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## Influence of pretreatment conditions on lignocellulosic fractions and methane production from grape pomace

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### Abstract

The lignocellulosic structure of grape pomace requires the use of pretreatments facilitating microbial decomposition of the matter and enhancing methane production. In this study, the effects of various pretreatments (freezing, alkaline treatment using NaOH and NH<sub>3</sub>, acid treatment using HCl, ultrasounds and pulsed electric fields) were examined in batch mode. The highest methane production (0.178 Nm<sup>3</sup> kg<sup>-1</sup> of COD) was attained after alkaline treatment with 10% NaOH w/w dry basis, at 20 °C and for 24h. This result is due to the degradation of more than 50% of lignin and about 22% of cellulose present in grape pomace. The coupling of this pretreatment with freezing at -20 °C exhibited the highest methane production of 0.2194 ± 0.0007 Nm<sup>3</sup> kg<sup>-1</sup> of COD. When applied to a larger scale continuous digester, this coupled pretreatment increased methane production by about 27%, compared to the untreated samples, promoting the green valorization of the biomass.

### Highlights

- Alkaline pretreatment with 10% NaOH increased methane production by 36%

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