Vitis **34** (3), 195–196 (1995)

Research Note

Identification of some *o*-aminophenones as secondary metabolites of *Saccharomyces cerevisiae*

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S u m m a r y : During fermentation of a peculiar model medium a strain of *Saccharomyces cerevisiae* var. *cerevisiae* (S1C) yeast from our collection was able to produce *o*-aminoacetophenone as well as other metabolites tentatively identified as *o*-aminopropiophenone and 3-(*o*-aminophenyl)-prop-1-en-3-one.

K e y w o r d s : *o*-aminophenones, *Saccharomyces cerevisiae*, fermentation by-products.

Introduction: The identification of some *o*-aminophenones as volatile by-products of *Saccharomyces cerevisiae* var. *cerevisiae* is reported in this note.

o-aminoacetophenone which usually occurs in musts and wines of *V. vinifera* x *V. labrusca* hybrids (Acree *et al.* 1989) has been recently identified in *V. vinifera* wines (Rapp *et al.* 1993) and considered as a contributor to the "hybrid-naphthalene" off-flavour.

Materials and methods: C o m p o s i t i o n o f r a w m o d e l n u t r i e n t m e d i u m : $(NH_4)_2SO_4$ 0.9 g/l; $(NH_4)_2HPO_4$ 0.9 g/l; saccharose 200 g/l; tartaric acid 4 g/l; NaOH for reaching pH=3; $CaCl_2$ 0.1 g/l; NaCl 0.1 g/l; KH_2PO_4 1 g/l; $MgSO_4 \cdot 7\ H_2O$ 0.5 g/l; $NaMoO_4 \cdot 7\ H_2O$ 200 µg/l; $ZnSO_4 \cdot 7\ H_2O$ 400 µg/l; $CuSO_4 \cdot 5\ H_2O$ 40 µg/l; H_3BO_3 500 µg/l; KI 100 µg/l; $FeCl_3 \cdot 6\ H_2O$ 400 µg/l; $MnSO_4 \cdot H_2O$ 400 µg/l.

The two media were prepared by adding to the above raw medium: (1) vitamin B6 (100 µg/l) and tryptophan (100 mg/l), (2) vitamin B6 (100 µg/l). All the media were sterilized by filtration with 0.2 µm membrane prior to the yeast cells inoculum. 10^3 cells/ml of a *Saccharomyces cerevisiae* var. *cerevisiae* strain (S1C) from our collection were inoculated and the temperature was kept at 20 °C during the fermentation.

S a m p l e p r e p a r a t i o n f o r G C - M S a n a l y s i s : 200 ml of each fermenting medium after addition of 1-heptanol as internal standard (67.4 µg) were eluted through a 10 g C18 reversed phase cartridge (Millipore), in order to absorb lipophylic compounds (from Di Stefano 1991). After washing with 50 ml of water, the adsorbed compounds were eluted with 50 ml of CH_2Cl_2. The extract was dried on $CaSO_4$, and reduced to a volume of about 0.5 ml, before GC-MS analysis.

A GC 5890 with 5970 mass selective detector Hewlett Packard, equipped with J&W DB-WAX (30 m;

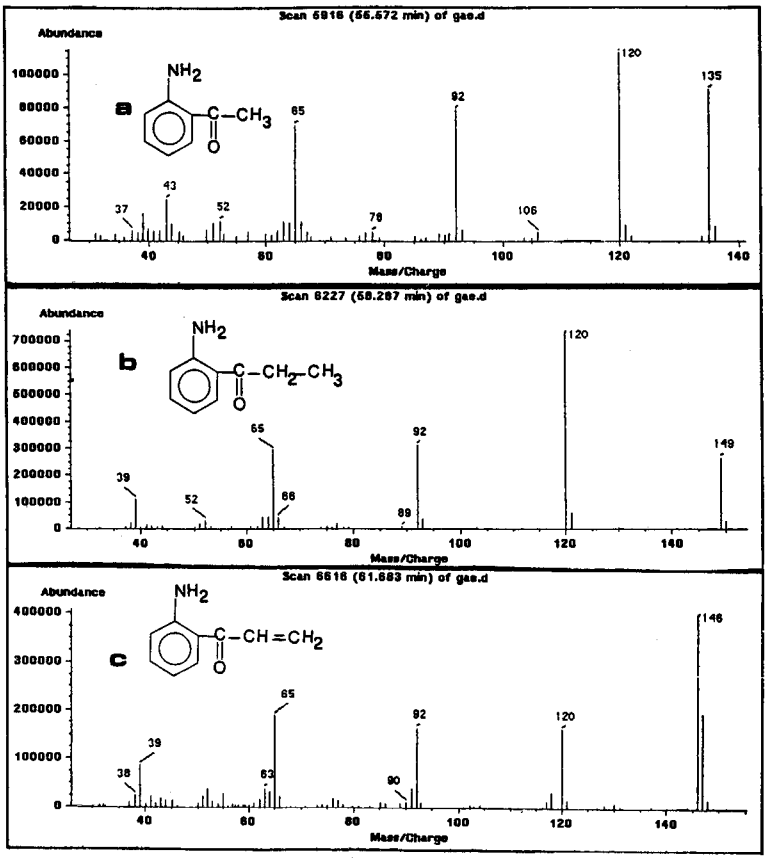

Figure: Mass spectra of *o*-aminophenones identified in medium (1) fermented by a *Saccharomyces cerevisiae* var. *cerevisiae* strain: a) *o*-aminoacetophenone, b) *o*-aminopropiophenone, c) 3-(*o*-aminophenyl)-prop-1-en-3-one.

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0.32 mm i.d.; d.f. = 0.32 μm) WCOT capillary column was used. Mass spectra were recorded at 70 eV with a total ion acquisition programme. The response factor for semiquanti-tative analysis is 1.

Results: The mass spectra of the *o*-aminoacetophenone as well as the two other compounds of the same chemical class identified in the medium (1) after fermentation are reported in the Figure. They were tentatively assigned to *o*-aminopropiophenone and 3-(*o*-aminophenyl)-prop-1-en-3-one. At higher retention time other unidentified metabolites of the same class of these compounds were detected.

The amounts of the *o*-aminophenones in the medium (1) are the following (μg/l): *o*-aminoacetophenone = 58; *o*-aminopropiophenone = 107; 3-(*o*-aminophenyl)-prop-1-en-3-one = 141.

Under the reported analytical conditions, only in the medium (1) it was possible to identify the above *o*-aminophenones.

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RAPP, A.; VERSINI, G.; ULLEMEYER, H.; 1993: 2-Aminoacetophenon: Verursachende Komponente der "untypischen Alterungsnote" ("Naphthalinton", "Hybridton") bei Wein. Vitis **32**, 61-62.