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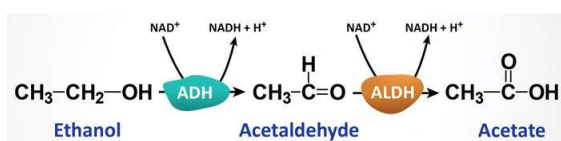
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Case study: Chemical pollutants - Toxicology

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Toxicokinetics of ethanol



- Mechanism**

- Mainly enzymatic (alcohol dehydrogenase ADH)
ADH1... ADH7.
- Limiting factor (alcohol dehydrogenase, reoxidation of NADH).
- Successive decomposition into acetaldehyde and acetate.

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Factors of inter-individual variability

- **Factors of inter-individual variability**
 - Body mass
 - Physical activity
- **Genetic polymorphism of ADH**
 - Proportion of ADH alleles varying by ethnicity
ADH allele frequency (%) by ethnicity (from Borson and Li, 1986)

	Fréquence (%)				
	ADH 2*1	ADH 2*2	ADH 2*3	ADH 3*1	ADH 3*2
Caucasoides américains	> 95	< 5	< 5	50	50
Caucasoides européens	85	< 15	< 5	60	40
Asiatiques (Japonais)	15	85	< 5	95	5
Atro-Américains	85	< 5	15	85	15

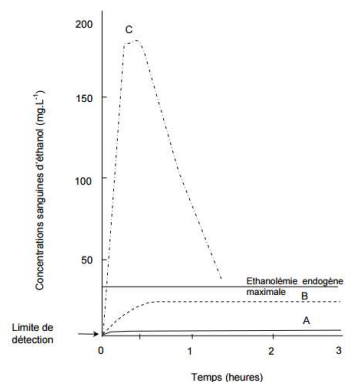
Elimination kinetics of ethanol

- **Zero order elimination**
The body eliminates about 0.015 (0.01-0.06) g/100 mL blood/hour (one beer)
Retrospective evaluation of blood alcohol [].

Example: ethanol removal after 6 beers (60 ml)

Ethanol	Time after Ethanol Consumption (h)						
	0	1	2	3	4	5	6
Ethanol eliminated (ml)	0	10	10	10	10	10	10
Ethanol remaining (ml)	60	50	40	30	20	10	0
Ethanol eliminated (% of remaining)	0/60	10/60	10/50	10/40	10/30	10/20	10/10
	0	17	20	25	33	50	100

Inhalation vs. Ingestion



Comparison of EtOH concentration in blood after ingestion and inhalation of vapors.

A. Inhalation (1900 mg/m³, at rest, 3hrs)

B. Inhalation (1900 mg/m³, intense physical work, 3hrs)

C. Ingestion (11 g)

Source: Anses