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# Comparison of steam gasification reactivity of algal and lignocellulosic biomass: Influence of inorganic elements

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## Abstract

This study aims at comparing the steam gasification behaviour of two species of algal biomass (*Chlamydomonas reinhardtii* and *Arthrospira platensis*) and three species of lignocellulosic biomass (miscanthus, beech and wheat straw). Isothermal experiments were carried out in a thermobalance under chemical regime. Samples had very different contents in inorganic elements, which resulted in different reactivities, with about a factor of 5 between samples. For biomasses with ratio between potassium content and phosphorus and silicon content  $K/(Si+P)$  higher than one, the reaction rate was constant during most of the reaction and then slightly increased at high conversion. On the contrary, for biomasses with ratio  $K/(Si+P)$  lower than one, the reaction rate decreased along conversion. A simple kinetic model was proposed to predict these behaviours.

**Keywords:** algal biomass /steam gasification/ kinetics/ inorganic elements /modelling

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