Table S1. Ranks of tested polynomial fitting curves for power consumption during rice comminution as a function of batch dosing speed W and total increase in angular speeds $S\Delta\omega$

Model	Residual Sum of Squares	Reduced Chi Sq	R^2	Adj. R^2	BIC
Poly (W)	0.85856	0.06133	0.07353	0.00735	-38.48362
Poly ($S\Delta\omega$)	0.25048	0.01789	0.72971	0.71041	-58.19396
Poly ($W,S\Delta\omega$)	0.18234	0.01403	0.80324	0.77297	-60.50125
Poly ($W,S\Delta\omega^2$)	0.09437	0.00858	0.89817	0.86113	-65.49439
Poly ($W,S\Delta\omega^3$)	0.09354	0.01039	0.89906	0.83176	-60.08981
Poly (W^2)	0.85852	0.06604	0.07357	-0.06896	-35.7118
Poly ($S\Delta\omega^2$)	0,17214	0,01324	0,81425	0,78567	-61,42236
Poly ($W^2,S\Delta\omega$)	0.17267	0.0157	0.81368	0.74592	-55.82826
Poly ($W^2,S\Delta\omega^2$)	0.09433	0.00943	0.89821	0.84731	-62.72884
Poly ($W^2,S\Delta\omega^3$)	0.0825	0.01179	0.91098	0.80923	-56.55507
Poly (W^3)	0.85445	0.0712	0.07796	-0.15255	-33.01521
Poly ($S\Delta\omega^3$)	0,17155	0,0143	0,81488	0,7686	-58,70422
Poly ($W^3,S\Delta\omega$)	0.15759	0.01751	0.82994	0.71657	-51.74451
Poly ($W^3,S\Delta\omega^2$)	0.07902	0.01129	0.91473	0.81729	-57.24534
Poly ($W^3,S\Delta\omega^3$)	0.07843	0.01307	0.91537	0.78841	-54.59161

The model with the best fitting selected based on the BIC and $R^2>0.5$ was marked on red.

Table S2. Ranks of tested polynomial fitting curves for power consumption during corn comminution as a function of batch dosing speed W and total increase in angular speeds $S\Delta\omega$

Model	Residual Sum of Squares	Reduced Chi Sq	R^2	Adj. R^2	BIC
Poly (W)	1.48638	0.10617	3.22492E-4	-0.07108	-29.70216
Poly ($S\Delta\omega$)	0.24184	0.01727	0.83735	0.82573	-58.75516
Poly ($W,S\Delta\omega$)	0.24136	0.01857	0.83767	0.8127	-56.01432
Poly ($W,S\Delta\omega^2$)	0.20408	0.01855	0.86274	0.81283	-53.15385
Poly ($W,S\Delta\omega^3$)	0.16293	0.0181	0.89042	0.81737	-51.21178
Poly (W^2)	1.46895	0.113	0.01204	-0.13995	-27.11827
Poly ($S\Delta\omega^2$)	0.22416	0.01724	0.84924	0.82605	-57.19763
Poly ($W^2,S\Delta\omega$)	0.20434	0.01858	0.86257	0.8126	-53.13358
Poly ($W^2,S\Delta\omega^2$)	0.18665	0.01867	0.87447	0.8117	-51.80945
Poly ($W^2,S\Delta\omega^3$)	0.1371	0.01959	0.9078	0.80242	-48.42875
Poly (W^3)	1.46542	0.12212	0.01442	-0.23197	-24.38426
Poly ($S\Delta\omega^3$)	0.19053	0.01588	0.87186	0.83982	-57.02555
Poly ($W^3,S\Delta\omega$)	0.19239	0.02138	0.8706	0.78434	-48.55202
Poly ($W^3,S\Delta\omega^2$)	0.16718	0.02388	0.88756	0.75905	-45.25406
Poly ($W^3,S\Delta\omega^3$)	0.13356	0.02226	0.91017	0.77544	-46.07439

The model with the best fitting selected based on the BIC and $R^2>0.5$ was marked on red.

