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3D Reconstruction of Barley Kernel

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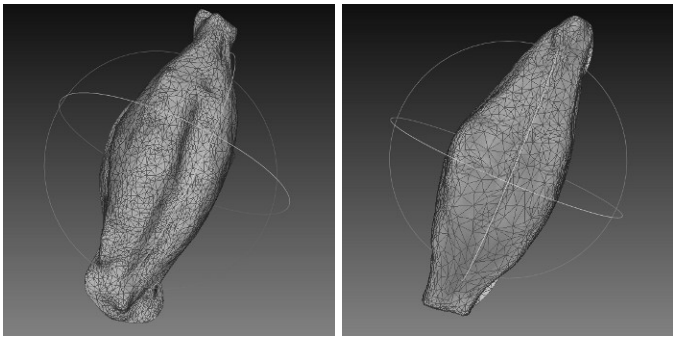
Abstract: The germ (embryo) of a barley kernel is considered a source of the diastatic enzymes required for the saccharification of the starch. Thus, its presence in the process of malting is essential. Sometimes, however, as a result of harvesting methods, improper storage and/or due to insect infestation, the embryo is damaged (Paleg & Sparrow 1962). Although there are techniques that allow malting of dehusked (Pollock et al. 1960) and embryo-less barley (Sparrow 1964), selecting only those grains that have the least damaged embryo appears to be the most preferred approach by the maltsters after all. Grain quality control and automatic sorting is more and more often performed with the assistance of computer vision (CV), which become increasingly significant in food processing (Sun 2012). In this communication we would like to present our preliminary results of the 3D reconstruction of a single barley kernel using a variety of different equipment and methods. The thus obtained three-dimensional model can be subsequently used to determine the quality of the kernel. Based on that, kernels not suitable for malting due to damaged embryo can be sifted out easily.



Barley kernel 3D model examples

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References

Paleg, L. G. and Sparrow, D. H. B. 1962, 'Gibberellic Acid and the Malting of Embryo-less Barley', *Nature* 193, pp. 1102–1103, doi:10.1038/1931102a0

Pollock, J.R.A., Pool, A.A., and Reynolds, T. 1960. 'Chemical aspects of malting. IX. Anthocyanogens in barley and other cereals and their fate during malting.' *J. Inst. Brew.*, 66:389–394.

Sparrow, D. H. B. 1964, 'Effect Of Gibberellic Acid On The Malting Of Normal, Dehusked And Embryo-Less Barley'. *Journal of the Institute of Brewing* vol. 70, no. 6, pp. 514–521, doi: 10.1002/j.2050-0416.1964.tb06357.x

Sun, D. 2012, Computer Vision Technology in the Food and Beverage Industries, 1st Edition, Woodhead Publishing, ISBN: 9780857090362

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