



**ethanol**

# DEFINITION

The word alcohol comes from the arabic 'alkohl' which is a fine metallic powder used in the east to stain the face and eyelids. The name was later extended to mean any powder produced by titration and sublimation, and then to a fluid obtained by distillation.

# ethanol

- Inebriant group, 3<sup>rd</sup> most common in addictive  
Type of alcohol: ethyl alcohol, methyl alcohol etc
- Clear, transparent, colorless volatile liquid with sweet burning taste
- Specific gravity: 0.79 and calorie 29 KJ/g or 7 Kcals/g

- ◎ Absolute alcohol: 99.5 % ethanol
- ◎ Rectified spirit: 95% ethanol
- ◎ Denatured spirit: 90-95% ethanol + 5-10% methanol [methylated / industrial] with crude pyridine
- ◎ Surgical spirit: methylated spirit + castor oil + oil of wintergreen
- ◎ Arrack: country made liquor

# USES

- Beverages
- Solvent- for fat, resins, volatile oil, bromine, iodine, perfumes, mouth wash, colognes, aftershaves etc
- Medicinal-antiseptic, many drugs contain varying amount
- Preservation
- Antidote for methanol

- **Standard Drink:** 10 gm of absolute alcohol is considered 1 unit
- **Proof Spirit:** 57.06% ethanol by volume  
that concentration of ethyl alcohol which weighs 12/13 of the weight of equal amount of distilled water  
or  
minimum concentration of ethyl alcohol which ignites gun powder when mixed.

BEVERAGES	ALCOHOL { %V }	
RUM	42.8	
WHISKY,BRANDY	42.8	
GIN	42.8/40/37.2	
WINES	8-15.5	
BEERS	2-10	
COUNTRY LIQUOR	11.4-45.7	

pratikpatel nhlmmcFM

- absorption: 20% stomach/80% small intestine ..in 1 ½ to 2 hrs
- Almost 100% is absorbed due to smaller molecules
- Not digested prior to absorption
- Blood peak in 90minutes of ingestion
- Rate depends on
  - ✓ Concentration ++
  - ✓ Amount ++
  - ✓ Warmness ++
  - ✓ Soda ++
  - ✓ Empty stomach ++
  - ✓ Motility ++
  - ✓ Surgery ++
  - ✓ Parasympathomimetics ++
  - ✓ Sympathetic or vagal tone - -
  - ✓ Cigaretes - -
  - ✓ Habits ++



- Metabolism in liver-alcohol dehydrogenase pathway- acetaldehyde>acetic acid>CO<sub>2</sub> + H<sub>2</sub>O[ ADH and AIDH] --- 90 % oxidized in liver
- Fat
- Arterial and **venous** blood: less in arterial blood : about 10 %
- Water in tissue: more alcohol concentration
- RBC and plasma: less in RBC , more in plasma
- *Fixed quantity in unit time: zero order kinetic of metabolism*
- Excretion thr' kidney and lungs ... 15mg<sup>0</sup>/hr

- Binds GABA receptors → sedative effects like that of benzodiazepines at cellular level
- Selectively inhibits N Methyl D Aspartate: responsible for tolerance and dependence

# ACUTE ALCOHOL POISONING

- ETHYL ALCOHOL DEPRESSES THE CNS IRREGULARLY IN DESCENDING ORDER FROM CORTEX TO MEDULLA.

**DEPRESSES THE HIGHER  
CENTERS WHICH CONTROL  
JUDGEMENT AND BEHAVIOUR**

**[STAGE OF EXCITEMENT]**

**[BLOOD ALCOHOL 30-100 mg%]**



**DEPRESSES MOTOR CENTERS**

**[STAGE OF INCOORDINATION]**

**[BLOOD ALCOHOL 100-300mg%]**



**FINALLY DEPRESSES THE  
VITAL CENTERS IN THE  
MEDULLA**

**[STAGE OF NARCOSIS]**

**[BLOOD ALCOHOL >300mg%]**

# Mode of action

- CNS depressant > initially suppression of inhibitory neurons causing paradoxical CNS stimulation
- Depression of RAS
- Frontal lobes-mood changes
- Occipital lobes-visual disturbances
- Cerebellum-loss of coordination



# intoxication

- 50 mg% is permissible blood alcohol level as per prohibition act [ 30 mg% ]
- Stage of sobriety [decent] 10-50mg%-Normal behavior
- No significant effect
- Euphoria with easy socialization

## ◎ Stage of excitement 50-150mg%

- Attention span decreased
- cognitive function disturbed
- Sensory perception decreased
- Inhibition control decreased
- Judgment altered
- Mood elated & Talk irrelevant
- AFR[alcohol flush reaction]or AFS[alcohol flush syndrome] –defective allele of AIDH
  - Flushed face and neck with nausea and vomiting
- Vital statistics
  - Pulse tachycardia, full and bounding
  - Temperature increased
  - BP mild hypertension
- Coordination of muscle
  - Fine movements affected
  - In coordination of muscles
  - Decreased reaction time
  - Sluggish reflexes
- Nystagmus due to effect on vestibulocochlear system
  - Three criteria for examination
    - Eye cannot follow a moving object smoothly
    - Distinct and clear jerking at maximum deviation
    - Jerking within 45 degree from center
  - Alcohol gaze nystagmus
    - Horizontal [Pen test] when Blood Alcohol Concentration [BAC] is equal to or more than 80 mg%
    - Vertical BAC still higher
  - Positional Alcohol Nystagmus
    - PAN I: on same side [ starts within 30 min, seen up to 3-4 hrs]
    - PAN II: on opposite side [ starts after 1-2 hrs of PAN I, lasts up to 10 hrs] *seen during hangover*

- Stage of incoordination 150-300mg % medico legally important stage
  - Incoordination of thoughts
  - Incoordination of speech
  - Incoordination of movements
- Stage of narcosis > 300 mg% McEwan sign
- Fatal dose 450 mg%



- Woodbury test [ dichromate test ]
  - 5 ml of 10 % Na Dichromate in 50 % sulphuric acid in 5 ml urine – Green
- Bedside test
  - 5 ml urine + 1ml Acetic acid + 1 drop sulphuric acid + heat gently for few minutes –emits strong fruity odour

- Micturition syncope-when rises from bed to pass urine
- Munich beer heart-dilatation and hypertrophy of heart
- wernick's encephalopathy
  - Ataxia
  - Encephalopathy
  - Oculomotor disturbances
- Delirium tremens
- Marchiafava's syndrome-degeneration of corpus callosum
- Mallory-Weiss syndrome-rupture of oesophagus with mediastinitis
- Saturday night paralysis
- Mania a potu: extreme excitement with homicidal tendency
- Korsakoff's psychosis
  - Amnesia
  - Confabulation
  - polyneuropathy

# Sub chronic alcoholism

- Alpha: psychological dependence
- Beta: physical disease state no physical dependence
- Gamma: mild physical dependence
- Delta: strong physical dependence
- Epsilon: periodic binges with abstaining in between
- Battered alcoholic syndrome; three or more fractures of different stages of healing as a result of trauma under influence of alcohol

# Treatment



- To ensure vital functions
- Take care of ABCD
- Gastric lavage /activated charcoal
- Nikethemide
- Dextrose[50-100 ml slow iv] with insulin[15 units]
- Thiamine 100 mg iv
- iv fluids
- FLUMAZENIL [3mg. i.v.] Has been shown to be effective in reversing the respiratory depression.