



Alcohol

Alcoholic beverages

- Beer

$10^{\circ} = 4 \text{ vol. \%}$ ($3.16 \text{ g v } 0.1 \text{ l} = 15.8 \text{ g v } 0,5 \text{ l}$)

$12^{\circ} = 5 \text{ vol. \%}$ ($3.95 \text{ g v } 0.1 \text{ l} = 19.7 \text{ g v } 0,5 \text{ l}$)

- Wine – cca 11% ($7.9 \text{ g v } 0.1 \text{ l} = 15.8 \text{ g v } 0.2 \text{ l}$)

- Spirits – 40 % ($31.6 \text{ g v } 0.1 \text{ l} = 15.8 \text{ g v } 0,05 \text{ l}$)

Blood-alcohol concentration (BAC)



Absorption

- Fullness and content of the stomach
- CO₂ content
- Concentration
- Temperature

Metabolism of ethanol

- ADH (alcoholdehydrogenase)
- MEOS (microsomal ethanol oxidation system)
- Catalase

1. Alcohol
2. Acetaldehyde
3. CO₂ and water

Velocity of elimination

- 0.12 – 0.20 g/kg per hour

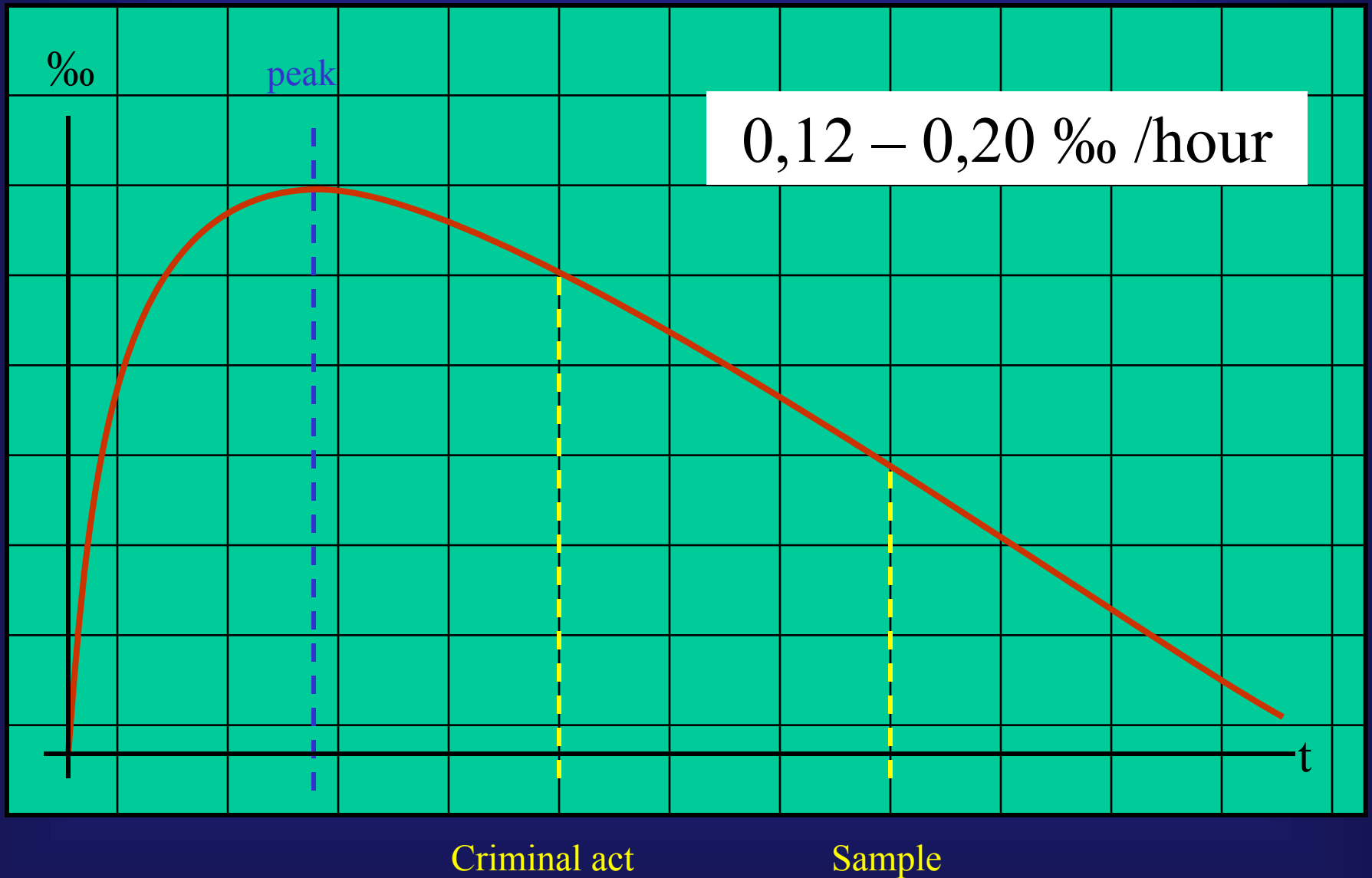
Analysis of alcohol

1. Specific gas chromatography – physical method
2. Non-specific Widmark's proof – chemical method

Calculation

1. Backward calculation
2. Balance calculation

Backward calculation



Balance calculation (formula)

$$\text{BAC } \text{‰} = \frac{\text{Alcohol (g)} - \text{absorption deficit}}{\text{Weight (kg)} \times \text{reduction factor}}$$

absorption deficit = 10%

reduction factor: ♀ = 0.6

♂ = 0.7

Example

- Man (weight 70 kg) drank from 7.00 p.m. till 9.00 p.m. five snifters „shots“ (0.05 l) of vodka (40 vol. %).
- ? BAC at 11.00 p.m. ?

Example - result

$$C_t = \frac{79 - 7.9}{70 \times 0.7} - 0.20 \times 4 = 0.65$$

$$C_t = \frac{79 - 7.9}{70 \times 0.7} - 0.12 \times 4 = 0.97$$

$$C_t = 0.65 - 0,97 \text{ g/kg}$$