Table S1. Design of formulation according to the D-optimal design

No.	Code (fraction)			Actual in Formulation (%)		
Runs	A	B	C	A	B	C
1	0.35	0.25	0.40	22.0	10.0	13.0
2	0.25	0.00	0.75	20.0	5.0	20.0
3	0.00	0.25	0.75	15.0	10.0	20.0
4	1.00	0.00	0.00	35.0	5.0	5.0
5	0.50	0.50	0.00	25.0	15.0	5.0
6	0.00	0.50	0.50	15.0	15.0	15.0
7	0.675	0.125	0.20	28.5	7.5	9.0
8	0.25	0.50	0.25	20.0	15.0	10.0
9	0.175	0.25	0.575	18.5	10.0	16.5
10	0.75	0.25	0.00	30.0	10.0	5.0
11	0.625	0.00	0.375	27.5	5.0	12.5
12	0.35	0.25	0.40	22.0	10.0	13.0
13	0.35	0.25	0.40	22.0	10.0	13.0
14	1.00	0.00	0.00	35.0	5.0	5.0
15	0.25	0.00	0.75	20.0	5.0	20.0
16	0.50	0.5	0.00	25.0	15.0	5.0

A = Methocel K100M DC2 (proportion);
B = Kollidon SR-Eudragit RS interpolymer complex (proportion);
C = effervescent components (proportion)

Table S2. Post-compression evaluation of swellable gastro-floating tablet formulation

No. Runs	Tablet weight (mg) (n=20; mean±SD)*	Drug content (%) (n=10; mean±SD)*	Crushing strength (kP) (n=10; mean±SD)*	FLT (s) (n=6; mean±SD)
Run 1	501.6±2.1	99.29±2.52	7.725±0.299	29.0±3.0
Run 2	501.0±1.8	99.96±0.17	7.780±0.368	21.1±1.3
Run 3	507.6±3.4	100.41±2.24	7.815±0.420	22.0±1.6
Run 4	501.5±3.4	100.65±3.40	7.850±0.243	912.6±148.2
Run 5	503.1±3.3	101.23±1.01	7.765±0.320	725.4±134.2
Run 6	499.8±3.2	104.96±1.07	7.825±0.380	14.9±1.2
Run 7	503.1±3.0	97.59±1.23	7.720±0.358	162.8±17.7
Run 8	502.6±3.9	100.49±5.37	7.840±0.343	29.4±4.8
Run 9	502.0±3.7	102.11±3.86	7.805±0.429	19.8±1.4
Run 10	501.9±3.3	99.73±2.41	7.975±0.255	346.1±55.4
Run 11	500.2±3.5	100.11±2.77	8.020±0.417	33.7±7.5
Run 12	500.4±3.5	101.36±0.91	7.885±0.298	26.9±4.0
Run 13	502.8±3.5	99.58±0.84	7.970±0.314	20.4±1.2
Run 14	499.5±2.1	103.28±1.34	7.865±0.374	643.5±23.6
Run 15	498.4±3.2	99.33±4.05	7.940±0.303	15.2±4.4
Run 16	502.3±2.5	100.59±2.89	7.945±0.255	646.5±5.9

FLT = floating lag time

* = $p>0.05$

Table S3. Goodness of fit parameter of several equation model for modelling the drug release

