

Supplementary Data

Model validations were performed using an industrial-batch-operated rotary dryer processing the two target species (Figures S1 and S2). The drum was 750 mm in diameter and 2400 mm in length. The eight internal flights were two stage flights, each 5 cm in length and angled at 175° (Figure S3). Hot air was provided using an air blower (Hotwind Premium, Leister, Switzerland), and the bulk density of the material was assumed to be at its minimum due to the constant rotation of the drum (3 rpm). Drying was characterized through periodic and direct sampling and removal of algae material. Samples were dried to completion using the Sartorius moisture analyzer to measure moisture content. Conditions for each macroalgae species tested are summarized in Table S1, and graphs of experimental data and model predictions using Equations 9 and 10 are shown in Figures S1 and S2, respectively.

Table S1. Relevant drying conditions for each species.

Macroalgae	Gas Temperature (°C)	Ambient temperature (°C)	Air flow rate (m/s)	Density (kg/m ³)	Material loading (kg)	<i>L</i> (m)
<i>U. ohnoi</i>	60	40	0.03	33	14.1	0.2
<i>O. intermedium</i>	41	31	0.03	33	15.2	0.2

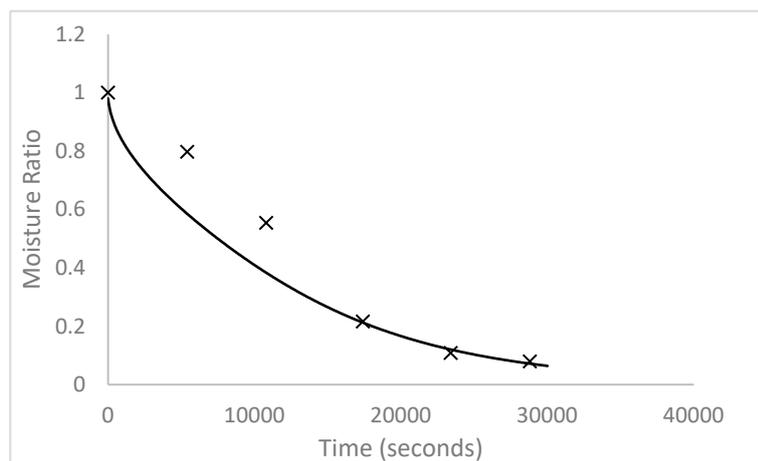


Figure S1. *U. ohnoi* pilot-scale drying. Comparison of experimental results and model predictions.

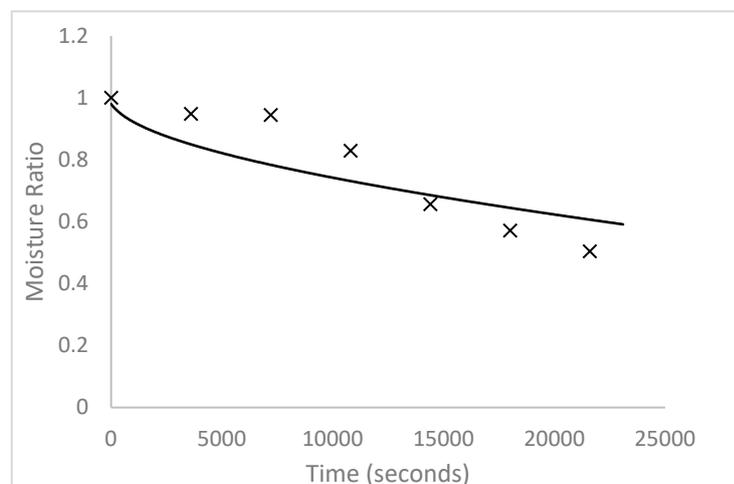


Figure S2. *O. intermedium* pilot-scale drying. Comparison of experimental results and model predictions.



Figure S3. Front-end view of the industrial flighted rotary dryer used for model validation.