Table 1 Composition, processing temperatures and FDM 3D printing compatibility of theophylline filament including PEO of different molecular weights.

Filament	**Composition**	**HME**		**FDM 3D Printing Temp. (ºC)**	**Compatibility with the gears of FDM 3D printer head**
		Processing Temp. (ºC)	Extrusion Temp. (ºC)		
Fil K100	Theophylline:PEG 6K: PEO 100K 30:35:35	60	60	NA*	Too fragile
Fil K200	Theophylline:PEG 6K: PEO 200K 30:35:35	65	65	105	Fragile
Fil K300	Theophylline:PEG 6K: PEO 300K 30:35:35	70	70	110	Compatible
Fil K600	Theophylline:PEG 6K: PEO 600K 30:35:35	80	80	145	Compatible
Fil K900	Theophylline:PEG 6K: PEO 900K 30:35:35	80	80	NA**	Compatible

* Filaments were incompatible with FDM 3D printer due to frequent filament breakage.

** Filaments were incompatible with FDM 3D printer due to immediate nozzle blockage.

Table 2 Hansen solubility parameter in $MPa^{1/2}$and components due to theophylline and PEO/PEG.

Where δD, δP and δH are the dispersion, polar, and hydrogen components of solubility parameter and (HSP) Hansen solubility parameter.

	δD	**δP**	**δH**	**HSP**
Theophylline	19.7	15.4	10.5	27.1
PEO, PEG	17	10	5	20.3

Table 3 Dimensions, volume of CAD designs, mass and surface/mass ratios of caplet and radiator-like structures generated by FDM 3D printing.

Design	**CAD design dimensions (mm)**			**CAD design volume (mm)**	**CAD design surface (mm^2)**	**Mass (mg)**	**Surface /mass ratio (mm^2/mg)**	**Drug contents (mg)**
	X	**Y**	**Z**					
Caplet	12	4.75	4.36	188.33	184.07	172.78±4.8	1.07	51.7±2.2
Radiator-2 mm spaced	20	10	5.99	141.47	1464.39	187.7±3.9	7.80	52.4±1.7
Radiator-1.5 mm spaced	19.679	10	5.99	170.46	1705.64	196.2±5.9	8.69	53±0.7
Radiator-1 mm spaced	19.93	10	6.03	231.35	2211.34	247.86±3.5	8.92	74.5±0.6
Radiator-0.5 mm spaced	19.433	10.	5.99	262.16	2557.66	290±7.9	8.82	80.1±0.7