Table S3. Ranks of tested polynomial fitting curves for throughput during rice comminution as a function of batch dosing speed W and total increase in angular speeds $S\Delta\omega$

Model	Residual Sum of Squares	Reduced Chi Sq	R^2	Adj. R^2	BIC
Poly (W)	308.15213	22.01087	0.25458	0.20134	55.64584
Poly ($S\Delta\omega$)	410.55464	29.32533	0.00687	-0.06407	60.23649
Poly ($W,S\Delta\omega$)	305.31304	23.48562	0.26145	0.14782	58.27034
Poly ($W,S\Delta\omega^2$)	209.114	19.01036	0.49415	0.31021	57.76019
Poly ($W,S\Delta\omega^3$)	180.53228	20.05914	0.56329	0.27215	60.95384
Poly (W^2)	243.55644	18.73511	0.41084	0.3202	54.65451

Model	Residual Sum of Squares	Reduced Chi Sq	R²	Adj. R²	BIC
Poly ($S\Delta\omega^2$)	356.82458	27.44804	0.13684	0.00405	60.76484
Poly ($W^2,S\Delta\omega$)	198.24838	18.02258	0.52044	0.34605	56.90644
Poly ($W^2,S\Delta\omega^2$)	144.51832	14.45183	0.65041	0.47561	54.6212
Poly ($W^2,S\Delta\omega^3$)	77.30327	11.04332	0.813	0.59929	52.92825
Poly (W^3)	241.55623	20.12969	0.41568	0.26959	57.29516
Poly ($S\Delta\omega^3$)	337.77682	28.14807	0.18292	-0.02135	62.65969
Poly ($W^3,S\Delta\omega$)	157.61483	17.51276	0.61873	0.36455	58.78176
Poly ($W^3,S\Delta\omega^2$)	94.35082	13.47869	0.77177	0.51093	56.11679
Poly ($W^3,S\Delta\omega^3$)	75.30305	12.55051	0.81784	0.5446	55.28139

The model with the best fitting selected based on the BIC and R²>0.5 was marked on red.

Table S4. Ranks of tested polynomial fitting curves for throughput during corn comminution as a function of batch dosing speed W and total increase in angular speeds $S\Delta\omega$

Model	Residual Sum of Squares	Reduced Chi Sq	R²	Adj. R²	BIC
Poly (W)	601.07571	42.93398	0.23566	0.18106	66.33588
Poly ($S\Delta\omega$)	764.35603	54.59686	0.02803	-0.0414	70.18089
Poly ($W,S\Delta\omega$)	579.03434	44.5411	0.26369	0.15041	68.51072
Poly ($W,S\Delta\omega^2$)	424.85456	38.62314	0.45975	0.26329	69.10206
Poly ($W,S\Delta\omega^3$)	416.94165	46.32685	0.46981	0.11635	74.34643
Poly (W^2)	567.2993	43.63841	0.27861	0.16763	68.18313
Poly ($S\Delta\omega^2$)	619.19565	47.63043	0.21262	0.09148	69.58368
Poly ($W^2,S\Delta\omega$)	536.23852	48.74896	0.31811	0.07015	72.82738
Poly ($W^2,S\Delta\omega^2$)	391.07814	39.10781	0.5027	0.25404	70.54922
Poly ($W^2,S\Delta\omega^3$)	382.15907	54.59415	0.51404	-0.04135	78.49786
Poly (W^3)	566.56068	47.21339	0.27955	0.09944	70.93487
Poly ($S\Delta\omega^3$)	611.5543	50.96286	0.22233	0.02792	72.15758
Poly ($W^3,S\Delta\omega$)	534.49374	59.38819	0.32033	-0.13279	78.32041
Poly ($W^3,S\Delta\omega^2$)	389.0618	55.58026	0.50526	-0.06016	78.78428
Poly ($W^3,S\Delta\omega^3$)	381.42045	63.57007	0.51498	-0.21256	81.23949

The model with the best fitting selected based on the BIC and R²>0.5 was marked on red.

Table S5. Ranks of tested polynomial fitting curves for specific energy consumption during rice comminution as a function of batch dosing speed W and total increase in angular speeds $S\Delta\omega$

