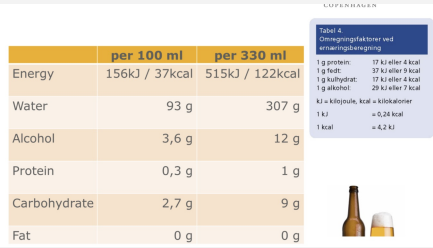
Alcohol

Absorption	Ethanol is absorbed in small intestine and metabolised in liver
Metabolis-ation factors	Gender, body fat, liver size, amount of metobilitic enzymes
Metabolism slide	

Beer composition

Water	Beer is 93% water, which counters dehydration
	Also helps with uric acid -> kidnet stones
	Helps mineral balance
	Better water to calories ratio
	Low alcohol (free) beer is isotinic (have same tension)
Water numbers	1 g of alchol -> 10ml urine excretion
	Alcohol makes you pee more by supression of vassopressin, which is hormone that reuptakes water
	Dehydration -> hangovers
Net water intake	330ml beer -> 191 ml
	125ml wine -> -11
Health benifits	Less kidney stones (40% risk reduciton)
	Beer after exercise does not decrease water uptake

Major nutrients

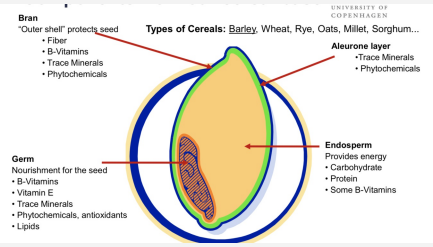


	per 100 ml	per 330 ml
Energy	156kJ / 37kcal	515kJ / 122kcal
Water	93 g	307 g
Alcohol	3,6 g	12 g
Protein	0,3 g	1 g
Carbohydrate	2,7 g	9 g
Fat	0 g	0 g

Calorie counts and exercise

Beer	12 oz = 150 kcal, alcfree 100 kcal
Red wine	125 kcal (antiinflammatory)
Pina Colada	6 oz = 460 kcal
Margarita	280 kcal
100 kcal is	Casual biking: 23 min
	LIfting weights: 15 mins
	Pilates: 24 mins
	Swimming: 15 mins moderate intensity

Nutrients



Nutrients II

Major nutrients	readily available carbohydrates: 10 - 60 g/litre as dextrins

Nutrients II (cont)

	little free sugars: < 5 g/litre – typical lager = 1 g/litre
	Fibre: 1 beer contains 3-6% of the daily requirement for fibre
	no fat
	protein as small peptides – 2 - 6 g/litre
Trace nutrients	vitamins, minerals, antioxidants, other hop compunds
Vitamins	Cereals good for B vitamins, malting increases B9 and B6 (spouting), B2 from yeast
	Beer is more vitamin rich than beer
	Too high levels of homocysteine = heart disease, increase in level of homocysteine after wine and spirits consumption, but not for beer
	Lots of potassium and magnesium in beer
	lots of silicon in beer, which is not readily available anymore in water
	antioxidants in beer help against free radicals that can start cancers
Polyph-enols	positive: beer taste and aging stability, health

Nutrients II (cont)

negatives: haze (together with proteins), astringent bitterness

beer < white wine < red wine, beer has way less

shown to protect LDLs from oxidation

Health

Harmful effects	Accidents, brain degeneration, hepatits, cancer, stroke
Amount pr week	7 for women, 14 for men, stop before 5 on one occasion
Most consumed alcohol	Wine, then beer
Habits	Beer drinkers were generally more unhealthy compared to wine drinkers
Beer vs wine	Higher drinking frequency, shorter education, lower income, more men, more smoking, lower exercise, less healthy diet

Calculation of BAC

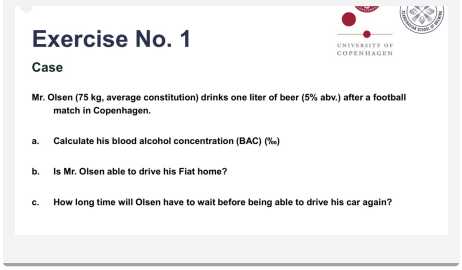
Formula	C=A/(p*r)
C	BAC
A	Alcohol intake in grams
p	body weight in kg
r	distribution or reduciton factor

Calculation of decrease in BAC

Formula	C_t = C_0 - k * t
C_t	current BAC in promille
C_0	legal BAC in promille
k	individual factor, ca 1/400
t	time in minutes
rule of thumb	bac decreases 0.15 bac/hr

Exercise slides for examples

Exercise 1



Exercise No. 1

Case

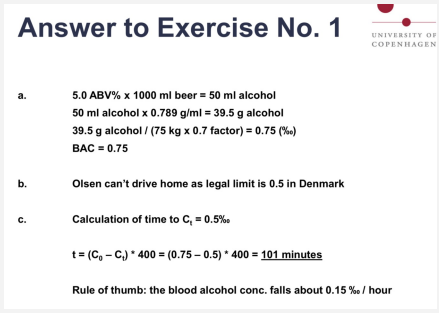
Mr. Olsen (75 kg, average constitution) drinks one liter of beer (5% abv.) after a football match in Copenhagen.

a. Calculate his blood alcohol concentration (BAC) (‰)

b. Is Mr. Olsen able to drive his Fiat home?

c. How long time will Olsen have to wait before being able to drive his car again?

