pharmaceutics

MDPI

Supplementary Materials: Process design of continuous powder blending using residence time distribution and feeding models

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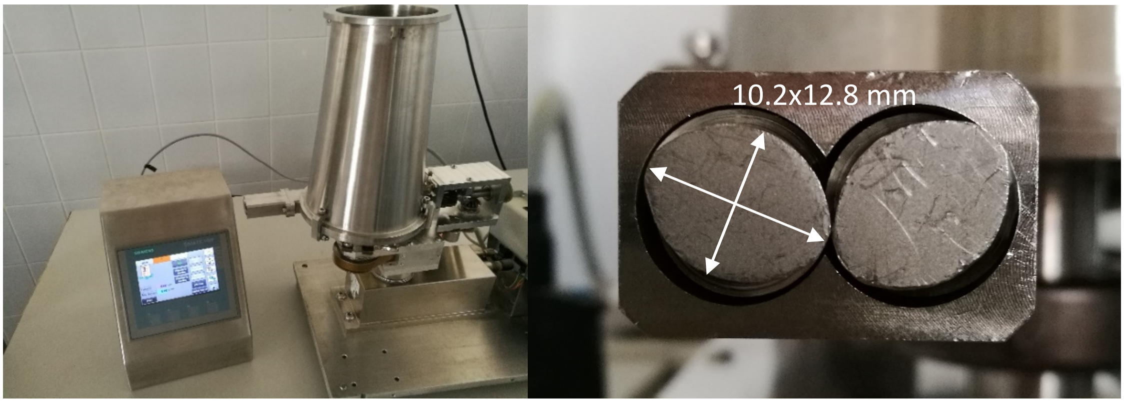


Figure S1. MechaCAD twin-screw feeder.

Figure S2. Brabender twin-screw feeder.

Table S1. Results of scale-up experiments carried out by changing mass flow rate from lab-scale 0.3 kg/h to pilot-scale 1 kg/h and constant 80 rpm screw rotational speed.

Mass flow [kg/h]	Screw Rotational Speed [rpm]	MRT [s]	σ [s]	$m_{hold-up}$ [g]
0.30	80	63.89	27.25	5.33
0.40	80	59.72	17.01	6.64
0.60	80	63.45	18.55	10.58
0.80	80	58.34	22.47	12.97
1.00	80	62.74	13.48	17.44

Table S2. Results of scaled-up experiments carried out by changing screw rotational speed from 40 rpm to 100 rpm and constant 0.3 kg/h mass flow.

Mass flow [kg/h]	Screw Rotational Speed [rpm]	MRT [s]	σ [s]	$m_{hold-up}$ [g]
0.30	100	55.93	21.89	4.66
0.30	80	63.89	27.25	5.33
0.30	60	70.63	20.36	5.89
0.30	40	99.03	22.55	8.26

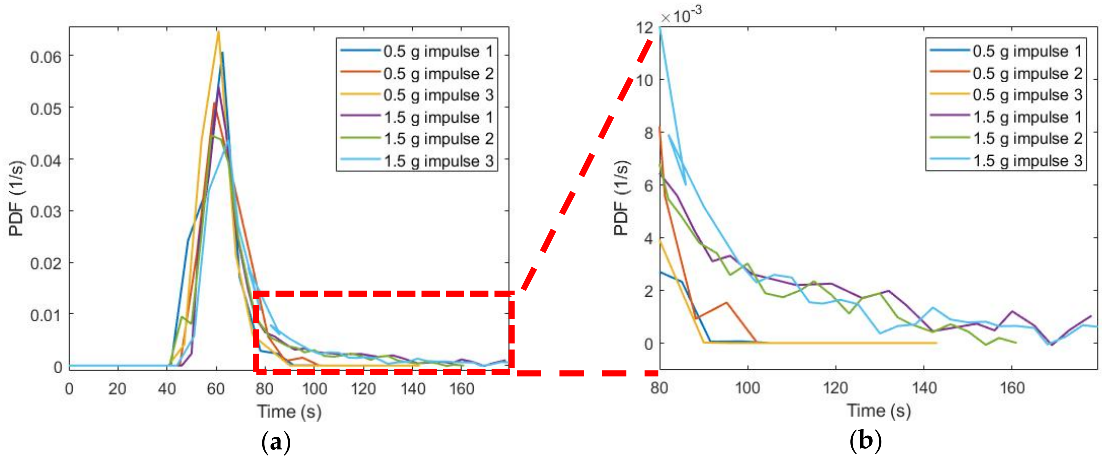


Figure S3. Impulse responses of 0.5 g and 1.5 g ASA disturbances on 0.30 kg/h mass flow and 60 RPM screw rotational speed setup: (**a**) Impulse response; (**b**) Impulse response zoomed to the tail of the distribution (t > 80 s).

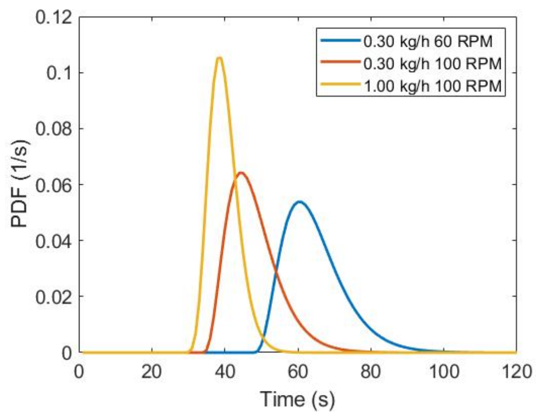
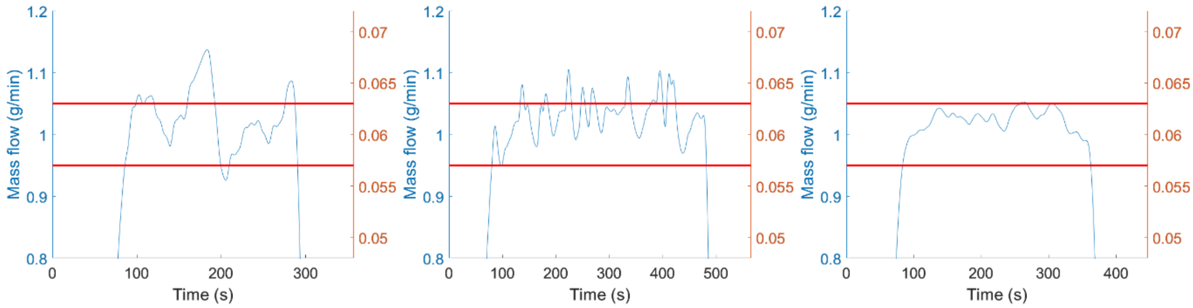


Figure S4. Effect of CPPs on the PDF. Screw rotational speed decrease dead time, and mass flow slightly decrease width.



(**a**) (**b**) (**c**)

Figure S5. ASA mass flow after the powder blender based on lab-scale RTD model and the feeder characterization experiments: (**a**) MechaCAD; (**b**) Brabender; (**c**) Single-screw.