Model	Residual Sum of Squares	Reduced Chi Sq	R²	Adj. R²	BIC
Poly (W)	0.00262	$1.87183 \cdot 10^{-4}$	0.04441	-0.02384	-131.15348
Poly ($S\Delta\omega$)	0.00223	$1.59594 \cdot 10^{-4}$	0.18526	0.12706	-133.70478
Poly ($W,S\Delta\omega$)	0.00211	$1.62502 \cdot 10^{-4}$	0.22967	0.11116	-131.82904
Poly ($W,S\Delta\omega^2$)	0.00104	$9.48599 \cdot 10^{-5}$	0.6195	0.48114	-137.56932
Poly ($W,S\Delta\omega^3$)	$8.65173 \cdot 10^{-4}$	$9.61304 \cdot 10^{-5}$	0.68452	0.47419	-135.022
Poly (W^2)	0.00242	$1.86081 \cdot 10^{-4}$	0.11789	-0.01781	-129.66113
Poly ($S\Delta\omega^2$)	0.00138	$1.06219 \cdot 10^{-4}$	0.49647	0.41901	-138.63194
Poly ($W^2,S\Delta\omega$)	0.0017	$1.54128 \cdot 10^{-4}$	0.38177	0.15696	-129.8032
Poly ($W^2,S\Delta\omega^2$)	$8.41944 \cdot 10^{-4}$	$8.41944 \cdot 10^{-5}$	0.69299	0.53948	-138.23006
Poly ($W^2,S\Delta\omega^3$)	$6.42658 \cdot 10^{-4}$	$9.18083 \cdot 10^{-5}$	0.76566	0.49783	-134.23389
Poly (W^3)	0.0023	$1.91346 \cdot 10^{-4}$	0.16271	-0.04661	-127.72283
Poly ($S\Delta\omega^3$)	0.00138	$1.14651 \cdot 10^{-4}$	0.49831	0.37289	-135.9179
Poly ($W^3,S\Delta\omega$)	0.00155	$1.72389 \cdot 10^{-4}$	0.43425	0.05708	-125.6772
Poly ($W^3,S\Delta\omega^2$)	$5.24798 \cdot 10^{-4}$	$7.49711 \cdot 10^{-5}$	0.80863	0.58993	-137.47549
Poly ($W^3,S\Delta\omega^3$)	$5.19755 \cdot 10^{-4}$	$8.66258 \cdot 10^{-5}$	0.81047	0.52618	-134.85741

The model with the best fitting selected based on the BIC and R²>0.5 was marked on red.

Table S6. Ranks of tested polynomial fitting curves for specific energy consumption during corn comminution as a function of batch dosing speed W and total increase in angular speeds $S\Delta\omega$

Model	Residual Sum of Squares	Reduced Chi Sq	R^2	Adj. R^2	BIC
Poly (W)	0.00794	$5.67185\cdot10^{-4}$	0.07075	0.00438	-113.41592
Poly ($S\Delta\omega$)	0.00611	$4.36576\cdot10^{-4}$	0.28474	0.23365	-117.60349
Poly ($W,S\Delta\omega$)	0.00551	$4.23651\cdot10^{-4}$	0.35549	0.25634	-116.49748
Poly ($W,S\Delta\omega^2$)	0.00457	$4.15238\cdot10^{-4}$	0.46548	0.2711	-113.9461
Poly ($W,S\Delta\omega^3$)	0.00414	$4.59621\cdot10^{-4}$	0.51592	0.19319	-109.98685
Poly (W^2)	0.00793	$6.0987\cdot10^{-4}$	0.07219	-0.07055	-110.66812
Poly ($S\Delta\omega^2$)	0.00524	$4.0319\cdot10^{-4}$	0.38662	0.29225	-117.28953
Poly ($W^2,S\Delta\omega$)	0.00543	$4.93266\cdot10^{-4}$	0.36503	0.13413	-111.19094
Poly ($W^2,S\Delta\omega^2$)	0.00456	$4.55533\cdot10^{-4}$	0.46691	0.20037	-111.21663
Poly ($W^2,S\Delta\omega^3$)	0.00403	$5.76225\cdot10^{-4}$	0.52797	-0.01149	-104.84517
Poly (W^3)	0.00793	$6.60692\cdot10^{-4}$	0.07219	-0.15976	-107.89553
Poly ($S\Delta\omega^3$)	0.00494	$4.11301\cdot10^{-4}$	0.42241	0.27801	-115.47893
Poly ($W^3,S\Delta\omega$)	0.00534	$5.92801\cdot10^{-4}$	0.37565	-0.04059	-105.91555
Poly ($W^3,S\Delta\omega^2$)	0.00434	$6.19918\cdot10^{-4}$	0.49218	-0.08819	-103.67574
Poly ($W^3,S\Delta\omega^3$)	0.00403	$6.72262\cdot10^{-4}$	0.52797	-0.18007	-102.07258

The model with the best fitting selected based on the BIC and $R^2>0.5$ was marked on red.

