pharmaceutics

MDPI

Supplementary Materials: High-Shear Wet Granulation of SMEDDS Based on Mesoporous Carriers for Improved Carvedilol Solubility

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Table S1. The results of SMEDDS granules characterization during formulation development: GD added per 6 g og carrier, % of povidone K25, d_{50} - median particle diameter, SPAN – particle size distribution and granules flow rate (expressed per 100g).

Mesoporous carrier	GD added per 6 g of carrier (g)	% povidone K25 in GD	d_{50} (μm)	SPAN	Flow time (s)
Syloid® 244FP	15.19	2	108	7.4	7.4
	15.44	4	159	5.2	5.2
	15.56	6	314	5.7	5.7
	17.29	7	448	8.8	8.8
	15.48	10	678	8.9	8.9
	18.82	12	145	8.9	8.9
	15.9	13	452	/	/
	15.88	16	361	/	/
	16.54	18	716	5.9	5.9
Neusilin® US2	19.7	6	330	1.95	9.9
	19.72	7	529	1.22	12.5
	19.09	8	165	1.6	7.8
	18.08	10	219	2.53	9.2
	19.09	12	189	2.46	7.2
	19.45	15	360	1.96	18.4
	20.27	20	602	1.46	16.1
Fujicalin® SG	13.25*	2	266	2.33	6.2
	13*	3	233	2.81	4.8
	16.35*	4	437	1.19	7.15
	18.5*	5	609	0.93	11.7
	13.55*	7	410	1.88	6.0
	12.93*	10	751	0.47	5.9
Syloid® XDP 3050	13.77	5	58.8	0.97	7.0
	13.63	6	56.4	0.88	7.2
	14.83	7	60.9	0.94	∞
	15.48	10	106	2.39	/
	15.72	15	351	1.78	26.7
	15.65	17	340	1.66	/
	15.62	20	723	1.18	15.8
	15.45	25	791	1.25	13.5
	15.38	30	879	1.06	/
Aeroperl® 300	15.25	10	332	2.56	8.4
	15.23	15	623	0.84	7.9
	15.58	17	710	0.78	9.1
	15.62	20	602	0.93	16.1

*GD added per 20 g of carrier (g).

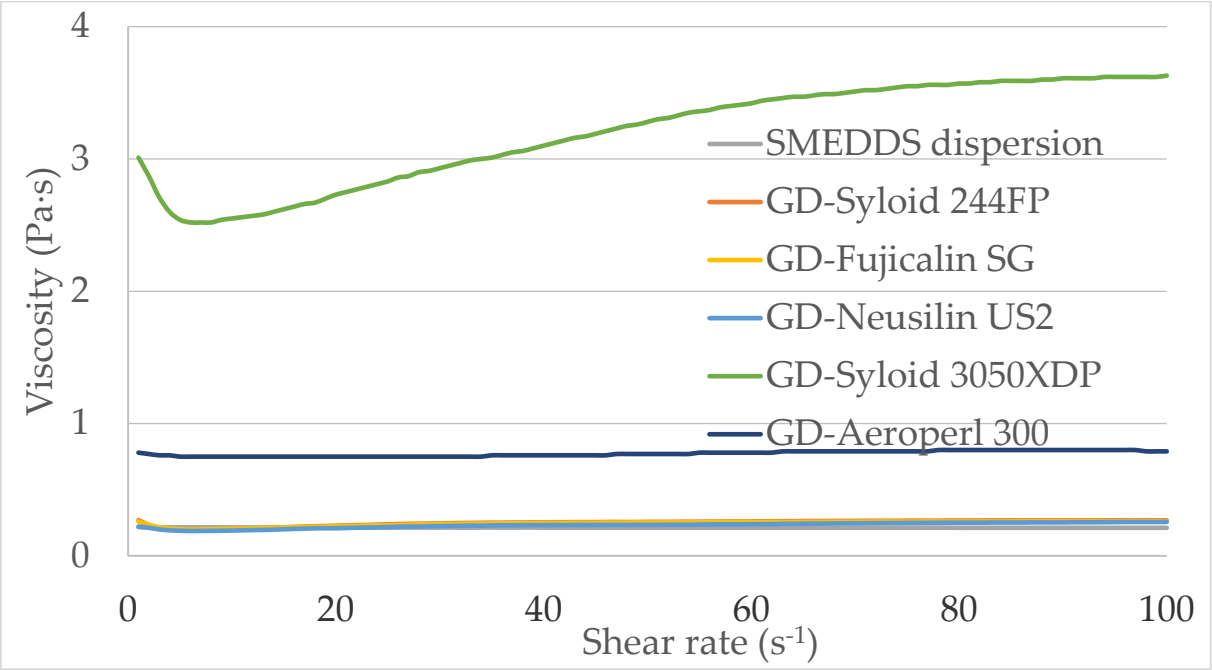


Figure S1. Viscosity of GD used for preparation of optimal products with corresponding mesoporous carriers, depending on the type of mesoporous carrier used. .

