



# Will It Block or Not?

## UV-A Transmission of Soft Contact Lenses Measured by Spectrometer

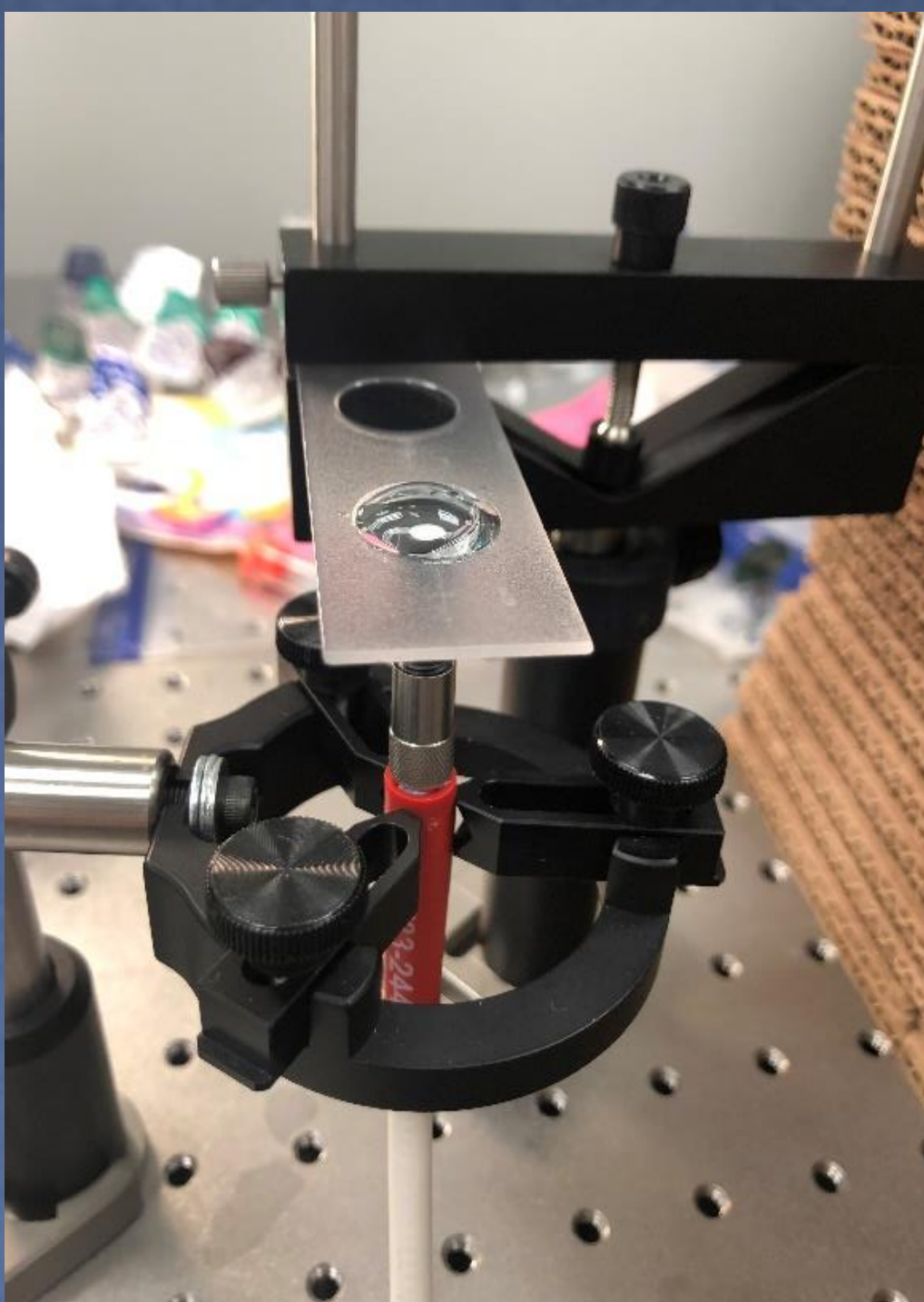
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### PURPOSE