Table S7. Ranks of tested polynomial fitting curves for size reduction ratio during rice comminution as a function of batch dosing speed W and total increase in angular speeds $S\Delta\omega$

Model	Residual Sum of Squares	Reduced Chi Sq	R^2	Adj. R^2	BIC
Poly (W)	0.01434	0.00102	0.01169	-0.05891	-103.9609
Poly ($S\Delta\omega$)	0.00183	$1.30382\cdot10^{-4}$	0.87418	0.86519	-136.93943
Poly ($W,S\Delta\omega$)	0.00166	$1.2737\cdot10^{-4}$	0.88587	0.86831	-135.7265
Poly ($W,S\Delta\omega^2$)	0.00164	$1.49209\cdot10^{-4}$	0.88687	0.84573	-130.32213
Poly ($W,S\Delta\omega^3$)	0.00102	$1.13081\cdot10^{-4}$	0.92985	0.88308	-132.42366
Poly (W^2)	0.01432	0.0011	0.01306	-0.13877	-101.21062
Poly ($S\Delta\omega^2$)	0.00182	$1.40082\cdot10^{-4}$	0.87448	0.85516	-134.20438
Poly ($W^2,S\Delta\omega$)	0.00163	$1.47782\cdot10^{-4}$	0.88795	0.8472	-130.47588
Poly ($W^2,S\Delta\omega^2$)	0.00162	$1.62133\cdot10^{-4}$	0.88824	0.83237	-127.74545
Poly ($W^2,S\Delta\omega^3$)	$9.7441\cdot10^{-4}$	$1.39201\cdot10^{-4}$	0.93284	0.85608	-127.57439
Poly (W^3)	0.0143	0.00119	0.01404	-0.23245	-98.45392
Poly ($S\Delta\omega^3$)	0.0012	$9.97952\cdot10^{-5}$	0.91745	0.89682	-138.13822
Poly ($W^3,S\Delta\omega$)	0.00159	$1.7645\cdot10^{-4}$	0.89054	0.81756	-125.3047
Poly ($W^3,S\Delta\omega^2$)	0.00158	$2.26246\cdot10^{-4}$	0.89084	0.76608	-119.8032
Poly ($W^3,S\Delta\omega^3$)	$9.60194\cdot10^{-4}$	$1.60032\cdot10^{-4}$	0.93382	0.83454	-125.03695

The model with the best fitting selected based on the BIC and $R^2>0.5$ was marked on red.

Table S8. Ranks of tested polynomial fitting curves for size reduction ratio during corn comminution as a function of batch dosing speed W and total increase in angular speeds $S\Delta\omega$

Model	Residual Sum of Squares	Reduced Chi Sq	R^2	Adj. R^2	BIC
Poly (W)	21.28902	1.52064	0.00888	-0.06191	12.88741
Poly ($S\Delta\omega$)	4.40668	0.31476	0.79485	0.78019	-12.31371
Poly ($W,S\Delta\omega$)	4.21585	0.3243	0.80373	0.77353	-10.24944
Poly ($W,S\Delta\omega^2$)	4.08608	0.37146	0.80977	0.7406	-5.2045
Poly ($W,S\Delta\omega^3$)	3.39615	0.37735	0.84189	0.73649	-2.61843
Poly (W^2)	20.65312	1.5887	0.03849	-0.10944	15.1748
Poly ($S\Delta\omega^2$)	4.39685	0.33822	0.7953	0.76381	-9.57686

Poly ($W^2,S\Delta\omega$)	3.46002	0.31455	0.83892	0.78034	-7.86552
Poly ($W^2,S\Delta\omega^2$)	3.45018	0.34502	0.83938	0.75906	-5.13846
Poly ($W^2,S\Delta\omega^3$)	2.63743	0.37678	0.87721	0.73689	-1.11863
Poly (W^3)	20.1386	1.67822	0.06244	-0.17195	17.54374
Poly ($S\Delta\omega^3$)	3.81087	0.31757	0.82258	0.77823	-9.09275
Poly ($W^3,S\Delta\omega$)	2.82268	0.31363	0.86859	0.78098	-5.57773
Poly ($W^3,S\Delta\omega^2$)	2.70889	0.38698	0.87389	0.72976	-0.69091
Poly ($W^3,S\Delta\omega^3$)	2.12291	0.35382	0.90117	0.75292	-1.81831

The model with the best fitting selected based on the BIC and $R^2 > 0.5$ was marked on red.