Table S2. Viscosity of GD used for preparation of optimal products with corresponding mesoporous carriers, determined at shear rate of 1 s^{-1}. GD consisted of SMEDDS dispersion (70 % SMEDDS and 30 % water) and binder povidone K25.

Sample	% povidone K25	Viscosity (Pa·s)
SMEDDS dispersion	0	0.62
GD-Syloid® 244FP	7	0.67
GD-Neusilin® US2	7	0.62
GD-Fujicalin® SG	5	0.66
GD-Syloid® 3050 XDP	25	3.41
GD-Aeroperl® 300	15	1.18

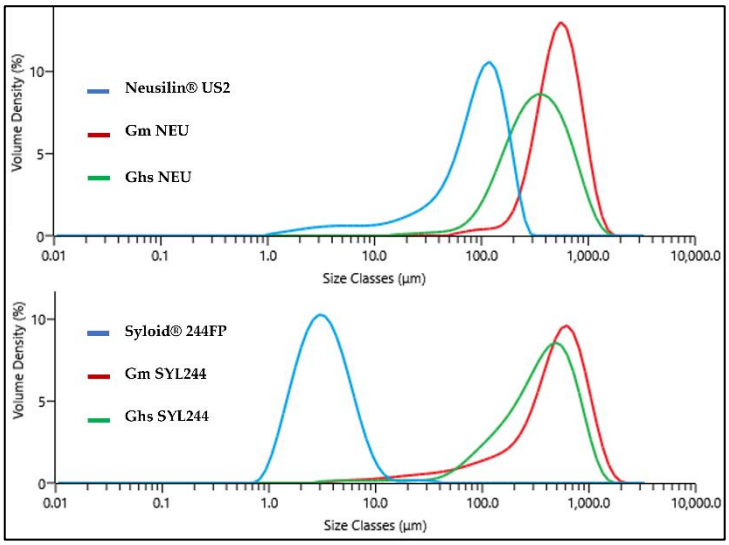
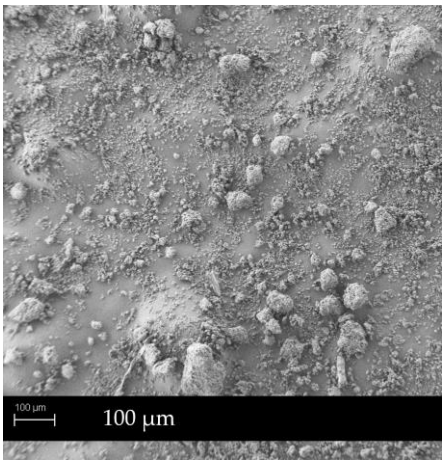
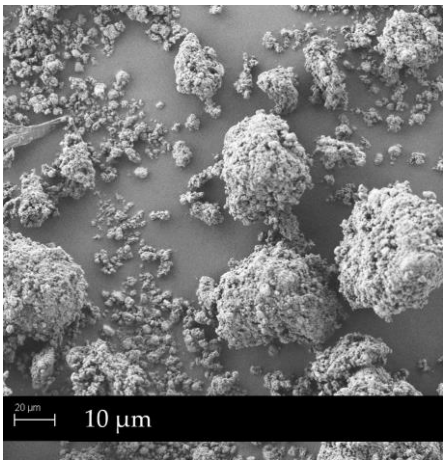


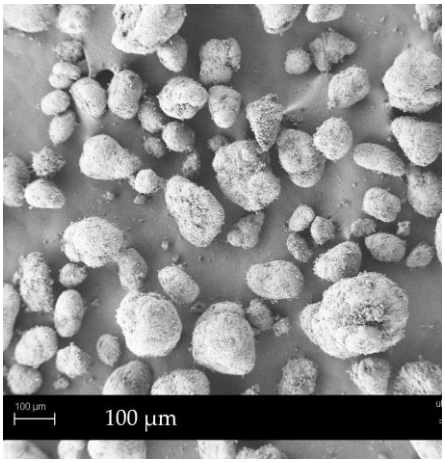
Figure S2. Particle size distribution of each mesoporous carrier, granules produces manually and in HS granulator, with Syloid® 244FP and Neusilin® US2.