Ultraviolet (UV) radiation poses a significant risk to several ocular structures<sup>1</sup>. Chronic exposure to UV radiation has been associated with adnexal, anterior segment and retinal alterations<sup>2,3</sup>. As such, UV protection is frequently recommended by practitioners to protect ocular health. With the ever-expanding advances in technology, many contact lenses brands now advertise UV-A and UV-B blocking abilities. With growing interest in contact lens options amongst the general public, the purpose of this study was to evaluate the ability of soft contact lenses to block UV-A radiation and to compare lenses of different brands and manufacturers.

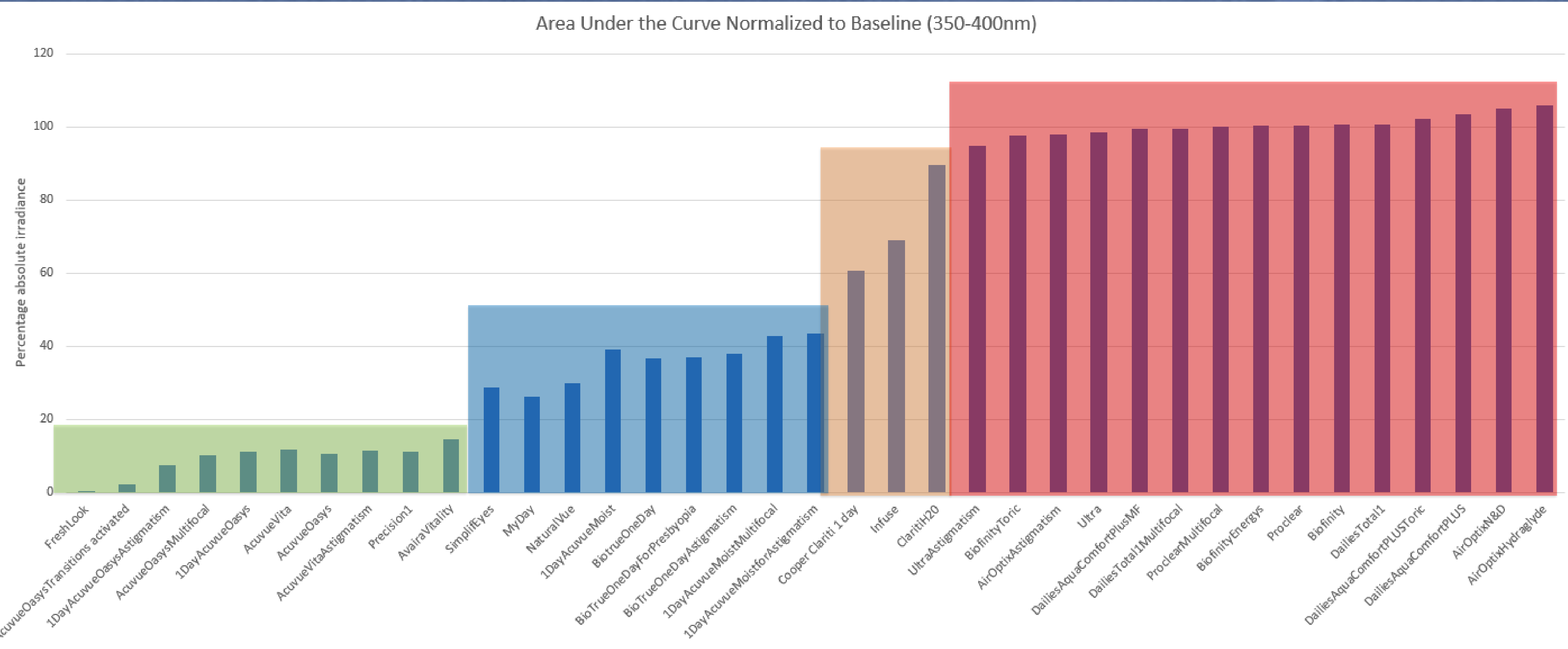
### METHODS

A UV-A light source was placed 50cm from a spectrometer. Multiple baseline measurements of absolute irradiance (microwatts/cm<sup>2</sup>/nm) through a microscope slide were obtained and averaged. Individual contact lenses were then placed on the microscope slide and the absolute irradiance of light transmitted through each was measured. On average, 6 measurements were taken through 37 different brands of contact lenses. Measurements of the peak absolute irradiance at 370nm and integrated absolute irradiance across the UV-A spectrum 350-400nm were recorded. These values were then compared to the baseline as well as to one another.



