

Abstracts from Other Journals

This section contains summaries of recent papers published in a number of other Journals considered of interest to our readers, as well as a selection of patents that have been applied for or recently granted. If you would like to serve as an abstractor for the Journal of the Institute of Brewing, please contact Richard E. Wheeler.

R.E.W.

ABSTRACTORS FOR THIS ISSUE

I. Campbell, T. Bühler, I. Russell, G.G. Stewart and R.E. Wheeler

1) Beer – Analysis

Evaluation of the NIR method for measuring the alcohol content and other connected parameters in beer (Alcolyzer Beer). P. SCHROPP, T. BRUDER and A. FORSTNER (*Monatsschrift für Brauwissenschaft* 55, No. 11/12, 212–216, 2002).

The suitability of the new analysis device “Alcolyzer Beer”, produced by Fa. Anton Paar GmbH, Graz, Austria, was tested. The measuring principle, which determines the alcohol content, is based on a novel NIR method. As a basis of the performance evaluation, the distillate reference analysis was chosen as a comparative method. The NIR measurement results from 119 different samples showed a good correlation with the ones found by using the distillate method both for the alcohol content and the subsequent parameters such as extract and original extract. Initial comparative studies in laboratory “ring” analyses have verified the suitability of this method for operations and quality control in breweries.

TB/REW

2) Beer Processing

Yeasts as postfermentation agents in beer. B. VANDERHAEGEN, S. COGHE, N. VANBENEDEN, A. van LANDSCHOOT, B. VANDERHASSELT and G. DERDELINCKX (*Monatsschrift für Brauwissenschaft* 55, No. 11/12, 218–232, 2002).

Saccharomyces cerevisiae and non-*Saccharomyces* yeasts have been used for many years in Belgian speciality beers, for postfermentation improvements of maturing and conditioned beer. The use of *S. cerevisiae* strains is justified by carbonation effects and some oxygen removal. In contrast, the effects of non-*Saccharomyces* sp., which are mainly present in “sour” beers, are predominantly effective in regard to flavour evolution. This study reviews successively the physiology (energy) aspects of the several yeast species encountered in Belgian speciality beer, and the potential of *Saccharomyces cerevisiae* strains for flavour modification after beer conditioning. The more practical aspects regarding pitching and yeast preparation are also considered. Further, several interesting features of *Brettanomyces* sp., *Dek-*

*ker*a sp., *Kloeckera* sp., *Candida* sp., *Cryptococcus* sp. and *Torulopsis* sp. have been studied. The influence of enzymatic activity such as alcohol dehydrogenase, aldehyde dehydrogenase, beta-glucosidase and alcohol oxidase under certain conditions can allow the development of some typical flavours. The use of herbs, spices or fruit together with these yeasts will accelerate, modify, improve and probably, sometimes, alter the “final touch” of the beer. Scientific research and projects are underway to further understand and control the production of speciality beers.

TB/REW

3) Microbiology

Supplementation to the MRS medium for the cultivation of fastidious beer spoilage bacteria. A. GILLET, M.-H. DUPUCHE and N. VELINGS (*Monatsschrift für Brauwissenschaft* 56, No. 1/2, 10–14, 2003).

The rapid detection and cultivation of specific beer spoilage bacteria has always been a problem and is still unresolved for some of the most fastidious *Lactobacillus* and *Pediococcus* species. This paper presents a new medium based on an adaptation of the MRS medium proposed by DeMan, Rogosa & Sharpe in 1960. The new medium is compared to others in terms of size of the colonies on plates and growth kinetics in liquid media. The kinetics were followed by optical density measurement, as well as by CFU enumerations. In conclusion, the new medium allowed the cultivation and enumeration of some of the most fastidious bacterial beer spoilers.

TB/REW

The protein kinase Kic1 affects 1,6- β -glucan levels in the cell wall of *Saccharomyces cerevisiae*. E. VINK, J. H. VOSSSEN, A. F. J. RAM, H. VAN DEN ENDE, S. BREKELMANS, H. DE NOBEL and F. M. KLIS (*Microbiology*, 2002, 148, 4035–4038).