Model	Parameter Statistik	Run 1	Run 2	Run 4	Run 5	Run 6	Run 7	Run 8	Run 9	Run 10	Run 11
Zero-order	R^2	0.9241	0.9330	0.9350	0.9179	0.8768	0.9300	0.9251	0.9116	0.9166	0.9273
	Adj. R^2	0.9157	0.9256	0.9277	0.9087	0.8631	0.9222	0.9168	0.9018	0.9074	0.9192
	RMSE	7.90	7.20	7.01	8.12	8.95	7.34	8.23	8.12	8.06	7.45
	k_0	17.814	23.875	17.922	19.797	35.550	17.727	18.261	22.114	19.100	17.581
First-order	R^2	0.9587	0.9087	0.9469	0.9408	0.7887	0.9483	0.9725	0.9043	0.9392	0.9476
	Adj. R^2	0.9587	0.9087	0.9469	0.9408	0.7887	0.9483	0.9725	0.9043	0.9392	0.9476
	RMSE	5.52	7.97	6.01	6.54	11.12	5.98	4.73	8.01	6.53	6.00
	k_1	0.270	0.317	0.256	0.279	0.561	0.258	0.301	0.279	0.266	0.253
Higuchi	R^2	0.9939	0.9901	0.9965	0.9939	0.8538	0.9958	0.9935	0.9882	0.9928	0.9944
	Adj. R^2	0.9939	0.9901	0.9965	0.9939	0.8538	0.9958	0.9935	0.9882	0.9928	0.9944
	RMSE	2.12	2.62	1.55	2.09	9.24	1.71	2.29	2.81	2.24	1.96
	k_H	32.569	35.206	31.775	33.298	39.063	31.835	33.962	33.656	32.587	31.649
Weibull	R^2	0.9958	0.9755	0.9896	0.9950	0.9778	0.9938	0.9945	0.9898	0.9948	0.9934
	Adj. R^2	0.9947	0.9694	0.9870	0.9937	0.9722	0.9923	0.9931	0.9873	0.9935	0.9917
	RMSE	1.98	4.62	2.97	2.13	4.03	2.31	2.38	2.92	2.14	2.38
	α	2.346	1.752	2.422	2.158	1.257	2.378	2.219	1.968	2.243	2.398
	β	0.694	0.571	0.735	0.661	0.484	0.670	0.717	0.594	0.656	0.665
	Ti (*lag time*)	0.050	0.033	0.039	0.033	0.033	0.033	0.050	0.033	0.033	0.033
Korsmeyer-Peppas	R^2	0.9769	0.9989	0.9918	0.9803	0.9931	0.9834	0.9760	0.9903	0.9805	0.9835
	Adj. R^2	0.9744	0.9988	0.9909	0.9781	0.9923	0.9816	0.9734	0.9893	0.9784	0.9817
	RMSE	4.35	0.92	2.49	3.98	2.12	3.57	4.66	2.68	3.89	3.54
	k	29.482	37.919	30.238	31.732	48.867	29.440	30.410	34.701	30.888	29.293
	n	0.592	0.447	0.546	0.554	0.339	0.574	0.600	0.487	0.556	0.572

R^2, determination coefficient; Adj. R^2, adjusted R^2; RMSE, root mean square error

k_0, k_1, k_H, α, β, *Ti*, *k*, and *n* are constant according to each model

Figure S1. Profile of bulk density alteration of swellable gastro-floating formulation during swelling process. Red dashed line represents threshold bulk density (1.027 g/mL) to float

