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Data Article

Data on saponins, xylan and cellulose yield obtained from quinoa stalks after pressurized hot water extraction



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ABSTRACT

The data we present below are linked to our research paper “Integrated process for sequential extraction of saponins, xylan and cellulose from quinoa stalks (*Chenopodium quinoa* Willd.)” (Gil-Ramírez et al., 2018) [1]. The objective is to provide supplementary information in order to facilitate the comprehension of the central composite experimental design (rotatable 2²) used in the integrated process of extractions. Two factors, temperature and time of extraction are considered in the design. The responses are the yield of saponin, xylan and cellulose. First, the desirable linear regression obtained by the observed vs. predicted yields plot for each variable response confirm the validation of the model (Fig. 1). Second, the data presented here through Standardized Pareto Charts (Fig. 2), provides information about the effect of the time and temperature, as well as their interactions, in the yield of saponins, xylan and cellulose obtained in an integrated sequential extraction.

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Specifications Table

Subject area	Chemistry, Biology, Engineering
More specific subject area	Biorefinery, valorization of bioproducts
Type of data	Graphs
How data was acquired	Spectrophotometric, gravimetric and High Performance Anion Exchange Chromatography with Pulsed Amperometric Detection (HPAEC – PAD) analysis.
Data format	Analyzed, linear regression, standardized Pareto charts
Experimental factors	Temperature and time in the saponin extraction
Experimental features	Pressurized hot water extraction (PHWE) of saponins, alkaline extraction of xylan and acid recovery of cellulose.
Data source location	Lund University, Department of Chemistry, Division of Biotechnology. Sweden
Data accessibility	All data are available in this document.
Related research article	Gil-Ramirez, A., Salas-Veizaga, D.M., Grey, C., Nordberg Karlsson, E., Rodríguez-Meizoso, I., Linares-Pastén, J.A.(2018). Integrated process for sequential extraction of saponins, xylan and cellulose from quinoa stalks (<i>Chenopodium quinoa Willd.</i>) Industrial Crops and Products, 121: 54–65 [1].

Value of the data

- The linear trend obtained by the observed vs. predicted yields plot for each variable response support the validation of the models elaborated for the extraction of saponins, xylan and cellulose (Fig. 1).
- Standardized Pareto Chart shows the effect of time and temperature of PHWE, as well as their interactions in the yield of saponins, xylan and cellulose obtained (Fig. 2).

1. Data

Linear regression obtained by the observed vs. predicted yields plot for each variable response allows the validation of the models obtained for the extraction of saponins, xylan and cellulose (Fig. 1). Pareto Chart shows the effect of factors, such as time and temperature of extraction, as well as their interactions (Fig. 2).

2. Experimental design, materials, and methods

The experimental design was a central composite and rotatable design 2^2 with star points ($\alpha = 1.414$) with two central points selected for the PHWEs of saponins. The factors studied were temperature (in a range of 50 to 170 °C) and time (in a range of 11–60 min) of extraction. Xylan was extracted by alkaline extraction with NaOH. Subsequently, cellulose was recovered by reflux in a mixture of acetic and nitric acid. Saponins were analyzed spectrophotometrically and by mass spectrometry. Xylan and cellulose were analyzed by High Performance Anion Exchange Chromatography with Pulsed Amperometric Detection (HPAEC – PAD), Fourier transform infrared (FT-IR) spectroscopy and Scanning electron microscopy (SEM) [1].

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