EFFECTS OF MODERATE INTAKE OF INDUSTRIAL BEER ON SERUM HOMOCYSTEINE.

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INTRODUCTION - **Beer is the oldest and most produced alcoholic beverage worldwide, it is a rich source of folate and vitamin B_6, molecules involved in the pathways of homocysteine (HCY), whose deficiency can induces a rise in serum HCY. Since HCY is a risk factor for cardiovascular disease, any reduction of this molecule, reduces the risk of heart failure.**

Aim of this research was to evaluate if a moderate consumption of industrial beer could reduce the serum HCY level and consequently protect the cardiovascular system.

METHODS - **The study involved a group of 11 men and 6 women, healthy, omnivorous, with normal BMI (20-24.9), non-smoking and not taking oral supplements or oral contraceptives.**
After initial adjustment, diets were the same for the whole length of the experiment. Subjects received for a periods of 3 weeks each a single dose of industrial beer (330 ml = 13.5 g of alcohol). Blood samples were taken at the beginning and at the end of the experiment and analysed for: liver transaminase (GPT and GGT) C reactive protein (PCR), vitamins B_6 and B_{12}, folic acid.
After the end of the experimental period, volunteers was asked to avoid alcohol for 3 week and a blood sample was taken also at the end of this period.
Statistical analysis of data has been performed using Bonferroni's test and the SAS 9.3 software.

RESULTS - **The consumption of a moderate amount of beer did not affect neither liver transaminases GPT (20.0 *vs* 18.7 U/L) and GGT (17.2 *vs* 17.3 U/L) nor C reactive protein (1.0 *vs* 1.3 mg/L), while HCY decreased (7.48 *vs* 6.21 µmol/L; P = 0.0078). No differences were observed for vitamin B6 (17.6 *vs* 12.1 ng/mL) and B12 (362.8 *vs* 353.2 pg/mL), while folic acid increased (3.49 *vs* 3.96 ng/mL; P 0.0047).**

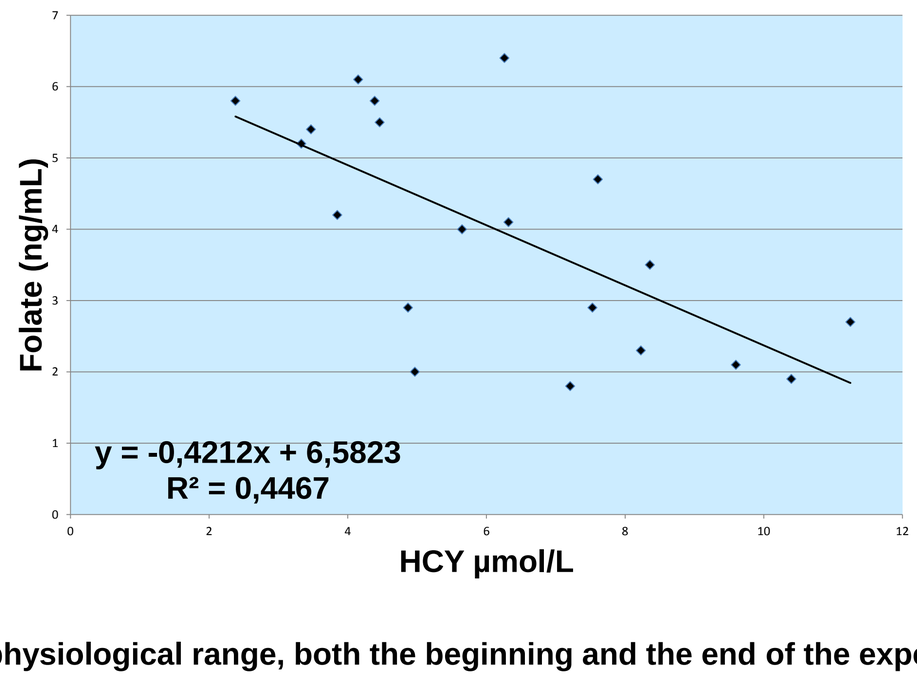
Table 1. Effect of a daily consumption of industrial beer (330 ml – 13.5 g of alcohol) for 3 weeks, on liver function, inflammation, vitamins and HCY blood levels.

	GPT (< 55 U/L)	GGT (12-64 U/L)	PCR (< 5 mg/L)	Vit B 6 (4.1-43.7 ng/mL)	Vit B 12 (187-883 pg/mL)	Folic acid (> 3 ng/mL)	HCY (< 14 µmol/L)
Beer 0 d	**20.00 ± 13,8**	**17.25 ± 8,3**	**1.02 ± 1,9**	**17.57 ± 12,1**	**362.80 ± 132,7**	**3.49 ± 1,5**	**7.48 ± 2,5**
Beer 21 d	**18.70 ± 11,3**	**17.35 ± 7,3**	**1.33 ± 2,3**	**18.12 ± 11,6**	**353.19 ± 119,9**	**3.96 ± 1,6**	**6.21 ± 2,5**
P	***0.1185***	***0.8680***	***0.1818***	***0.8236***	***0.3430***	***0.0047***	***0.0078***
Water period	***19,64 ± 10,0***	***17,48 ± 6,9***	***1,55 ± 2,8***	***23,22 ± 13,1***	***331,36 ± 87,8***	***3,96 ± 1,5***	***6,46 ± 2,4***

As reported in figure 1, there is a clear and inverse relationship between folic acid and HCY blood levels (r^2 = 0.447; P <0.01), while no significant relationship were detected for vitamins B6 and B12:

	r^2
Vitamin B_6	**- 0,016**
Vitamin B_{12}	**- 0,187**

Figure 1. Relationship between blood levels of folate and HCY after 3 weeks.



DISCUSSION - **Data reported in table 1 shows that all blood parameters were within the physiological range, both the beginning and the end of the experiment. As reported in the study of Van der Gagg et al (2000) a moderate beer consumption reduces HCY content, but while in that research was the vitamin B_6 the more probable reason of HCY reduction, in our experiment we observe that HCY reduction was linked to a raise in folic acid blood levels.**
Saccharomyces cerevisiae **is known to be a dietary source of folic acid (Witthöft et al, 1999) and yeasts used for beer production enrich the product with this vitamin. This could explain the inverse trend observed between folate and HCY.**

CONCLUSION - **Our results support the hypothesis that a moderate daily intake of beer (about 1 alcoholic unit) can reduce HCY without any negative effect on liver function.**

REFERENCES - **Van der Gaag et al (2000) Effect of consumption of red wine, spirits and beer on serum homocysteine. *The Lancet*, 355:1522.**
Witthöft et al (1999) Folates-food sources, analyses, retention and bioavailability. *Scand. J. Nutr., 4:* 138-146.

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