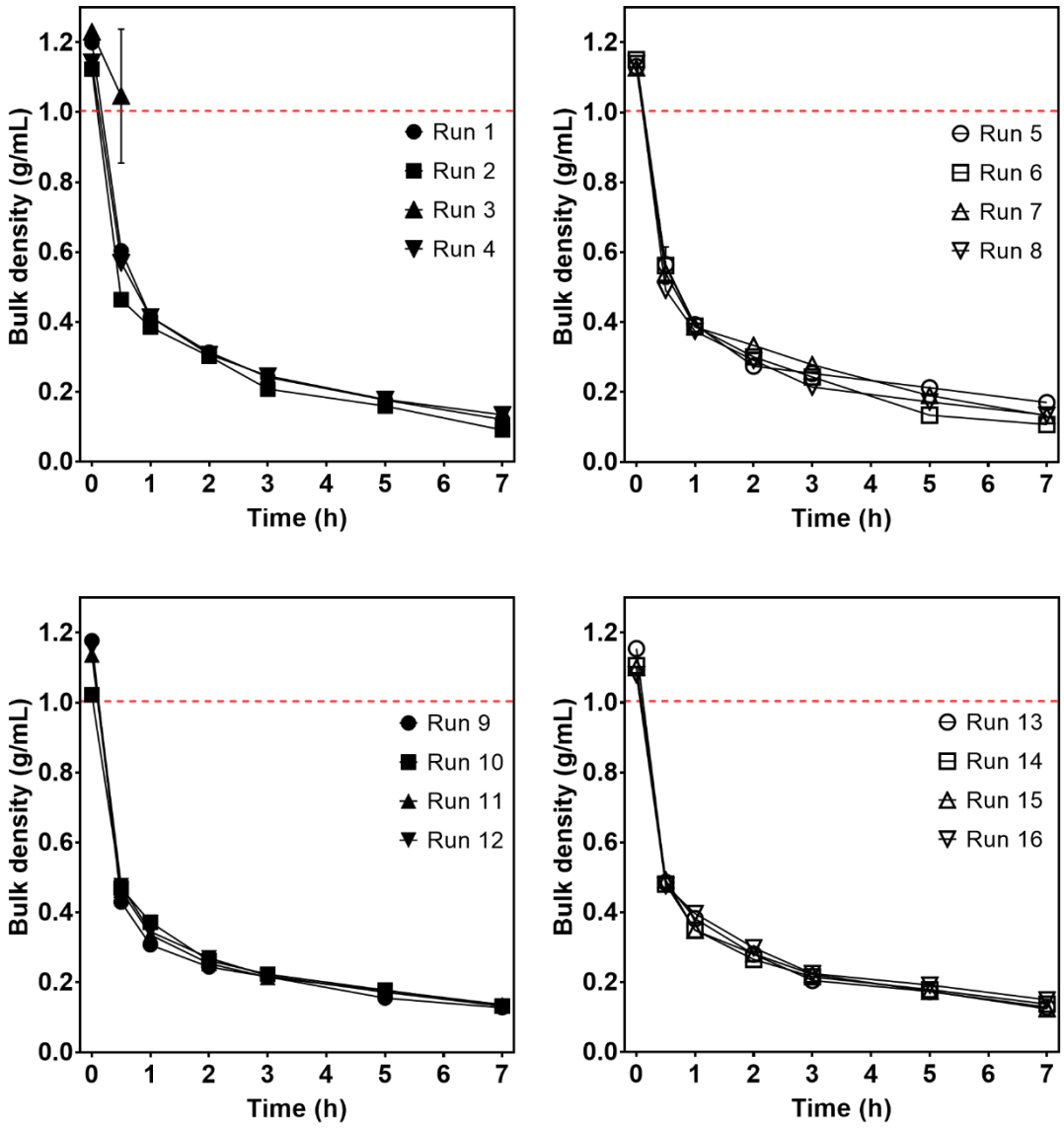


Figure S2. Matrix erosion system from swellable gastro-floating formulation during swelling process. Calculated based on the matrix erosion only and the drug release was ignored.

