

CARLSBERG RESEARCH LABORATORY

ANNUAL REPORT 2017

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PEER-REVIEWED PUBLICATIONS

Beier, S., Himmelbach, A., Colmsee, C., Zhang, X.Q., Barrero, R.A., Zhang, Q.S., Li, L., Bayer, M., Bolser, D., Taudien, S. et al. (2017) Construction of a map-based reference genome sequence for barley, *Hordeum vulgare* L. *Scientific Data*, **4**.

Betts, N.S., Berkowitz, O., Liu, R.J., Collins, H.M., Skadhauge, B., Dockter, C., Burton, R.A., Whelan, J. and Fincher, G.B. (2017) Isolation of tissues and preservation of RNA from intact, germinated barley grain. *Plant Journal*, **91**, 754-765.

Betts, N.S., Wilkinson, L.G., Khor, S.F., Shirley, N.J., Lok, F., Skadhauge, B., Burton, R.A., Fincher, G.B. and Collins, H.M. (2017) Morphology, Carbohydrate Distribution, Gene Expression, and Enzymatic Activities Related to Cell Wall Hydrolysis in Four Barley Varieties during Simulated Malting. *Frontiers in Plant Science*, **8**.

Braumann, I., Dockter, C., Beier, S., Himmelbach, A., Lok, F., Lundqvist, U., Skadhauge, B., Stein, N., Zakhrabekova, S., Zhou, R.N. et al. (2017) Mutations in the gene of the G alpha subunit of the heterotrimeric G protein are the cause for the brachytic1 semi-dwarf phenotype in barley and applicable for practical breeding. *Hereditas*, **155**.

Cho, S.K., Ryu, M.Y., Poulsen, C., Kim, J.H., Oh, T.R., Choi, S.W., Kim, M., Yang, J.Y., Boo, K.H., Geshi, N. et al. (2017) HIGLE is a bifunctional homing

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Hebelstrup, K.H., Nielsen, M.M., Carciofi, M., Andrzejczak, O., Shaik, S.S., Blennow, A. and Palcic, M.M. (2017) Waxy and non-waxy barley cultivars exhibit differences in the targeting and catalytic activity of GBSS1a. *Journal of Experimental Botany*, **68**, 931-941.

Holt, S., Kankipati, H., De Graeve, S., Van Zeebroeck, G., Foulquie-Moreno, M.R., Lindgreen, S. and Thevelein, J.M. (2017) Major sulfonate transporter *Soa1* in *Saccharomyces cerevisiae* and considerable substrate diversity in its fungal family. *Nature Communications*, **8**.

Junker, K., Hesselbart, Ana. and Wendland, J. (2017) Draft Genome Sequence of *Saccharomycopsis fodiens* CBS 8332, a Necrotrophic Mycoparasite with Biocontrol Potential. *Genome Announcements; Washington*, **5**.

Kempf, C., Lengeler, K. and Wendland, J. (2017) Differential stress response of *Saccharomyces* hybrids revealed by monitoring Hsp104 aggregation and disaggregation. *Microbiological Research*, **200**, 53-63.

Marri, L., Jansson, A.M., Christensen, C.E. and Hindsgaul, O. (2017) An enzyme-linked immunosorbent assay for the detection of diacetyl (2,3-butanedione). *Analytical Biochemistry*, **535**, 12-18.

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Mnich, E., Vanholme, R., Oyarce, P., Liu, S., Lu, F.C., Goeminne, G., Jorgensen, B., Motawie, M.S., Boerjan, W., Ralph, J. et al. (2017) Degradation

of lignin beta-aryl ether units in *Arabidopsis thaliana* expressing LigD, LigF and LigG from *Sphingomonas paucimobilis* SYK-6. *Plant Biotechnology Journal*, **15**, 581-593.

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Sultan, A., Frisvad, J.C., Andersen, B., Svensson, B. and Finnie, C. (2017) Investigation of the indigenous fungal community populating barley grains: Secretomes and xylanolytic potential. *Journal of Proteomics*, **169**, 153-164.

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Zhou, N., Bottagisi, S., Katz, M., Schacherer, J., Friedrich, A., Gojkovic, Z., Swamy, K.B.S., Knecht, W., Compagno, C. and Piskur, J. (2017) Yeast-bacteria competition induced new metabolic traits through large-scale genomic rearrangements in *Lachancea kluyveri*. *FEMS Yeast Research*, **17**.

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CONFERENCE ABSTRACTS AND PRESENTATIONS

Wendt, T., Holme, I., Dockter, C., Preuß, A., Thomas, W., Druka, A., Waugh, R., Hansson, M. and Braumann, I. HvDep1 is a positive regulator of culm elongation and grain size in barley and impacts yield in an environment-dependent manner. Botanikertagung 2017- "Plant Research in a Changing World", Kiel, Germany (2017).

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MASTER THESES

Nielsen, A.V.: Evaluating the Stability of a Set of Brewing Yeasts in Serial Repitching and Assessing the Influence of Wort Composition. MSc thesis, University of Copenhagen, August, 2017.

PUBLISHED PATENT APPLICATIONS AND GRANTED PATENTS

Energy saving brewing method. **Søren Knudsen, Preben Riis, Birgitte Skadhauge, Lene Mølskov Bech, Ole Olsen.** Publ. No.: US 2017/0183611.

Plant based material for injection molding. **Renil Manat, Steen Vesborg, Hélène Rossignol.** Publ. No.: WO 2017/089467.

Flavour Stable Beverages. **Zoran Gojkovic, Pia Vaag, Arvid Garde.** Publ. No.: 2017-503497 (Japan).

Yeast for preparing alcoholic beverages. **Natalia Y. Solodovnikova, Jeppe Frank Andersen, Rosa Garcia Sanchez, Zoran Gojkovic.** Publ. No.: 3237601 (Europe).

Beverages containing barley beta-glucan. **Birthe Møller, Mette Skau Mikkelsen, Morten Georg Jensen, Zoran Gojkovic.** Publ. No.: WO 2017/191109.

Cellulose based polymer material. **Morten Meldal, Renil Manat.** Patent No.: 2,746,699 (Canada).

Coating of hydroxylated surface by gas phase grafting. **Morten Meldal, Renil Manat, Steen Vesborg.** Patent no.: 2,746,704 (Canada).

Method and system for improved process parameter control of a liquid composition in a reverse electro-enhanced dialysis (REED) system. **Arvid Garde, Jens-Ulrik Rype.** Patent. no.: 104084045 (China).

Process for controlling the pH and level of target ions of a liquid composition. **Arvid Garde, Jens-Ulrik Rype.** Patent. no.: 290809 (India).

Electro-membrane separation system. **Arvid Garde, Jens-Ulrik Rype.** Patent No.: 025684 (Kazakhstan), 025684 (Russia).

Barley with reduced lipoxygenase activity and beverage prepared therefrom. **Birgitte Skadhauge, Finn Lok, Klaus Breddam, Ole Olsen, Lene Mølskov Bech, Søren Knudsen.** Patent No.: 028532 (Eurasia).

Barley and malt-derived beverages with low DMS level. **Søren Knudsen, Gustav Hambraeus, Lene Mølskov Bech, Steen Bech Sørensen, Birgitte Skadhauge, Klaus Breddam, Ole Olsen.** Patent No.: 10-1769525 (Korea), 9,834,760 (USA).

Energy saving brewing method. **Søren Knudsen, Preben Riis, Birgitte Skadhauge, Lene Mølskov Bech, Ole Olsen.** Patent No.: 9,587,210 (USA).