

# Acid and alkali poisoning

# Acids

- concentration, time of act
- precipitation and dissolving proteins – **coagulation necrosis**
- cause dehydration of tissue and with water some acids are heat up and create termic changes
- after consume of acid it can immediately come collapse and quickly death

**Autopsy finding:** constricted stomach, stomach wall is oedematous and fat up to 1cm. Vessels are filled by black altered blood, up to tarry clots (acid hematin).

# Sulphuric acid - $\text{H}_2\text{SO}_4$

- deadly dose is dependent on concentration
- approximately 4 – 6 g
- symptoms immediately after swallow - burning pain in the mouth, neck, oesophagus, stomach and in the abdomen, very painful and continuous, than man screaming of pain and faint
- soon after consume begin vomiting of acid
- intestine constipation and in the urinary bladder is only little of urine
- intensive thirst with swallowing disorders, attempt to drink lead to new vomiting
- dehydration occur
- heavy and noisy breathing, hoarse voice, speaking latter impossible
- after absorbtion – nervous symptoms, alcali of blood decrease

# Hydrochloric acid - HCl

Deadly dose at concentrate acid is 10 – 15 g,  
at children approximately 2 g

Symptoms are similar as at sulphuric acid

# Nitric acid - $\text{HNO}_3$

Deadly dose is approximately 8 g, death be coming approximately 12 hours after consume.

Vomit liquid has lemon up to orange coloration.

**Autopsy:** at nose is yellow foam, finding is similar as at another acids, but epithelium is yellow.

# Acetic acid - $\text{CH}_3\text{COOH}$

Deadly dose is approximately 12 g, death be coming 1,5 hours up to 2 days after consume.

Symptoms: burning pain in the mouth and pharynx, pain in the stomach and abdomen. Becam thirst, vomiting, noisy breathing, irritable cough, temperature grow up.

Nervous signs – tremors, paralysis of the extremities.

**Autopsy:** similar finding on the body as at anorganic acids.

# Oxalic acid - $(\text{COOH})_2$ - $\text{CH}_3\text{COOH}$

Deadly dose is 15- 20 g, death be coming after 10 minutes up to 30 hours.

After consume begin burning in the mouth and in the oesophagus, vomiting, pains in the abdomen, hoarse voice. Vomit liquid is greenbrown up to black. Rising consciousness disorders, fibrillations of muscles, spasms, paleness, skin is cold, temperature go down.

**Autopsy finding:** basicly same as at acid. Oxalic acid uptake calcium from tissue and form insoluble calcium oxalate, calcium oxalate crystals can find under epithelium of stomach and intestine. Body loss calcium, it lead to muscle malfunction. In the kidney we can see crystals already macroscopically.

# Lemon, tartaric and lactic acid

Deadly doses

30 g lemon acid

10 g tartaric acid

Rising acidosis and cause of death is methaemoglobinaemia and production of acid haematin.

# Formic acid - $\text{HCOOH}$

Deadly dose 2g

Strong irritable effect

Inflammation of kidneys

# Alkali

Hydroxide create with proteins alkalic substances (albuminates) and not coagulate proteins.

Dissolving proteins, thereby rising gelatine masses and **colliquative necrosis**, which is sticky.

Acid create coagulation necrosis!!!

# Potassium and sodium hydroxide

## KOH & NaOH

Deadly dose: 80 – 100 g

Symptoms: burn on the skin or necrosis, healing by scars.

Per os: promptly burning pain in the mouth, oesophagus, stomach and in the abdomen. Vomit liquid have strong alkali reaction and there are parts of epithelium and blood. Cold feelings, salivation and tremor.

**Autopsy finding:** burn around mouth, epithelium in the stomach is incrassate(fat) and sticky. Lining is gelatinous, toxic damage of myocardium, in the liver necrosis.