sample</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1500 µl</td>
<td>1500 µl</td>
</tr>
<tr>
<td>Distilled water</td>
<td>10 µl</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Sample before the dose</td>
<td>--</td>
<td>10 µl</td>
<td>--</td>
</tr>
<tr>
<td>Sample after the dose</td>
<td>--</td>
<td>--</td>
<td>10 µl</td>
</tr>
<tr>
<td>Standard</td>
<td>--</td>
<td>--</td>
<td>10 µl</td>
</tr>
</tbody>
</table>

Mix, incubate for exactly 4 min. at 100°C. (boiling water bath).
Cool under tap water and read absorbance (A) against reagent blank. \( \Delta A = A_{Sample} - A_{Sample blank} \)

**Calculations**

**Serum**: \( \text{Conc.D-Xylose (mg/dl)} = \frac{\Delta A_{Serum sample}}{\text{A Standard}} \times \text{Con. Standard (mg/dl)} \)

**Urine**: \( \text{Conc.D-Xylose (mg/dl)} = \frac{\Delta A_{Urine sample diluted}}{\text{A Standard}} \times \text{Con. Standard (mg/dl)} \times F \)

\( F = \text{Dilution urine factor} \)

\( F=100 \) (if your dilution ratio 10 µl urine + 990 µl distilled water)

\[ \frac{mg/dl}{100 X} = \frac{g/L}{0.01} \]

**5hrs. Urine collection:**

\( \text{Excreted xylose} = \text{Urine volume (L)} \times \text{Conc.D-Xylose Urine (g/L)} \)

\( \text{Excreted xylose %} = \frac{\text{Excreted xylose (g)}}{\text{xylose dose (g)}} \times 100 \)

**Converted units factor:**

\[ \frac{mg/dl}{15 X} = \frac{mmol/L}{0.0666} \]
**D-Xylose**  Colorimetric test, Phloroglucinol method without deproteinization

**Linearity**
0.5 - 150 mg/dl
At higher concentrations dilute sample (1+1) with sodium chloride solution (0.9 %) and multiply the result by 2.

**Precaution**
This reagent contains hydrochloric acid, which is irritating to the eyes and skin. If solution comes into contact with skin, eyes or mucous membranes, flush immediately with large quantities of water.

**Reference range**

### Children

<table>
<thead>
<tr>
<th></th>
<th>Conventional Units</th>
<th>SI Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serum (1 hrs.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 6 mth.</td>
<td>&gt; 15 mg/dL</td>
<td>&gt; 1.00 mmol/L</td>
</tr>
<tr>
<td>&gt; 6 mth.</td>
<td>30 – 50 mg/dL</td>
<td>2.00 – 3.33 mmol/L</td>
</tr>
<tr>
<td>Serum (2 hrs.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 6 mth.</td>
<td>30 – 40 mg/dL</td>
<td>2.00 – 2.66 mmol/L</td>
</tr>
<tr>
<td>Urine (5 hrs.)</td>
<td>&lt; 6 mth.</td>
<td>11 – 30 % excreted xylose</td>
</tr>
<tr>
<td>6 – 12 mth.</td>
<td>20 – 32 % excreted xylose</td>
<td></td>
</tr>
<tr>
<td>1 – 3 yr.</td>
<td>20 – 42 % excreted xylose</td>
<td></td>
</tr>
<tr>
<td>3 – 10 yr.</td>
<td>25 – 45 % excreted xylose</td>
<td></td>
</tr>
<tr>
<td>&gt; 10 yr.</td>
<td>25 – 50 % excreted xylose</td>
<td></td>
</tr>
</tbody>
</table>

### Adults

<table>
<thead>
<tr>
<th></th>
<th>Conventional Units</th>
<th>SI Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serum (2 hrs.)</td>
<td>&gt; 33 mg/dL</td>
<td>&gt; 2.20 mmol/L</td>
</tr>
<tr>
<td>Urine (5 hrs.)</td>
<td></td>
<td>&gt; 16 % excreted xylose</td>
</tr>
</tbody>
</table>

These ranges are given for orientation only, each laboratory should establish its own reference range.

**References**