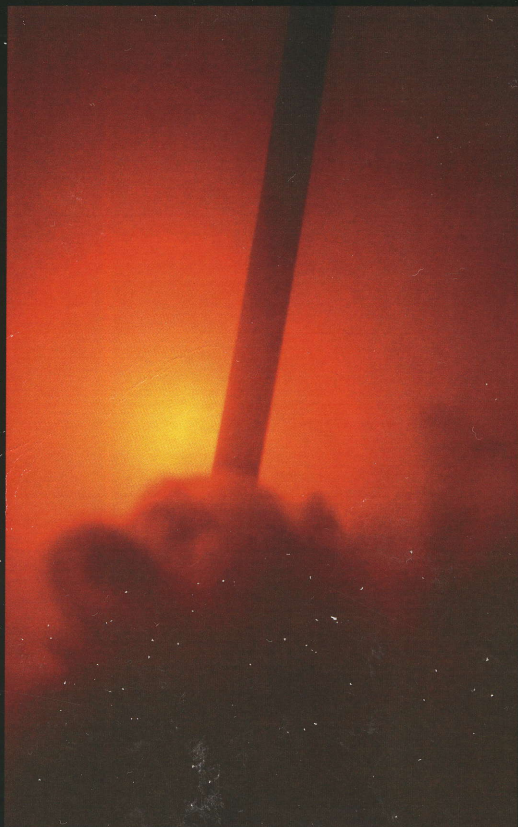


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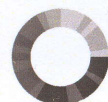


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EVALUATION OF ETHYL CARBAMATE RISK IN RELATION TO YEAST STRAIN AND WINE AGEING CONDITIONS

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Ethyl carbamate (EC), *alias* urethane, is the ethyl ester of carbamic acid recognised since 2007 by IARC as probably carcinogenic to humans. Its mean intake per day was evaluated at about 15 ng/kg bw coming from several fermented food and drinks, excluding the contribution of alcoholic beverages where EC concentration can reach 12 mg/L (Weber and Sharypov, 2009). EC in wines mainly derives from the direct chemical reaction between urea and ethanol, the former being produced during fermentation from arginine, citrulline and ornithine (Ough et al., 1988; Stevens and Ough 1993; Kodama et al. 1994) whereas in spirits the main precursors are cyanides (Butzke and Bisson, 1997; Aresta et al. 2001). The final amount of urea in wine is related to yeast genotype, grape variety and fermentative conditions (Bertrand 1993; Ough et al., 1990; An and Ough, 1993; Larcher et al., 2007) and strategies for minimising the risk of EC synthesis were reported by Butzke and Bisson (1997) highlighting the role of temperature throughout ageing.

The present work investigated using GC-MS the development of EC during an accelerated ageing in bottle at 40°C under dark conditions for 152 days. Sixty white wines from 6 varietal juices fermented using 10 yeast strains were considered.

Under the experimental conditions applied, reaction did not reach plateau conditions - confirming Hasnip et al. (2004) - and urea was converted in EC with a mean rate of 3.4%.

On the basis of the results achieved, in the case of wines with at least 20 mg/L urea less than 5 days at 40°C were sufficient to give 15 ÷ 30 µg/L EC, a warning content in many Countries. These temperature condition can be easily reached during not conditioned wine shipping or storing in not specialised shops. The use of particular yeast strains (i.e. La Claire SP665; Maurivin Platinum) proved the possibility to minimise urea content in wine, thus reducing EC risk.

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