

**BUTYL ALCOHOL in urine by GC-FID**  
**Code GC05510**

**BIOCHEMISTRY**

Butanol (or n-butyl alcohol) is an alcohol which at room temperature is presented as a colorless liquid smelling of alcohol. It is an inflammatory compounds, harmful, irritant, miscible with most common organic solvents and almost completely miscible with water. Butanol is used as a solvent in the manufacture of paints and serves to prevent the opacity of the varnish when it dries in a wet. It is also used as an intermediate in the synthesis of ethers and esters, in whose synthesis reactions often acts also as solvent. Butanol is also a solvent for lacquers and paints, solvents, an additive used for industrial cleaning, a fuel additive, an eluent for the thin-layer chromatography and a solvent for extraction. The proposed method determines the butyl alcohol injecting GC / FID rate of urine sample previously treated in an appropriate solvent.



This product fulfills all the requirements of Directive 98/79/EC on in vitro diagnostic medical devices (IVD). The declaration of conformity is available upon request.

|        |                                  |         |
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| N° 002 | Butyl Alcohol in urine by GC/FID | 10/2024 |
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## **TECHNICAL FEATURES**

### **Principle of the Method :**

This method enables the butyl alcohol urine by GC-FID. The butyl alcohol is first diluted and then is directly injected into GC.

**Recovery:** 100%

**Sensitivity:** < 1 mg/l

**Dynamic Range of the Method:** 1 – 300 mg/l

**Normal Values:** n.d.

### **Components of the kit :**

All the reagents are ready-to-use and stable 3 years at Room Temperature  $\leq 20^{\circ}\text{C}$ .

**Reagent A – Diluting Solution, 1 x 100 ml**

**Reagent B – Test Solution / Chemical Standard, 1 x 5 ml    Store at 2-8 °C**

### **Minimum Instrumental equipment required:**

GC/MS  
Operational Computer

### **Optional Equipment:**

Autosampler

### **Urine Collection Procedure:**

After work shift, collect 10 ml of urine in a suitable test tube.

Stable 4 weeks at  $-20^{\circ}\text{C}$ .

## **PREANALYTICAL PROCEDURE**

Preparation of Test Solution.

Dispense in a vial of 10 ml:

- 900 µl of **Reagent A – Diluting Solution**
- 100 µl of **Reagent B – Test Solution**

Inject 2 µl of solution into gas chromatograph GC. Verify that the Test solution has retention time similar to fig. 1. If the Test is all right you can start with the analytical procedure; if not, check the functionality of the analytical system.

## **ANALYTICAL PROCEDURE**

**STEP 1:** Preparation of Calibration Standard Solution at 16 µg/l

Dispense in a tube:

- 900 µl of **Urine**
- 100 µl of **Reagent B – Chemical Standard**

**IMPORTANT: This Calibration Standard Solution is prepared from time to time**

To verify that the urine is effectively free from Butyl Alcohol, to prepare a Blank:

- 900 µl of **Urine**
- 100 µl of **H<sub>2</sub>O HPLC grade**

**If the Blank urine presented the peak of Butyl Alcohol, proceed to identify the quantitative difference between the areas / heights of the peaks of Butyl Alcohol in urine enriched and blank.**

Dispense in a tube:

|                                      | <b>Calibration Standard</b> | <b>Control</b> | <b>Sample</b> | <b>Blank</b> |
|--------------------------------------|-----------------------------|----------------|---------------|--------------|
| <b>Calibration Standard</b>          | 100 µl                      |                |               |              |
| <b>Control</b>                       |                             | 100 µl         |               |              |
| <b>Sample</b>                        |                             |                | 100 µl        |              |
| <b>Blank</b>                         |                             |                |               | 100 µl       |
| <b>Reagent A – Diluting Solution</b> | 900 µl                      | 900 µl         | 900 µl        | 900 µl       |

- Put all the supernatant in vials for GC-FID. Inject 2 µl in GC-FID.

