

Improving the efficiency and antioxidant activity of essential oil extraction from *Abies sachalinensis* by underwater shockwave pretreatment for the construction of low-energy and sustainable essential oil extraction system

Supporting Materials

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To evaluate the effect on dried leaves, 1.8 kg of leaves (W_{pm} ; approximately 1 kg DW) were finely cut, and subjected to steam distillation for 1.5 h. The initial water weight (W_w) was 2 kg. As with the fresh samples, leaves receiving shockwave treatment were subjected to steam distillation separately, but in a similar manner. Using steam distillation EO and approximately 0.5 L (W_{vc}) of water were extracted. The extracted EO was weighed, and the EO yield (W_{EO}) was then calculated in terms of DW (kg).

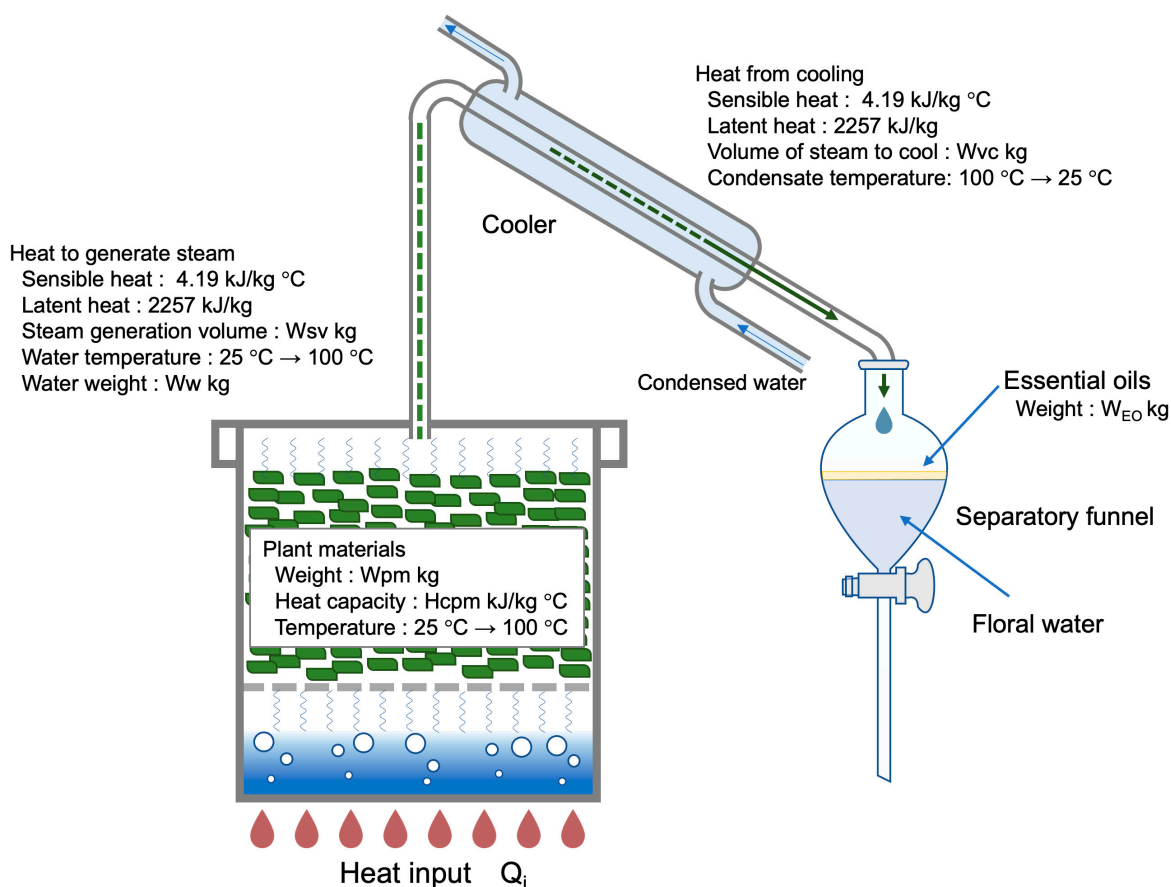


Figure S1. Evaluation of the energy of essential oil extraction by steam distillation of leaves and branches of *Abies sachalinensis*.