Exercise 1 answers



Answer to Exercise No. 1

a. 5.0 ABV% x 1000 ml beer = 50 ml alcohol
50 ml alcohol x 0.789 g/ml = 39.5 g alcohol
39.5 g alcohol / (75 kg x 0.7 factor) = 0.75 (‰)
BAC = 0.75

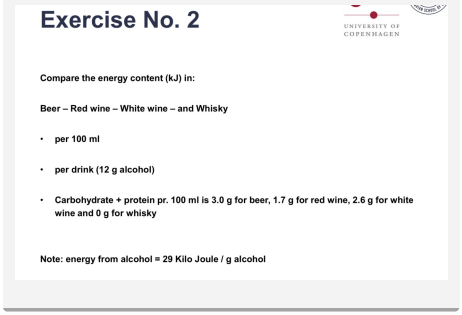
b. Olsen can't drive home as legal limit is 0.5 in Denmark

c. Calculation of time to C_t = 0.5‰

$t = (C_0 - C_t) * 400 = (0.75 - 0.5) * 400 =$ 101 minutes

Rule of thumb: the blood alcohol conc. falls about 0.15 ‰ / hour

Exercise 2.1



Exercise No. 2

Compare the energy content (kJ) in:

Beer – Red wine – White wine – and Whisky

- per 100 ml
- per drink (12 g alcohol)
- Carbohydrate + protein pr. 100 ml is 3.0 g for beer, 1.7 g for red wine, 2.6 g for white wine and 0 g for whisky

Note: energy from alcohol = 29 Kilo Joule / g alcohol

Exercise 2.1 answers

Calculation

Find amount of alcohol in 100 ml:
(4.6 / 100) ml/ml x 100 ml x 0.789 g/ml = 3.63 g alcohol

Find energy from alcohol in 100 ml:
3.63 g alcohol x 29 kJ/g = 105 kJ

Find energy from other macro nutrients:
2.7 g carbohydrate x 17 kJ = 46 kJ

0.3 g protein x 17 kJ = 5.1 kJ

Total energy content in 100 ml beer: 156 kJ

Exercise 2.2

Energy content in alcoholic beverages

Note: Alcohol density = 0.789 g/ml. Energy from alcohol = 29 kJ/g

	Beer 4,6% vol. (330 ml)	Red wine 12% vol. (125 ml)	White wine 12,5% vol. (125 ml)	Whisky 46% vol. (33 ml)
Energy content per 100 ml				
Energy content per drink				

Effects of alcohol consumption

2-4 drinks (men) 1-2 (women)	mortality protection of 18%
Jshaped curve	Risk goes down with moderation, goes up with excessive use
HDL and LDL	High density lipoprotein up with alcohol (good choles-terol)
	LDL down with alcohol (bad cholesterol)
diabetes in moderate drinkers	30% reduced risk of diabetes
	alcohol is anti-inflammatory

Effects of alcohol consumption (cont)

	enhanced insulin sensitivity with lower plasma insulin concentrations (risk factor for diabetes)
	partly due to lower average weight of drinkers (obesity is a risk factor for diabetes)
Cognotive function	Alcohol decreases arteriosclerosis in brain vessels, Protective antioxidative effects of polyphenols on cerebral cells (both good)
	“regular consumers of alcohol had a significantly lower risk of Alzheimer’s compared to non-drinkers”, protection was 50% for moderate drinkers
	1-6 drinks/week associated with lower risk of dementia in ≥ 65year adults, 20% reduction in dementia risk for moderates

Effects of alcohol consumption (cont)

	Alcohol triggers release of dopamine, a hormone, which plays a major role in reward-motivated behavior
Osteo porosis	“a positive association between alcohol intake and bone mineral density in older women has been reported in the original Framingham Osteoporosis Study“
	Suppression of gradual bone loss that increases with age, called resorption, Positive effect of silicon on bone formation
	Moderate consumption of alcohol may be beneficial to bone mineral density in men and postmenopausal women. The tendency toward stronger associations between BMD and beer or wine, relative to liquor, suggests that constituents other than ethanol may contribute to bone health.

Exercise 2.2 answers

Energy content in alcoholic beverages

	Beer 4,6% vol. (330 ml)	**Red wine** 12% vol. (125 ml)	**White wine** 12,5% vol. (125 ml)	**Whisky** 46% vol. (33 ml)
Energy content per 100 ml	156 kJ	303 kJ	330 kJ	1053 kJ
Energy content per drink	515 kJ	379 kJ	413 kJ	347 kJ

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