**Close vials hermetically**

**Mix at Vortex**

**Place them in the Sampler**

**Prepare work list and start the series according to the system's specifications.**

### **BUTYL ALCOHOL - Warnings**

#### **REAGENT B : TEST SOLUTION / CHEMICAL STANDARD**

|                      |          |
|----------------------|----------|
| <b>BUTYL ALCOHOL</b> | 160 mg/l |
|----------------------|----------|

#### **SET OF GAS-CROMATOGRAPH:**

- Factor Four VF- 624 ms 30 m x 0,32 mm x 1,80 µm Column (conditioned)
- Injector's Temperature 250 °C
- Splitting Ratio about 1:5
- Temperature 60 °C x 3 minutes + 20 °C/min up to 160 °C x 1 minute + 40 °C/min up to 280 °C x 2 minutes (run 14 minutes)
- Column Flow: 1 ml/min
- Detector (FID) Temperature: 250 °C
- Range (sensitivity) of Detector: 12 (max)
- Make Up Flow N<sub>2</sub>: 25 ml/min
- H<sub>2</sub>: 30 ml/min
- Air: 300 ml/min

#### **CONDITIONING OF FACTOR FOUR VF-624 MS COLUMN**

Follow the manufacturer prescription.

#### **CLEANING OF THE COLUMN**

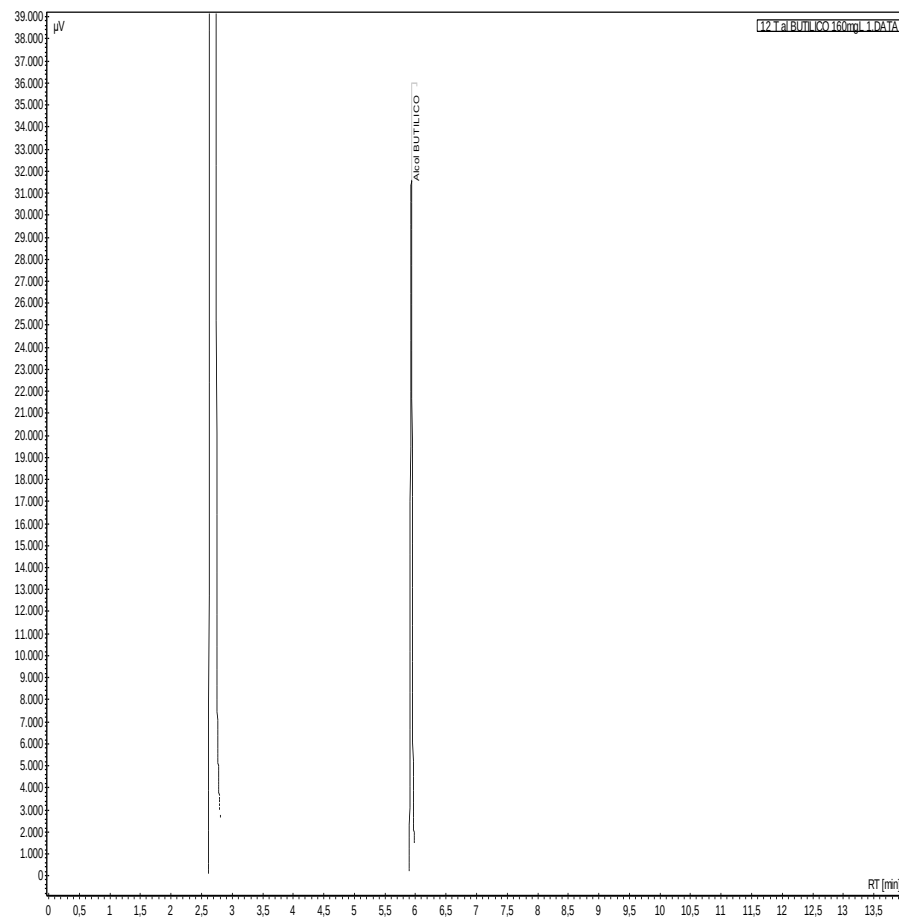
Disconnect the detector. Keep the column at the highest temperature for the recommended time. (See the manufacturer's instructions)

