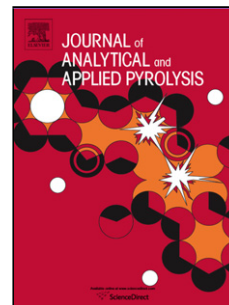


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Algae Characterization and Multistep Pyrolysis Mechanism

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Highlights

- Algae: third generation biofuels.
- Characterization procedure of algae.
- Devolatilization model of algae fuels.
- Multistep pyrolysis mechanism of algae.
- Algae pyrolysis at low and high heating rates.

ABSTRACT

This paper presents a new characterization method and a multistep kinetic mechanism for describing the pyrolysis process of algae fuels. Since third generation biomasses are still largely unexplored, we first organized a database by collecting literature information on the nature and main features of algal biomass. The algal species, both macro- and micro-algae, are constituted by proteins, carbohydrates and lipids, present in various amounts depending on the taxonomy and growing conditions. Noteworthy, algae contain higher levels of proteins, lipids, nitrogen and ashes compared to vegetal biomasses. Starting from the ultimate analysis and ash content, the biochemical composition of each algal species is defined in terms of proteins, carbohydrates, and lipids. To this aim, a limited number of representative reference species is first defined, based on atomic mass balances. The predicted biochemical compositions fairly agree with experimental information. Then, a

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