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ABSTRACT COMMITTEE 2004

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Abstract Briefs from *Monatsschrift für Brauwissenschaft*

Effect of non-enzymatic browning on flavour, colour and antioxidative activity of dark specialty malts – a review. S. Coghe, G. Derdelinckx and F.R. Delvaux. *Monatsschrift für Brauwissenschaft*, 57, June 2004, 25–38.

Descriptors: Maillard reaction, caramelisation, pyrolysis, melanoidins, reducing power.

Non-enzymatic browning reactions such as Maillard reactions, caramelisation and pyrolysis, have a considerable impact on the properties of dark specialty malts. The mechanisms and chemical reactions leading to non-enzymatic browning are briefly described. While pyrolysis and caramelisation are restricted to roasting processes, Maillard reactions can occur during the production of all types of malt due to milder reaction conditions. As the Maillard reaction is the most important mechanism of non-enzymatic browning in malt, factors affecting the rate of this reaction including temperature, time, water activity, concentration and type of reactants, pH and occurrence of sulphur compounds are considered in detail. This review specifically focuses on flavour, colour and antioxidative activity. These major dark malt characteristics result from browning products, which pass into dark beer thereby influencing beer colour, flavour and flavour stability. Current knowledge on key compounds responsible for flavour (Strecker aldehydes and heterocyclic compounds), colour (LMW chromophores, melanoidins) and antioxidative activity (reductones and melanoidins) and elements in the chemical structure, which may contribute to these properties, are reviewed. Furthermore, testing procedures for colour determination, instrumental or sensory evaluation of flavour and assessment of antioxidative activity as well as the relationships between the different characteristics are described.

Effects of Pasteurization on aluminium content and aroma compounds changes in beer. F. Ivušić, Z. Nemet, K. Berković, L. Gracin, and V. Marić, V. *Monatsschrift für Brauwissenschaft*, 57, June 2004, 39–43.

Descriptors: Aluminium, beer, pasteurization, aroma compounds (esters and higher alcohols), storage.

Although beer pasteurization has been the object of a number of studies, there is no published data dedicated to investigation of the effects of pasteurization on the aluminium content of beer and aluminium migration from the package to beer. Thus, in order to investigate the changes of aluminium content along with aroma compound changes, the GF-AAS method with Zeeman background correction, and the GC-HSS method were used in this work. Also, for other analytical determinations, classic physical and chemical methods were applied. Pitting corrosion of aluminium cans was determined by microscopic analysis. Analyses were conducted periodically throughout seven months of storage on two different brands of beer filled in aluminium cans (pasteurized and non-pasteurized samples). One part of the samples was stored in a refrigerator (4°C) and the other in a thermostatic chamber (22°C). The effects of pasteurization on the beer aluminium content and on aroma compound changes were observed. Pasteurized samples, at the beginning of storage (22°C), showed a higher content of aluminium and can corrosion. At the end of storage time in non-pasteurized samples, presumably via the activity of present microorganisms, more expressive can corrosion and aluminium migration was observed. Levels of aroma compounds in both pasteurized and non-pasteurized beer samples decreased negligibly during storage.

Effect of adjuncts and calcic salts on wort fermentation. M. Cvenegroschová, G. Šepel'ová and D. Šmogrovičová. *Monatsschrift für Brauwissenschaft*, 57, June 2004, 44–48.

Descriptors: Adjuncts, calcium, fermentation, maltose syrup, saccharose, wort.

The influence of adjuncts added to 12°P worts on the fermentation process was studied. With 10% substitution of malt with maltose syrup "Fermentose", the time of the primary fermentation was 1 day shorter and the wort deeper fermented (1.91°P) than wort with 10% saccharose adjunct (2.02°P). Calcium salts addition, in the form of

CaCl₂ at 160 mg/l, did not cause any important differences in the fermentation run. The day of yeast removal from CCT, diacetyl reduction, and number of the dead cells (to 1.5%) were comparable. Apparent extract reached lower values and deeper fermentation was achieved in 12°P wort (1.68°P) with CaCl₂ addition than without (2.02°P). The highest wort FAN content and foam stability was reached in wort without adjuncts and with CaCl₂ addition (233 mg/l FAN, 255 seconds) and the lowest FAN content in worts with adjuncts (220 mg/l for Fermentose, 221 mg/l for saccharose).

Microbiology

Detection of resistance of lactic acid bacteria to a mixture of the hop analogue compounds tetrahydroiso- α -acids by noninvasive measurement of intracellular pH.

A. Yansanjav, H. Siegumfeldt, L. Jespersen, M. Vancanneyt, J. Swings, L. Hellerova and J. J. Leisner. *Journal of Applied Microbiology*, 2004, 96, 1324–1332.

