

Supplementary Materials

Performance and Stability of Tenofovir Alafenamide Formulations within Subcutaneous Biodegradable Implants for HIV Pre-Exposure Prophylaxis (PrEP)

Linying Li, Leah M. Johnson, Sai Archana Krovi, Zach R. Demkovich and Ariane van der Straten

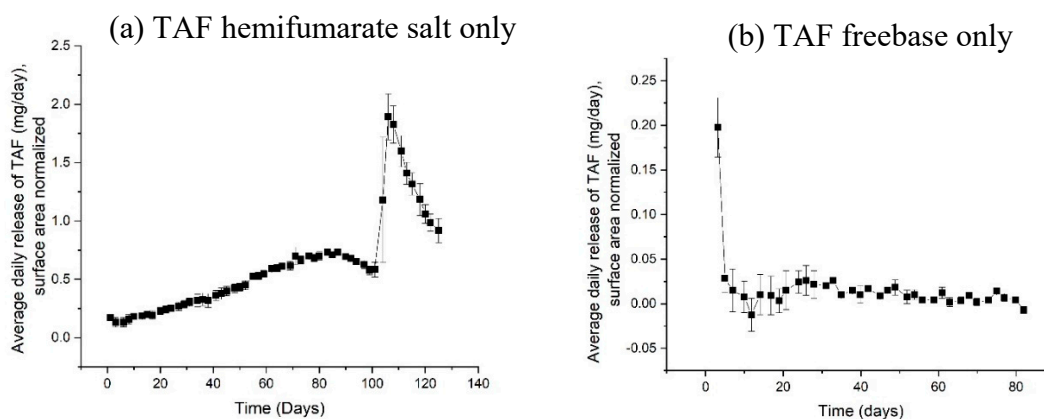


Figure S1. Daily release profiles of implants filled with TAF hemifumarate salt (TAF_{HF}) (a) and TAF freebase (TAF_{FB}) (b).

Table S1. Chromatographic purity of TAF_{HF} formulated with castor oil or PEG600 inside implants exposed to simulated physiological conditions over 120 days.

Chromatographic purity	TAF _{HF} -Castor oil	TAF _{HF} -PEG600
Time 0	99.8%	99.7%
Day 14	99.3%	97.3%
Day 28	98.9%	94.8%
Day 42	97.4%	89.7%
Day 52	96.0%	76.0%
Day 62	94.7%	63.3%
Day 82	82.6%	40.3%
Day 92	74.4%	22.9%
Day 102	57.1%	10.3%
Day 120	17.6%	1.36%

Table S2. Chromatographic purity of TAF_{FB} formulated with sesame oil or castor oil inside implants exposed to simulated physiological conditions over 210 days.

	TAF _{FB} -Sesame oil	TAF _{FB} -Castor oil
Day 0	99.8%	99.8%
Day 90	98.4%	97.1%
Day 120	98.0%	96.5%
Day 150	96.0%	92.5%
Day 180	94.9%	88.5%
Day 210	92.0%	84.5%

Table S3. Water ingress within the implant reservoir of TAF_{HF} formulated with castor oil or PEG600 measured via the loss-on-drying method.

Formulations	TAF _{HF} -Castor oil			TAF _{HF} -PEG600		
	Water content (mg)	% water ingress (of total mass of implant)	Cumulative drug release (mg)	Water content (mg)	% water ingress	Cumulative drug release (mg)
Time 0	0	0%	0	2.0	2%	0
Day 14	0.6	0.7%	4.2	6.7	8.1%	10.2
Day 28	1.0	1.2%	8.3	7.8	9.4%	16.1
Day 42	1.5	1.8%	15.4	8.4	10.1%	26.4
Day 52	2.1	2.4%	19.6	8.6	10.3%	38.0
Day 62	3.0	3.6%	22.1	13.1*	15.8%	54.5
Day 82	4.0	4.8%	30.6	10.9	13.1%	52.6
Day 92	5.5	6.6%	35.6	13.2*	15.9%	74.8
Day 102	8.2*	9.8%	50.5	13.3*	16.0%	56.7
Day 120	9.7	11.6%	44.6	18.0*	21.6%	102.9

* Implants are compromised.

Table S4. Water ingress within the implant reservoir of TAF_{FB} formulated with castor oil or sesame oil measured via loss-on-drying method.

Formulations	TAF _{FB} -Sesame oil			TAF _{FB} -Castor oil		
	Water content (mg)	% water ingress (of total mass of implant)	Cumulative drug release (mg)	Water content (mg)	% water ingress	Cumulative drug release (mg)
Time 0	0	0%	0	0%	0	0
Day 90	5.0	2.1%	16.9	11.7	5.1%	22.0
Day 120	10.0	4.6%	21.6	19.6	8.4%	29.8
Day 150	15.1	6.9%	26.7	29.1	12.2%	38.3
Day 180	22.7	10.6%	32.0	50.1	20.5%	47.6
Day 210	35.3	15.4%	38.2	55.4	23.1%	60.1

Table 5. Chromatographic purity profile of TAF_{HF} castor oil and TAF_{FB} sesame oil implants stored in open and closed foil pouches stored at 22 °C/50% RH and 40 °C/75% RH over 6-months.

Formulation	Storage Condition	Day 0	Day 90	Day 180
TAF _{HF} -Castor oil	22°C/50% RH (sealed)	99.5%	99.3%	99.1%
	22°C/50% RH (open)	99.5%	99.3%	99.0%
	40°C/75% RH (sealed)	99.5%	98.8%	97.5%
	40°C/75% RH (open)	99.5%	97.3%	91.2%
TAF _{FB} -Sesame oil	22°C/50% RH (sealed)	99.6%	99.1%	98.0%
	22°C/50% RH (open)	99.6%	98.5%	98.6%
	40°C/75% RH (sealed)	99.6%	98.8%	98.0%
	40°C/75% RH (open)	99.6%	99.4%	97.5%