

Brown seaweed processing: enzymatic saccharification of *Laminaria digitata* requires no pre-treatment - DTU Orbit (08/11/2017)

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This study assesses the effect of different milling pre-treatments on enzymatic glucose release from the brown seaweed *Laminaria digitata* having high glucan (laminarin) content. Wet refiner milling, using rotating disc distances of 0.1–2 mm, generated populations of differently sized pieces of lamina having decreasing average surface area (100–0.1 mm²) with increased milling severity. Higher milling severity (lower rotating disc distance) also induced higher spontaneous carbohydrate solubilization from the material. Due to the seaweed material consisting of flat blades, the milling did not increase the overall surface area of the seaweed material, and size diminution of the laminas by milling did not improve the enzymatic glucose release. Milling was thus not required for enzymatic saccharification because all available glucose was released even from unmilled material. Treatment with a mixture of alginate lyase and a cellulase preparation (Cellic@CTec2) on large-sized milled material released all available glucose within 8 h. Application of the cellulase preparation alone released only half of the available glucose. The alginate lyase catalysis apparently induced selective removal of alginate to improve the cellulase catalyzed degradation of laminarin and cellulose in the material.

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