



به نام حق

LABORATORY DIAGNOSIS OF ALCOHOLS

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LABORATORY DIAGNOSIS OF ALCOHOLS

الكلها :

- اتانول
- متانل
- ايزوپروپيل الكل (در شيشه پاك كن و..)
- اتيلن گليكول و دي اتيلن گليكول (ضديخ)
- پروپيلن گليكول (ضديخ غيرسمى)
- بنزيل الكل (ماده نگهدارنده)

ETHANOL (C₂H₅OH)

- Fermentation of sugars in fruits , vegetables and ...produces ethanol
- Low molecular weight
- Soluble in water and fat , chloroform and ether
- Clear , colorless , volatile and inflammable ,boils at around 78 c.
- Solvent,antiseptic,beverage

- Alcoholic strength:

- * **vol %**

- volumes of alcohol in 100 volumes of the beverage

- * **Proof Number (proof spirits)**

- Is twice the concentration in vol %
(thus, 100 proof is 50 vol%)

- Beer : 3-8 % V/V
- Wine : 10-15 % V/V
- Distilled Spirits : 40-60 % V/V
- Absolute alcohol : 99.4-100 % V/V

- Ethanol reports in blood and other body fluids:
- mg/mL
- mg/dL
- ug/mL

Table 11-2. Blood ethanol levels after intake of alcoholic beverages.

Beverage (% Ethanol)	Amount Ingested (mL)	Peak Blood Level in a 60-kg Person (mg/mL)*
Beer (3%)	500	0.46
Wine (10%)	250	0.77
Distilled spirits (40%)	50	0.62

*The blood ethanol level falls at a rate of approximately 0.185 mg/mL/h. To calculate the expected blood ethanol level at any other body weight, use the following formula:

$$\left[\frac{60 \text{ kg}}{\text{Subject's weight in kg}} \right] \times \text{Expected level from table} = \text{Expected level in subject}$$

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In blood:

(Adults)

>30 mg/dL	:	drunk
50-150 mg/dL	:	mild intoxication
150-300 mg/dL	:	moderate intoxication
300-400 mg/dL	:	severe intoxication
>400 mg/dL	:	coma , death

-Women and obese men get drunk faster

-fermented beverages may contain more complex alcohols and therefore more toxic

*** TOO MUCH TOO SOON ***

Laboratory diagnosis

- Samples:
 - 1-Biologic
 - 2-Nonbiologic

Laboratory diagnosis

Biologic Samples:

- Blood
- Breath
- Vitreous
- Saliva
- Urine
- CSF
- Hair
- Liver ,bone ,Sweat ,Brain ,Kidney , Bile

Nonbiologic samples:

- Different liquids , Beer ,wine, house-made and...

BLOOD

- Femoral vein blood
- No scooped blood
- Betadine or alcohol
- Sodium flouride 1%
- No heat ,No sunlight

BLOOD...

- Is oxidized to acetaldehyde and CO₂ and water
- Metabolism Rate:
15-20 mg/dL/h
- Golden time:
2-3h (max. 6 h)

- **Laboratory findings:**
- Chronic alcoholism : LFT evaluation
- Urinalysis may be positive for reducing sugars ,acetone or diacetic acid
- Elevation of Amylase in pancreatitis

Methanol (CH₃OH)

- Methyl or wood alcohol: antifreezer, paint remover, a solvent
- Poisoning results from ingestion, Inhalation or skin absorption
- Appear to have more toxicity when containing ethanol
- Fatal dose: 60-250 mL
- Metabolized to formic acid and formaldehyde resulting in injuries to retinal cells
- Liver, kidneys, and heart show parenchymatous degeneration
- Metabolized and excreted at a rate approximately one-fifth that of ethanol (takes a few days)

Methanol...

- Laboratory findings:
- Severe acidosis (bicarbonate level below 15 meq/mL)
- >50 mg/dL in blood is an indication for hemodialysis

Alcohol measurements

1-Qualitative tests(colour tests)

2-Quantitative tests:

Chemical

Enzymatic

Respiratory

GC (GC/MS)

Alcohol measurements...

Quantitative tests:

1- chemical method:

Deproteination-Distillation –adding
Potassium dichromate-OD at 450nm

2-Enzymatic:

ADH-UV spectrophotometer

Plasma(20% more than blood)

Saliva (20% more than blood)

Alcohol measurements...

Quantitative tests:

3- Respiratory (alcohol-breath analyzer , ABA):

Fast , documented , short chain of custody ,
minimal expertation , cheap , non-invasive



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Lifeloc Technologies, Inc.
FC20 u6.24a
Serial No. 02644

Units: mg/100ml

PASSIVE TEST # 1011

Result: NEG

Time: 19:13

Date: 03/29/2013

Last Calibrated:
Cal Standard: 101
Time: 13:21
Date: 03/19/2013

Last Check:
Cal Standard: 101
Result: 108
Time: 13:22
Date: 03/19/2013

Subject

I.D.

patient name

Operator

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Alcohol measurements...

Quantitative tests:

4- GC (GC/MS):

Propak Q – Carbopak 0.3%

Carrier gas : Nitrogen 30mL/min

Col. Temperature: 120

Injector tem. : 150

Detector tem. :200

Alcohol measurements...

Quantitative tests:

4- GC (GC/MS):

Retention time:

Methanol : 0.7 min

Ethanol : 1.9 min

Isopropyl alcohol : 4 min





**REGARDS,
Dr.Ghaziasgar**