Isolates of lactic acid bacteria (LAB) were identified to species level by SDS-PAGE of cell proteins. Beer isolates of *Lactobacillus brevis* grew better in the presence of tetrahydroiso- α -acids (THA) than non-beer isolates of *L. brevis* or other species of LAB of beer or other origin. The anti-bacterial effect of THA was also examined by measurement of intracellular pH by fluorescence microscopy of cells stained with carboxyfluorescein diacetate succinimidyl ester. Strains of *L. brevis* showing least decrease in pH during exposure to THA grew best in beer.

Beer

The chemistry of beer instability. Graham G. Stewart. *J. Chemical Education*, 2004, 81(7), 963–968.

The basic chemistry of non-biological instability in beer (physical, flavour, foam, light and gushing) is discussed.

A link to the full abstract of this paper can be found at

<http://www.jce.divched.org/Journal/Issues/2004/Jul/abs963.html>

Flavour Evaluation Methodology

A comparison of category and line scales under various experimental protocols. S.Y. Jeon, M. O'Mahony and K.-O. Kim. *Journal of Sensory Studies*, 19(1), 49, February 2004.

Judges were required to rate the total intensity of NaCl solutions and the sweetness of orange flavored beverages using a variety of unstructured category and line scales. Discrimination errors were noted for each type of scale. No strong differences were observed in discrimination between category and line scales although a 20-point category scale incurred fewer discrimination errors than 9-point category and line scales. Allowing judges to retaste stimuli and review and modify their scores reduced discrimination errors.

Training is a critical step to obtain reliable product profiles in a real food industry context. D. Labbe, A. Rytze and A. Hugi. *Food Quality and Preference*, 15(4), 341–348.

A panel of 10 assessors evaluated 8 soluble coffees for 17 attributes, before and after a training period. The value of the training was explored.

A link to the full abstract of this paper can be found at

<http://www.sciencedirect.com/science/journal/09503293>

Patents Issued and Patent Applications

Process for the production of alcoholic beverages using maltseed. J. Soupe and R.F. Beudeker (Mogen International N.V. and Gist-Brocades N.V.). United States Patent 6,699,515 March 2, 2004.

A process for the production of alcoholic beverages, such as beer, to which a mixture of enzymes is added, which mixture comprises at least an endo-beta-(1,4)-xylanase, an arabinofuranosidase, an alpha-amylase, an endo-protease and a beta-(1,3;1,4)-glucanase, optionally also containing a saccharifying amylase and/or an exopeptidase. Preferably the enzymes that are necessary for the beer production process are provided by transgenic seeds. The present invention further discloses transgenic seeds expressing the enzymes necessary in the beer production process.

Method and device for controlling the wort flow from a lauter tun. K. Stippler, K. Wasmuht and R. Pritscher (Anton Steinecker Maschinenfabrik GMBH). United States Patent 6,761,917 July 13, 2004.

The present invention relates to a method and a device for controlling the wort flow from a lauter tun. To shorten the lautering time, according to the present invention a second increased outflow value which is to be reached within a given time interval is predetermined in the course of the total sequence of a brewing process (first wort, second worts) in at least one phase (trending phase), based on a predetermined outflow value of the wort outflow, the increase in flow rate/per time unit (increase value) as is required for attaining the second outflow value is determined on the basis of these values, and the determined increase value is used as a set value for controlling an outflow regulator.

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Links to the full abstracts of these papers can be found at

<http://www.asbcnet.org/Journal/>

Occurrence of deoxynivalenol in Korean barley and barley products. S.C. Pei, W.J. Lee, S.S. Kim, and Y.W. Lee. *JASBC*, Vol. 62 (3), 2004, pp. 93–96.

Assessment of added glutathione in yeast propagations, wort fermentations, and beer storage. L. Gijjs, P. Perpète, A. Timmermans, C. Guyot-Declerck, P. Delincé and S. Collin. *JASBC*, Vol. 62 (3), 2004, pp. 97–102.

Relationships among common malt quality and modification parameters. M.J. Wentz, R.D. Horsley and P.B. Schwarz. *JASBC*, Vol. 62 (3), 2004, pp. 103–107.

Enzymatic generation of factors from malt responsible for premature yeast flocculation. S.N.E. van Nierop, A. Cameron-Clarke and B.C. Axcell. *JASBC*, Vol. 62 (3), 2004, pp. 108–116.

Effect of beta-glucans and process conditions on the membrane filtration performance of beer. Y.-L. Jin, R.A. Speers, A.T. Paulson and R.J. Stewart. *JASBC*, Vol. 62 (3), 2004, pp. 117–124.

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