

IN VITRO PHOTOSTABILITY TESTING OF SUNSCREEN COMPARED TO NATURAL SUNLIGHT

Job no: **PET26-770**

Rev: 0 Date: 29/04/2026

2. Area under the curve index (AUCI)

Area under the curve index (AUCI) of SPF according to the following equation

$$AUCI_{SPF} = \frac{AUC_{After(290-320\text{ nm.})}}{AUC_{before(290-320\text{ nm.})}}$$

where:

AUC_{before(290-320 nm.)}: Area under the curve before UV exposure of SPF wavelength (290-320 nm.)

AUC_{after(290-320 nm.)}: Area under the curve after UV exposure of SPF wavelength (290-320 nm.)

If AUCI>0.8, the sunscreen was considered photostable.

Area under the curve index (AUCI) of UVAPF according to the following equation

$$AUCI_{UVAPF} = \frac{AUC_{after(320-400\text{ nm.})}}{AUC_{before(320-400\text{ nm.})}}$$

where:

AUC_{before(320-400 nm.)}: Area under the curve before UV exposure of UVAPF wavelength (320-400 nm.)

AUC_{after(320-400 nm.)}: Area under the curve before UV exposure of UVAPF wavelength (320-400 nm.)

If AUCI>0.8, the sunscreen was considered photostable.

PART D: RESULTS

Result and conclusion:

☐ : Screening test (scan 1 plate)

☒ : Full test (scan 4 plates)

Table 2: SPF and UVAPF of Std. S2 (Lot no. 15/25) after UV irradiated

Test	Plate no.	Pre-irradiation UVAPF	C Coeff.	Irradiation dose (J/cm ²)	Exposure time (min)	Post-irradiation UVAPF
Std. S2 (Lot no. 15/25)	Plate 1	13.60	0.85	16.30	50:21	11.00
	Plate 2	13.30	0.79	15.90	49:13	10.90
	Plate 3	13.30	0.79	15.90	49:06	10.80
	Plate 4	13.30	0.77	16.00	49:26	10.90
Average						10.90
Standard dev.						0.10
UVAPF COV						16.35
Critical wavelength (nm)						379.10
UVAPF 95% CI (% of mean)						1.40

Table 3: AUCI of product after UV irradiated for 3 hours

Test	Plate no.	SPF (290-320 nm.)		UVAPF (320-400 nm.)	
		AUC _{before}	AUC _{after}	AUC _{before}	AUC _{after}
3 hours in Q-sun of test product	Plate 1	37.45	58.96	57.15	53.98
	Plate 2	52.12	64.65	78.17	91.99
	Plate 3	53.08	64.53	79.48	92.04
	Plate 4	53.89	64.65	81.40	94.05
AUCI		1.29		1.12	

Table 4: AUCI of product after UV irradiated for 6 hours

Test	Plate no.	SPF (290-320 nm.)		UVAPF (320-400 nm.)	
		AUC _{before}	AUC _{after}	AUC _{before}	AUC _{after}
6 hours in Q-sun of test product	Plate 1	37.45	58.72	57.15	83.55
	Plate 2	52.12	63.79	78.17	89.97
	Plate 3	53.08	64.20	79.48	90.80
	Plate 4	53.89	64.49	81.40	93.10
AUCI		1.28		1.21	

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Table 5: AUCI of product after UV irradiated for 10 hours

Test	Plate no.	SPF (290-320 nm.)		UVAPF (320-400 nm.)	
		AUC _{before}	AUC _{after}	AUC _{before}	AUC _{after}
10 hours in Q-sun of test product	Plate 1	37.45	57.74	57.15	79.99
	Plate 2	52.12	62.49	78.17	85.95
	Plate 3	53.08	62.74	79.48	87.01
	Plate 4	53.89	62.96	81.40	89.30
AUCI		1.25		1.16	

Conclusion:

No.	UV irradiated time in Q-Sun	UV irradiated time in Natural light	AUCI (AUCI > 0.8)	
			AUCI _{spf}	AUCI _{UVAPF}
1	3hrs	4hrs	1.29	1.12
2	6hrs	9hrs	1.28	1.21
3	10hrs	14hrs	1.25	1.16

The test sample description, *Molecology Starter Sunscreen SPF50+ PA++++ (Formula code : SLTTH00263R02SAI, Lot no. : 26A002)* provided AUCI of SPF (290-320 nm.) region and AUCI of UVAPF (320-400 nm.) region greater than 0.8 after exposure to simulated sunlight for 10 hours; thus the photostability of this product to natural sunlight for 14 hours was expected.

Analyzer:

Technician - Product Efficacy Test

Date: 29/04/2026

Reviewer:

Scientist - Product Efficacy Test

Date: 29/04/2026

Approver:

Technical Support Manager

Date: 29/04/2026

PART E: GRAPH PICTURE

I. Absorbance graph of after UV irradiated for 3 hours