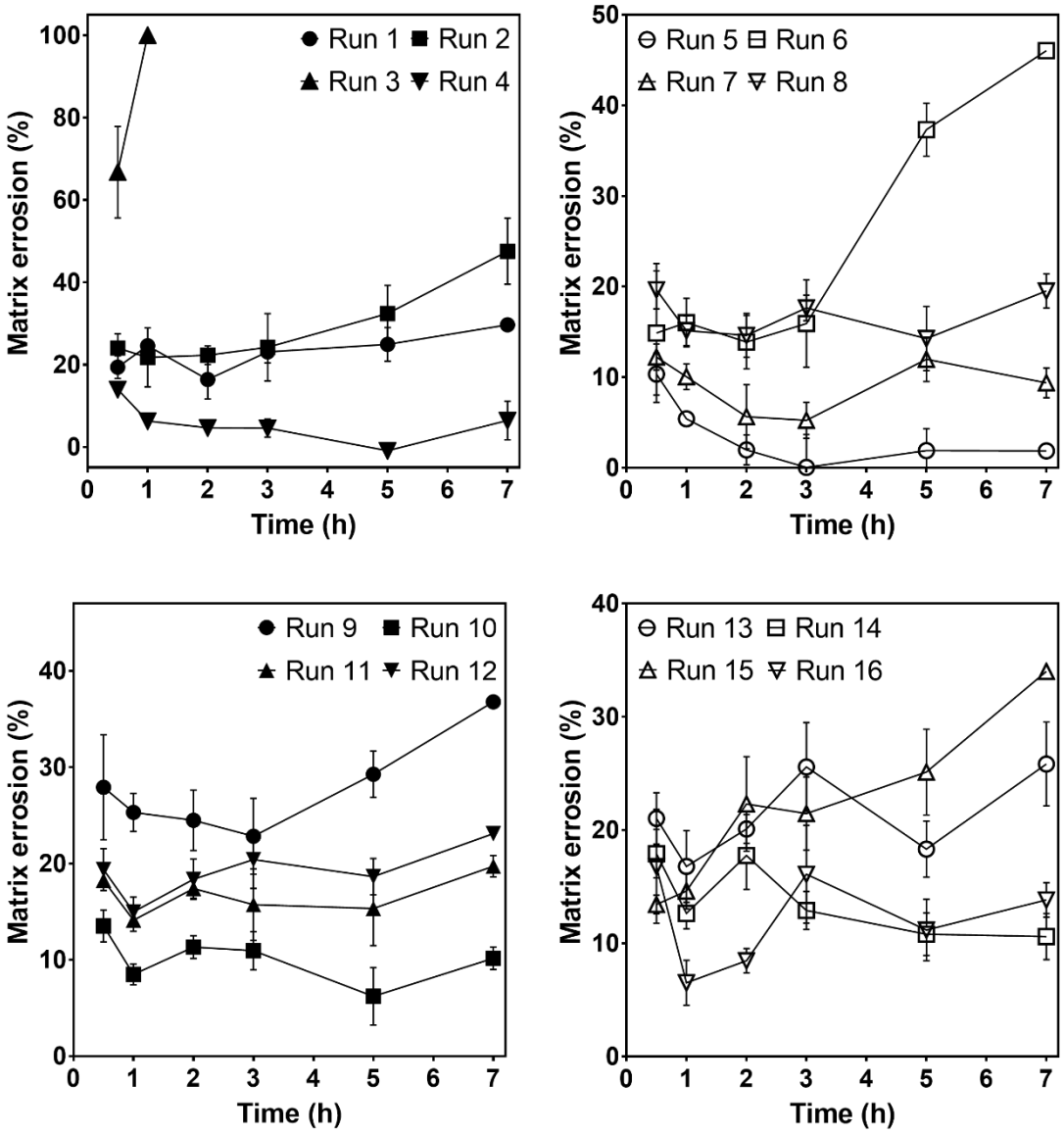
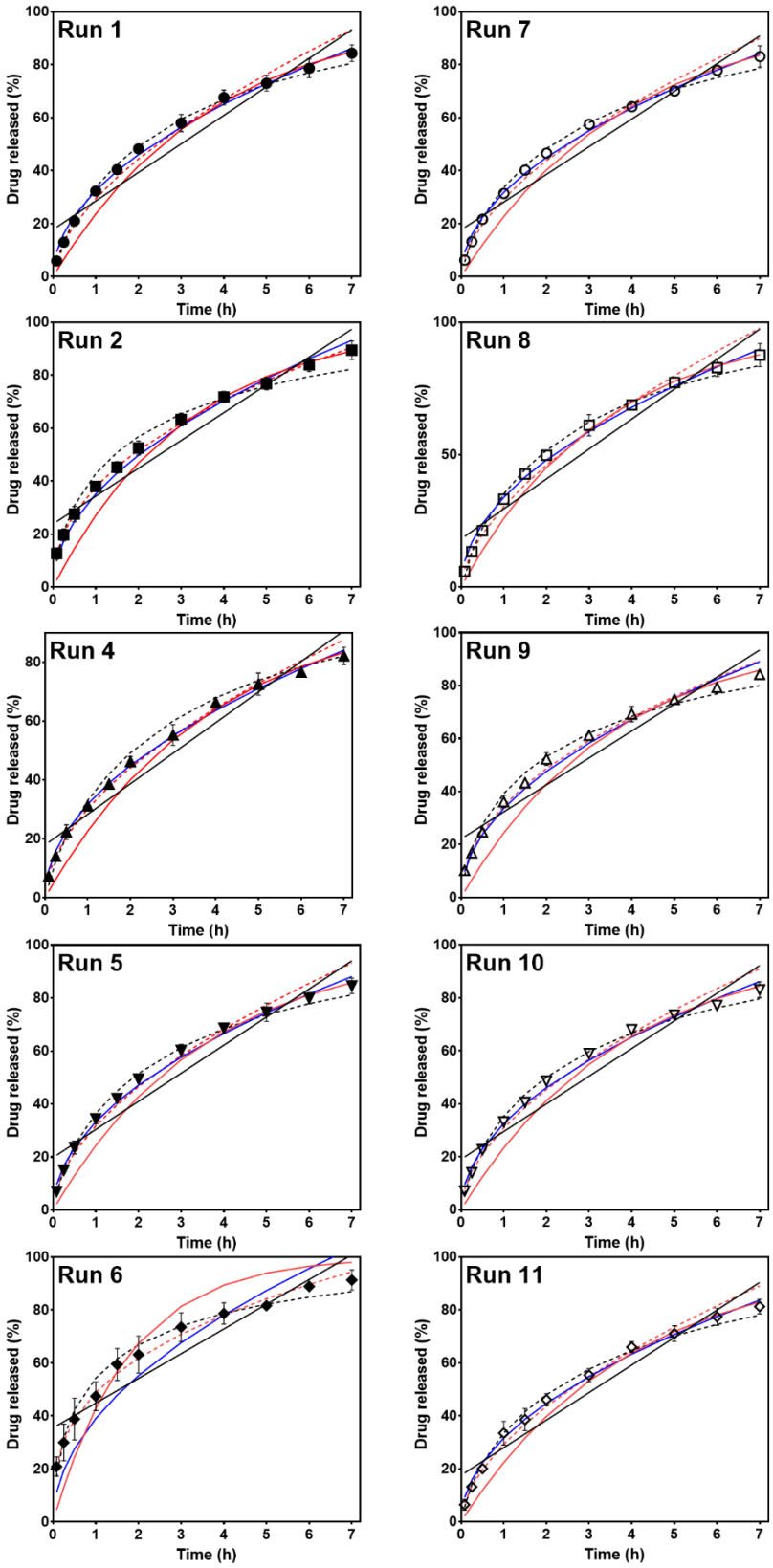
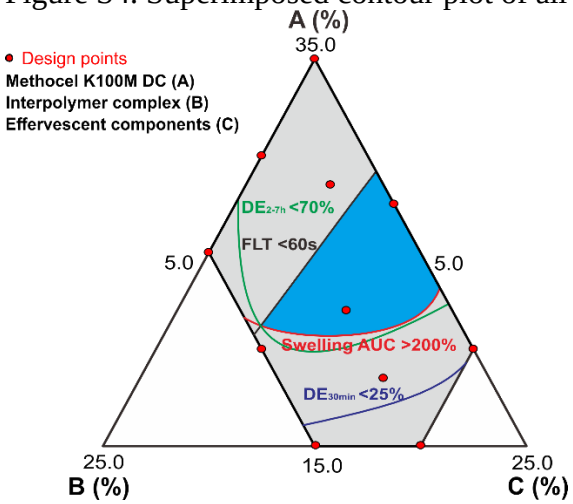


Figure S3. Modelling the drug release based on establish equation model. Zero-order release (—), first-order release (—), Higuchi (—), Weibull (---), dan Korsmeyer-Peppas (---)



Determination of controlled space and optimized formulae

Figure S4. Superimposed contour plot of all responses from swellable gastro-formulation



Critical quality attributes	Predicted	Observed	*p-value*	Residual (%)
Floating lag time (s)	32.24	31.46±2.12*	0.411	-2.41
Swelling AUC (%)	219.3	221.7±4.3*	0.997	1.09
DE_{30min} (%)	12.06	11.69±0.53*	0.201	-3.03
$DE_{2\text{-}7h}$ (%)	67.15	68.98±3.53*	0.311	2.73

*=p>0.05

Figure S5. Evaluation of optimized formulae of swellable gastro-floating formulation using D-optimal design