The *kic1* mutant was discovered by its hypersensitivity to the cell wall perturbing agent calcofluor white. Subsequent investigation showed that the *KIC1* gene encodes an essential protein kinase associated with the deposition of cell wall 1,6- β -glucan but the mechanism has not yet been determined. The *kic1* mutant showed a marked decrease in

1,6- β -glucan level in the cell wall and greater resistance to K1 killer toxin, for which 1,6- β -glucan is the receptor, and zymolyase. Overexpression of *KIC1* resulted in increased sensitivity to zymolyase.

I.C.

Metabolic flux analysis of RQ-controlled microaerobic ethanol production by *Saccharomyces cerevisiae*. C. J. FRANZEN (*Yeast*, 2003, 20, 117–132).

The respiratory quotient (RQ) was controlled by changing the inlet gas composition to a continuous culture of yeast. The oxygen concentration was used to control RQ in steps from anaerobic (i.e. infinite RQ) down to RQ 6. Tween 80 and ergosterol supplements were added under all conditions to maintain constant medium composition. The advantage of RQ as a control variable is that it couples oxygen uptake rate with carbon flux through the bioreactor system rather than with the concentration of yeast biomass. Also, RQ is independent of scale. Ethanol yield increased slightly from the anaerobic value to a maximum at RQ 20, irrespective of the dilution rate in the range 0.15–0.35. At RQ levels below 12 the greater aeration caused decreased ethanol production. Glycerol production was greatest under anaerobic conditions and decreased steadily with increased aeration, falling to zero at RQ 6. However, production of yeast biomass increased in proportion to aeration.

I.C.

4) Miscellaneous

Fenton reaction acceleration using maltose and ascorbic acid. J. SAVEL (*Monatsschrift für Brauwissenschaft* 56, No. 1/2, 4–8, 2003).

The degradation of various organic dyes such as methyl red (METR), indigo carmine (INDC) and methylene blue (MEBL) was studied in the presence of the hydrogen peroxide and metal ions (Cu^{2+} , Fe^{2+}). Ascorbic acid increased the degradation activity of the reaction, which was promoted by sugar (maltose) addition. High oxygen consumption was also observed in the course of the Fenton reaction in the presence of maltose. Some dyes (INDC) needed the presence of oxygen for their degradation while oxygen inhibited the degradation of others (METR). The presence of maltose in the Fenton reaction increased oxygen consumption. An electron donor (e.g. ascorbic acid) together with the suitable electron acceptor (e.g. oxygen) and an activation mechanism is needed for the additional degradation of natural substances. The activation mechanism can be based on a variety of substances such as transient metals, hydrogen peroxide, nitrite, natural organic compound degradation products, and others.

TB/REW

Roles of drinking pattern and type of alcohol consumed in coronary heart disease in men. K. J. MUKAMAL, K. M. CONIGRAVE, M. A. MITTLEMAN, C. A. CARMARGO, M. J. STAMPFER, W. C. WILLETT, and E. B. RIMM (*The New England Journal of Medicine*, 348 (2), 109–118, 9, 2003).

The association of alcohol consumption with the risk of myocardial infarction was studied among 38,077 male health professionals who were free of cardiovascular dis-

ease and cancer at base line. The consumption of beer, red wine, white wine, and liquor were assessed individually every four years using validated food-frequency questionnaires. Cases of nonfatal myocardial infarction and fatal coronary heart disease were documented from 1986 to 1998.

In this 12-year study it was found that men who drank alcohol three or more days per week had a reduced risk of heart attack compared with men who drank less frequently. Men who drank less than one drink a day had similar risk reduction to those who drank three. Among men, consumption of alcohol at least three to four days per week was inversely associated with the risk of myocardial infarction. No single type of beverage conferred additional benefit, nor did consumption with meals. Men who increased their alcohol consumption by a moderate amount during follow-up had a decreased risk of myocardial infarction.