Manufacturer	Spherical Contacts  *t also includes toric data *mf also includes MF data	Area under the curve - absolute irradiance microwatts/cm <sup>2</sup> /nm	% UV-A blocking (AVERAGED)
Background Baseline		30568	0%
Alcon	Air Optix N&D	32069	0%
Alcon	Air Optix Hydraglyde (*t)	31167	0%
Alcon	Dailies Aqua Comfort Plus (*t, *mf)	31083.67	0%
Cooper	Biofinity Energys	30707	0%
Cooper	Proclear (*mf)	30627.5	0%
Alcon	Dailies Total One (*mf)	30578.5	0%
Cooper	Biofinity (*t, *Energys)	30295.5	0.9%
B&L	Ultra (*t)	29583.5	3.2%
B&L	Infuse	21133	30.9%
Cooper	Clariti 1 day	18601	39.1%
J&J	1-Day Acuvue Moist (*t, *mf)	12795	58.1%
B&L	Biotrue One Day (*t, *mf)	11381	62.8%
Cooper	MyDay 1 Day (*t)	8026	73.7%
Cooper	Avaira Vitality	4397	85.6%
J&J	Acuvue Vita (*t)	3558.5	88.4%
Alcon	Precision 1	3358	89.0%
J&J	Acuvue Oasys (*mf)	3156.5	89.7%
J&J	1-Day Acuvue Oasys (*t)	2847.5	90.7%
J&J	Acuvue Oasys for Transitions activated	651.9	97.9%
CIBA	Freshlook	33.18	99.9%

Table of major contact lens brands showing averaged area under the curve and % of UV-A blocking



Area under the curve representing total UV-A being transmitted through the contact lens to the UV sensor. Contacts on the left permitted very little UV-A to pass through, whereas contacts on the right permitted a significant amount of UV-A to pass through.

### RESULTS

The average peak absolute irradiance at baseline measured with the light source setup and no contact lens was 796 microwatts/cm<sup>2</sup> at the peak wavelength of 370nm. The total UV-A (measured at baseline as the area under the curve from 350nm to 400nm) was 30,568 microwatts/cm<sup>2</sup>.

On average, the 37 different soft contact lenses blocked 43% of UV-A light. *Individual contact lenses included in the study are listed in the graph below. Individually, 10 lenses provided nearly complete UV-A blocking of 90% or more, 9 lenses provided significant UV-A blocking of 60-70%, 3 lenses provided minimal UV-A blocking of only 10-30%, and finally 15 lenses provided almost no UV-A blocking (<5% blocking).*

*Combined and averaged UV-A blocking is presented in the table to the left.*

The UV-A blocking performance was relatively consistent with the claims made by manufacturers with 20 out of the 37 lens manufacturers claiming UV blocking either on their website, packaging or both. On average, these 20 brands blocked 76.4% of UV-A. This was significantly higher than the other 17 lenses which made no such claims, and on average only blocked 2.1% of UV-A.

### CONCLUSIONS

We conclude that soft contact lenses block UV-A, but in highly varying degrees from one brand to another. The UV blocking claims made by contact lens manufacturers are generally accurate with higher UV blocking capabilities associated with the contact lenses that are advertised as such. A follow-up study may include measuring UV-B transmission of contact lenses as well as measuring UV transmission through spectacle lens materials for comparison.

### DISCLOSURES

- No conflicts of interest
- No internal/external funding



### REFERENCES

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