A study of bioactive, branched (1→3)-β-d-glucans in dimethylacetamide/LiCl and dimethyl sulphoxide/LiCl using size-exclusion chromatography with multi-angle light scattering detection

Water-soluble (1 → 3)-β-d-glucans with 1,6-linked branches (SBG) isolated from the cell walls of Saccharomyces cerevisiae were studied by size exclusion chromatography (SEC) with multi-angle laser light scattering (MALLS) detector using dimethylacetamide (DMAc) containing 0.5% (0.12 M) LiCl, or dimethyl sulphoxide (DMSO) in the absence and presence of 0.25 M LiCl, respectively, as eluents. The aggregating glucan could be dispersed as single chains in both solvents, with chain length distributions in reasonable agreement with results obtained previously with carboxymethylated glucans in aqueous solvent. However, DMAc is preferred over DMSO because of higher sensitivity in MALLS, and also because the latter produces SEC anomalies. SBG dissolves slowly in DMAc/LiCl at room temperature, but heating accelerates the process. The rate of depolymerisation of SBG in DMAc/LiCl at high temperatures (70–105 °C) was determined as a basis for defining dissolution procedures at elevated temperatures with a minimum of degradation. The result of the investigation is a simple and reliable protocol for preparing unaggregated, fully dissolved and undegraded SBG in DMAc/LiCl, which is well suited as a standard analysis of the molecular weight distribution of SBG-like molecules without chemical derivatization.

General information
Publication status: Published
Organisations: Norwegian University of Science and Technology
Contributors: Qin, F., Kes, M., Christensen, B. E.
Pages: 109-113
Publication date: 2013
Peer-reviewed: Yes

Publication information
Journal: Journal of Chromatography A
Volume: 1305
ISSN (Print): 0021-9673
Ratings:
BFI (2013): BFI-level 1
Scopus rating (2013): CiteScore 4.6 SJR 2.006 SNIP 1.615
Web of Science (2013): Impact factor 4.258
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
Original language: English
Keywords: (1→3)-β-D-Glucan, Saccharomyces cerevisiae, SEC-MALLS, Dimethylacetamide (DMAc), Dimethyl sulphoxide (DMSO), Refractive index increment
DOIs:
10.1016/j.chroma.2013.07.002
Source: PublicationPreSubmission
Source ID: 130630354
Research output: Contribution to journal › Journal article – Annual report year: 2013 › Research › peer-review