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The effect of added enzymes on process potentials derived from different qualities of barley: A model study using simulated mashing conditions by rapid visco analyzer

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Barley sorting is an important step for picking up grain of desired quality. Whilst brewing with 100% sorted barley (picked high quality) has become realistic with addition of exogenous enzymes. The effect of added enzymes on process potentials derived from un-sorted barley (mixed) and sorted-out barley (low quality) were almost not investigated. The aim of this study is to examine the rheological behaviors of sorted out barleys affected by addition of enzymes in comparison with sorted barley, and to evaluate quality attributes derived from respective barleys focusing on wort fermentability and filterability parameters. To achieve this, rapid visco analyzer was used to simulate brewery mashing process by applying two commercial enzymes (Ondea® Pro and Cellic® CTec2) at lab scale (Fig.1). During the simulated process, the rheological profile of low quality barley was markedly different from others, irrespective of enzyme type, whereas small difference was observed between sorted and un-sorted barley. With respect to major wort nutrients for fermentation, the sorted-out barley generated lowest sugar yield, regardless of enzyme used; however, the use of Cellic® CTec2 resulted in significantly higher sugar content compared to Ondea® Pro, irrespective of quality of barley. Interestingly, considerably higher levels of free amino nitrogen were observed resulting from sorted-out barley, likely due to smaller size/weight of barley compared to others. For wort filterability, the Ondea® Pro treatment resulted in significantly lower turbidity and smaller particle size compared to Cellic® CTec2; however, this effect was observed in sorted and un-sorted barley but not in sorted-out barley. Consequently un-sorted barley demonstrated great potential in brewing process with added enzymes, whereas sorted-out barley is not comparable to sorted barley in terms of rheological behaviors of mashes, as well as nutrient and filtration parameters studied, showing potential as biofuel feedstock that can be degraded to fermentable sugars by enzymes.

Biography

Radhakrishna Shetty as Postdoc has worked primarily on the discovery, cloning and expression of novel high-temperature gluten degrading recombinant mashing enzymes that is useful for the brewing industry. He is actively involved in brewing projects at lab and pilot scale and in particular on studying the use of enzymes and new process equipment for brewing with non-conventional 100% adjunct brewing processes.

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