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Use of high pressure to increase the content of xanthohumol in beer wort

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Xanthohumol (XN), a hop (*Humulus lupulus* L.) prenylflavonoid also found in beer, exhibits a large spectrum of biological activity, such as anti-carcinogenic, antioxidant, anti-inflammatory and anti-infective [1]. During beer production, XN extracted from the hops through wort boiling is largely converted into its isomeric flavanone, isoxanthohumol (IXN), this being the reason why commercial beers around the world are characterized by a very low content of XN [1]. This situation leads to a great interest in the production of XN enriched beers for their enhanced health benefits.

Apart from its main commercial use in the cold pasteurization of foods, high (hydrostatic) pressure (HP), up to 500-600 MPa, has recently been suggested as a promising method to carry out faster and more efficient extraction processes at room temperature [2]. This work aimed to evaluate the possible use of HP, at room temperature, to extract XN from hop into beer wort, in order to produce worts with higher XN content for the development of XN enriched beers.

"Lager" and "dark" worts were pressurized at room temperature from 100 to 500 MPa (1000 to 5000 atm) for 5 and 15 minutes, using hop pellets (type 45, Czech Saaz variety) as XN source. The pressurized wort samples presented higher amounts of XN (up to 5-fold), compared to the boiled ones, while the amounts of IXN were very small. These results indicate that XN extraction occurs, under HP, with very little isomerization. For 5 min extractions, at 100 to 250 MPa, the amount of XN in wort was linearly correlated with the pressure used ($R^2=0,891$). "Dark" wort samples present higher levels of XN than "lager" wort samples.

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References

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