S1. Hess' Law

To establish a balance on the heat of hydrothermal liquefaction reaction, Hess' law can be used. For a given temperature, the resulting enthalpy of the reaction corresponds to the difference of standard enthalpy of formation of reactants and products (Equation 2):

A reaction can be described as follow:

$$0 = \sum_i \vartheta_i A_i \qquad \text{(Equation 1)}$$

Where A_i are the compounds involved in the reaction.

$\vartheta_i > 0$ if the compound A_i is a product

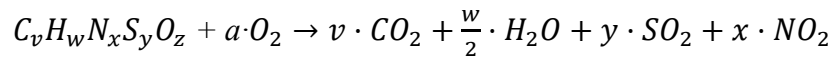$\vartheta_i < 0$ if the compound A_i is a reactant

$$\Delta H^0_{r(T)} = \sum_i \vartheta_i \Delta H^0_{f(T)} \quad \text{(Equation 2)}$$

The standard enthalpies of formation of biomasses and liquefaction products $\Delta H^0_{f(T)}$ are not known but can be calculated thanks to the measurement of enthalpy of the combustion reaction. The measurement or the calculation of the enthalpy of the combustion reaction, their initial elemental composition and the known enthalpy of formation of combustion products such as CO_2, H_2O, SO_2 and NO_2 (presented in Table S1) allow the calculation of the standard enthalpy of formation of the product of interests.

Table S1. : Enthalpy of formation of combustion products.

Combustion products	Standard enthalpies of formation ΔH^0_f (kJ/mol)
$CO_{2(g)}$	-393.5
$H_2O_{(l)}$	-285.8
$SO_{2(g)}$	-296.8
$NO_{2(g)}$	33.8

The enthalpy of formation of biocrude and the organic fraction dissolved in the aqueous phase can be calculated from the enthalpy of formation of combustion products and from the enthalpy of combustion $\Delta H_{combustion}$. The equation of full combustion is given by:

$$C_v H_w N_x S_y O_z + a \cdot O_2 \rightarrow v \cdot CO_2 + \frac{w}{2} \cdot H_2O + y \cdot SO_2 + x \cdot NO_2$$

with $a = v + \frac{w}{4} + y + x - \frac{z}{2}$

The enthalpies of formation of the biocrude and the organic fraction are then given by :

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$$\Delta H_{formation} = v \cdot \Delta H^0_{f,CO_2(g)} + \frac{w}{2} \cdot \Delta H^0_{f,H_2O(l)} + y \cdot \Delta H^0_{f,SO_2(g)} + z \cdot \Delta H^0_{f,NO_2(g)} - \Delta H_{combustion}$$

Finally, the global enthalpy of reaction can be calculated with Hess' law from the difference of the enthalpies of formation between the products and the reactants