#### **ACCESSORIES AND CONSUMABLES**

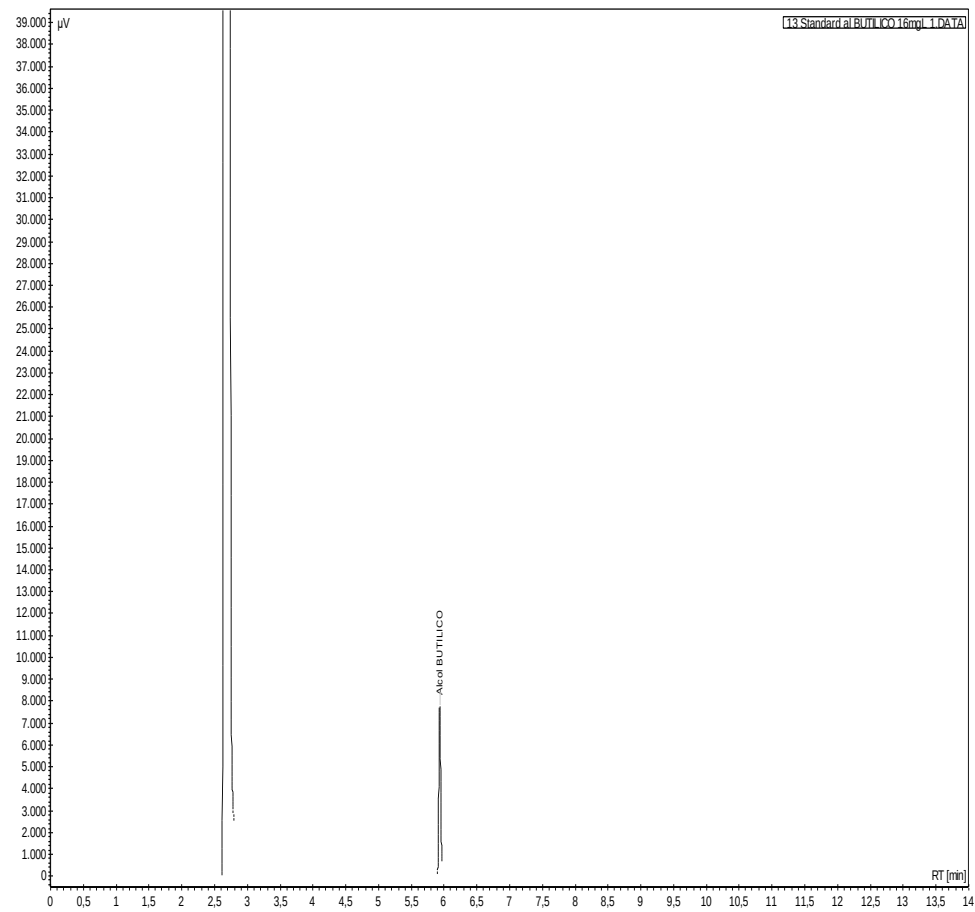
| <b>CODE</b>     | <b>DESCRIPTION</b>                                        | <b>PACKAGING</b> |
|-----------------|-----------------------------------------------------------|------------------|
| <b>GC05520</b>  | Chemical Standard for Butyl Alcohol                       | 1 x 2 ml         |
| <b>ZRE13870</b> | Rxi-624 Sil MS (30 m x 0,32 mm – 1,8 µm) Capillary Column | 1 Pc             |
| <b>S29057U</b>  | Standard glass vials of 2 ml with screw cap               | 1 x 100 Pcs      |
| <b>S29046U</b>  | Caps for Standard glass vials of 2 ml with screw cap      | 1 x 100 Pcs      |
| <b>S24717</b>   | Insert 100 µl for vials of 2 ml                           | 1 x 100 Pcs      |

