Barley genotypic β-glucan variation combined with enzymatic modifications direct its potential as a natural ingredient in a high fiber extract

β-Glucan was extracted from eight different barley genotypes varying in β-glucan content and molecular structure using Termamyl® SC (T), Attenuzyme® (A) and Attenuzyme® Flex (AF) amylolytic enzymes in combinations. Extracts from barley lines Lys5f, KVL408, KVL1104 and CDC Fibar exceeded 4 g β-glucan/l, providing European Food Safety Authority (EFSA) and U.S. Food and Drug Administration (FDA) recommended amounts (3 g β-glucan/day) from three portions. TAF extracts of Lys5f and KVL408 grains reached extraordinary high concentrations of 8–9 g β-glucan/l. The β-glucan molecular mass decreased with enzyme treatment T < TA < TAF due to minor lichenase side activity. Extractability was generally higher and molecular mass lower for barley lines low in triosyl/tetraosyl (DP3/DP4) ratios than for those high in DP3/DP4 ratios (Lys5f, KVL408 and KVL1104). Overall, the higher β-glucan content and structural robustness in Lys5f and KVL408 raw materials favor these in a β-glucan rich extract with potential for EFSA and FDA health and Nutrition claims.