G.G.S.

5) Patents Issued and Patent Applications

The following sampling of abstracts from recently issued patents and patent applications were selected from the United States Patent and Trademark Office Website (<http://www.uspto.gov/patft/>) and from Europe's Network of Patent Databases (<http://gb.espacenet.com>). Full patent information is available at these sites (online and at no cost) if more details are desired.

Treatments for improved beer flavor stability. M. MCGARRITY, D. MARADYN, R. STEWART, A. TINGINYS, D. THOMPSON, Labatt Brewing Company Limited (*United States Patent 6,514,542, February 4, 2003*).

This invention is directed to the prevention of the production of skunky thiols upon exposure of beer to ultraviolet or visible light. Preferably, the invention is directed to the removal or inactivation of one or more of the reactants that are present in beer that bring about skunky thiol formation, particularly the removal of flavin reactants, especially riboflavin, or to the prevention of the light excitation of such reactants.

I.R.

Method of monitoring a fermentation process. V. HIGGINS, P. ROGERS, I. DAWES, Unisearch Ltd (WO-02092846, November 21, 2002).

This invention relates to a method of monitoring a fermentation process. In particular, the invention relates to a method of monitoring a fermentation process comprising the step of measuring the expression level of one or more zinc regulated nucleic acid molecules from a microorganism, preferably selected from the group consisting of *Escherichia*, *Bacillus*, *Cyanobacter*, *Streptomyces*, *Corynebacteria*, *Zymomonas*, *Saccharomyces*, *Zygosaccharomyces*, and *Schizosaccharomyces* cells, present in the fermentation and comparing said expression level to a reference level of expression for said nucleic acid molecules, wherein said expression level is indicative of sub-optimal fermentation. Preferably the fermentation process in a beer brewing process.

I.R.

Biocompatible apparatus for ultrasensitive and rapid detection of contaminants in liquids. D. BUTTRY, G. CHEN, Coors Brewing Company (*United States Patent 6,473,171, October 29, 2002*).

A biocompatible flow cytometry system is described such that low levels of bacteria or other particles in a sample will not adsorb onto the system's surfaces. The biocompatible flow cytometry system comprises an upper chamber assembly. The upper chamber comprises a biocompatible input system, a means for retaining and adjusting the biocompatible system, a sheath fluid input port, and a means of interfacing with a glass tube. The interface between the biocompatible system and a glass tube allows for the low level contaminants to be irradiated with a laser source selected to interact with marked bacteria and cause them to fluoresce at a wavelength that can be detected.

I.R.

Malt beverage having stabilized flavor and methods of production thereof. R. RANGEL-ALDAO, A. BRAVO, B. SANCHEZ, I. GALINDO-CASTRO, Cerveceria Polar, C.A. (*United States Patent 6,468,567, October 22, 2002*).

The present invention is directed to a method for stabilizing the flavor of a fermented malt beverage, most par-

ticularly a beer, by the addition of one or more inhibitors, blockers, reducing agents or binding agents that inactivate one or more Maillard reaction intermediates that induce staling of the flavor of fermented malt beverages. In preferred such methods, the agents used are reductase enzymes, especially aldehyde reductases, carbonyl reductases, aldose reductases, oxoaldehyde reductases and most particularly oxidoreductases such as isozymes of Old Yellow Enzyme (OYE; EC 1.6.99.1) (e.g., OYE1 and OYE2 and OYE3). The invention is also directed to the fermented malt beverage prepared by such a method, and to the use during the brewing process of reductase enzymes from naturally occurring sources, including those produced by yeasts, to stabilize the flavor of the resulting beer product and to produce a beer having a stable flavor. The invention also relates to cells which have been specifically modified, selected, or genetically engineered to express or secrete a reductase enzyme which may be used during the brewing process to stabilize the flavor of the resulting beer product and to produce a beer having a stable flavor. The invention also provides fermented malt beverages having enhanced flavor stability produced by these methods.

I.R.