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# The effect of xanthohumol-supplemented beer on angiogenic and inflammatory *in vivo* assays

**R. Costa<sup>1</sup>, D. Duarte<sup>1</sup>, T. Taveira<sup>1</sup>, A. Pirraco<sup>1</sup>, P. Coelho<sup>2</sup>, L. Guardão<sup>1</sup>, R. Soares<sup>1</sup> and R. Negrão<sup>1</sup>**

<sup>1</sup> Department of Biochemistry (U38-FCT), Faculty of Medicine, University of Porto, Portugal.

<sup>2</sup> Escola Superior de Tecnologia da Saúde do Porto, ESTSP, Portugal

Angiogenesis is a process by which new blood vessels are formed from pre-existing ones and can occur in adulthood during tissue regeneration. This process is closely related with inflammatory conditions [1,2].

Due to their notable biological activities, phenolic compounds have an important role in nutrition and human health. Special attention has been given to xanthohumol (XN), a compound present in hops and beer [3].

Our purpose was to evaluate the effects of a XN-supplemented beer on angiogenesis and inflammation, in a rat skin-wound healing process.

Six week old Wistar male rats drank water, 5% solution ethanol, stout beer or stout beer supplemented with 10 mg XN/L, during 4 weeks. Then, two incisions were created on the dorsal skin. Animals continued beverages consumption for 7 days. The number of vessels in the incision area (vWF staining), NO release, NAG activity and IL-1 $\beta$  content in serum were measured. Analyses of serum biochemical markers of hepatic function (AST, ALT and ALP activities) and of metabolic status (glucose, triglycerides, cholesterol, VLDL, LDL and HDL) were evaluated. GSH/GSSG plasma levels were measured in plasma by HPLC. Statistical differences were evaluated by ANOVA followed by the Bonferroni test. Differences were considered significant whenever  $p < 0.05$ .

The consumption of XN-supplemented beer led to decreased number of vessels in the wound area, and decreased NAG activity, NO and IL-1 $\beta$  content in the serum when compared to stout beer. Plasma biochemical markers of hepatic function and metabolic status did not change with the distinct beverages consumption. GSH/GSSG ratio increased with ethanol and beer consumption.

Altogether, these findings suggest that gastrointestinal administration of XN-supplemented beer may affect the wound healing process, in what concerns inflammation and angiogenesis, without hepatotoxic effects. Ethanol consumption seems to improve plasma anti-oxidant protection. These health-promoting properties of XN can be interesting to the brewing community.

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## References:

[1] C. Costa, J. Incio, R. Soares, *Angiogenesis* 10 (2007), 149-66.

[2] A. Albini, R. Dell'Eva, R. Vené, N. Ferrari, D.R. Buhler, D.M. Noonan, G. Fassina, *The FASEB Journal*, 20 (2006) 527-529.

[3] P.J. Magalhães, D.O. Carvalho, J.M. Cruz, L.F. Guido, A.A. Barros, *Nat. Prod. Communications*, 4 (2009), 591-610.