# BUTYL ALCOHOL IN URINE

(Reference Chromatograms)



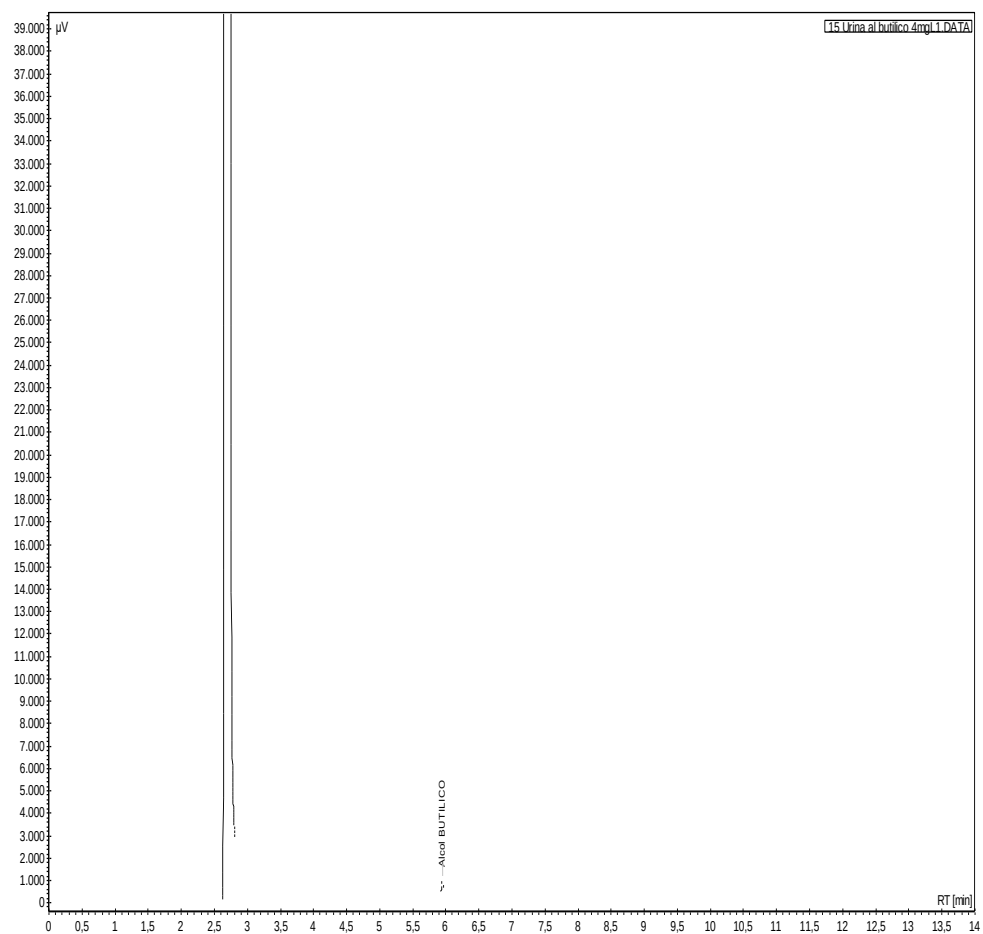
|                 |                                 |
|-----------------|---------------------------------|
| <b>Fig. 1 :</b> | <b>Test Solution</b>            |
|                 | R.T. 6.0 BUTYL ALCOHOL 160 mg/l |



|                 |                                |
|-----------------|--------------------------------|
| <b>Fig. 2 :</b> | <b>Calibration Standard</b>    |
|                 | R.T. 6.0 BUTYL ALCOHOL 16 mg/l |

# BUTYL ALCOHOL IN URINE

(Reference Chromatograms)



|                 |                               |
|-----------------|-------------------------------|
| <b>Fig. 3 :</b> | <b>Urine Sample</b>           |
|                 | R.T. 6.0 BUTYL ALCOHOL 4 mg/l |