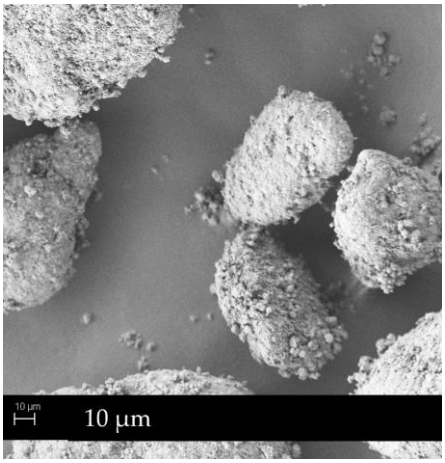




(**a**) (**b**)

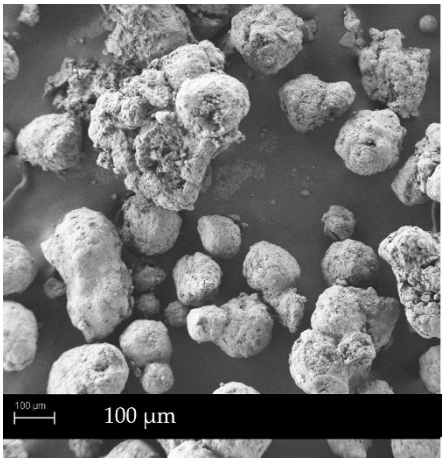
Figure S3. SEM images of G_m SYL$_{244}$: (**a**) under magnification 200x; (**b**) under magnification 1000x.

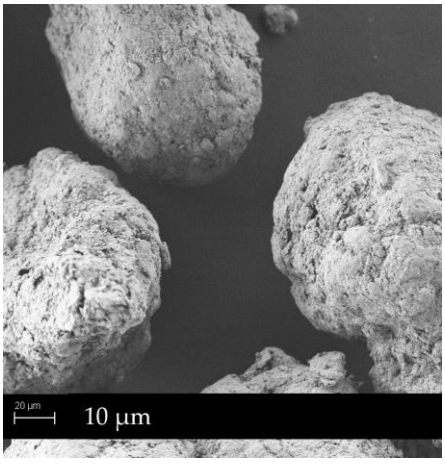




(**a**) (**b**)

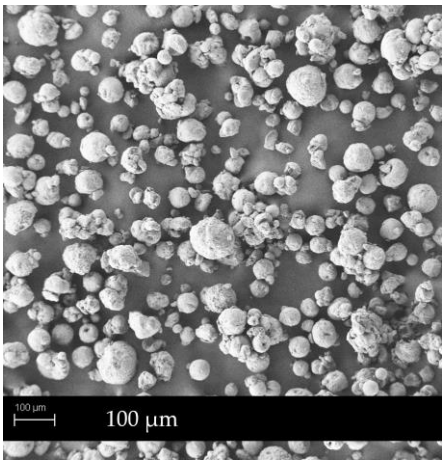
Figure S4. SEM images of G_{hs} SYL$_{244}$: (**a**) under magnification 200x; (**b**) under magnification 1000x.

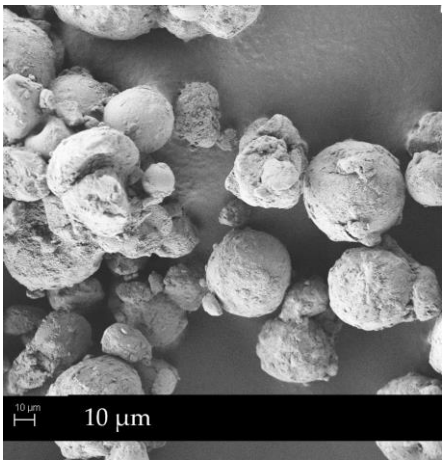




(**a**) (**b**)

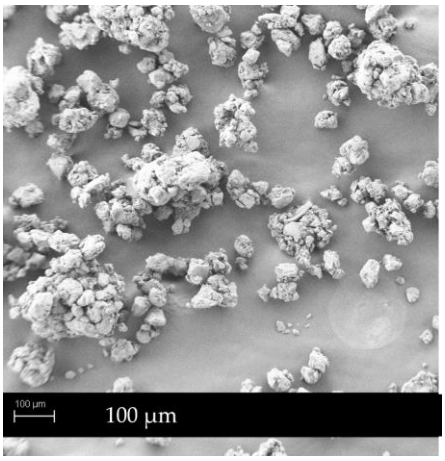
Figure S5. SEM images of G_m FUJ: (**a**) under magnification 200x; (**b**) under magnification 1000x.

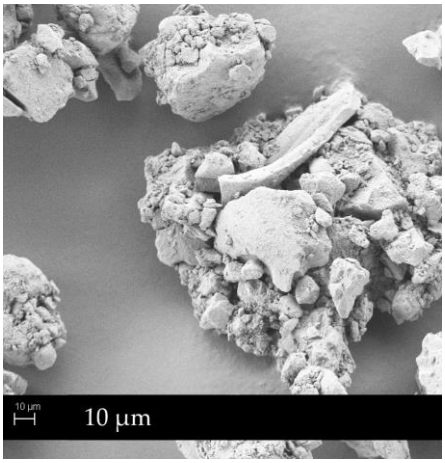




(**a**) (**b**)

Figure S6. SEM images of G_m AER: (**a**) under magnification 200x; (**b**) under magnification 1000x.





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

Figure S7. SEM images of G_m SYL_{3050}: (**a**) under magnification 200x; (**b**) under magnification 1000x.