

# Beach umbrellas do not block out all solar radiation

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Thirty-four percent of ultraviolet radiation filters through under beach umbrellas. Credit: SINC

A team of researchers from the University of Valencia (UV) has proven that 34% of ultraviolet radiation filters through under beach umbrellas. According to what is published in the journal *Photochemistry and Photobiology*, umbrellas intercept the full direct flow that comes from the Sun, but not the diffused radiation that penetrates through from the sides.

"We have proven that irradiance (radiation incidence per unit of surface area) that reaches the ground covered by an umbrella is 34% of the total", José Antonio Martínez-Lozano, co-author of the study and coordinator of the Research Group of Solar Radiation in UV, highlights to SINC.

To carry out the Project, which was published recently in the journal *Photochemistry and Photobiology*, the team positioned an ultraviolet ray sensor on the base of a canvas umbrella painted blue and white, with a radius of 80cm and height of 1.5 metres.

"The umbrella intercepts the direct radiation that comes from the Sun, but part of the diffused radiation, which makes up approximately 60% of the total, reaches the sensor from the sky not covered by the umbrella", explains Martínez-Lozano.

The results show that canvas has a very high capacity for absorbing radiation, "with only 5% transmissivity", but this does not prevent diffused [ultraviolet radiation](#) from penetrating through on the sides.

In addition, the team has developed a geometric model to obstruct the sky to calculate the irradiance that is received on the different horizontal and vertical planes under the umbrella. In the case of horizontal irradiance, the values that the model provides coincide with those registered experimentally with only a relative error of 3%.

In this way, and using various configurations of sky, ground and umbrella, the researchers have been able to simulate the real situation of people, who do not always remain lying down under sunshades, as they often tend to rise, sit or stand up.

## **Protection against skin cancer**

Scientists believe that this study can help to gain a better understanding of the epidemiology of some skin cancers. An excess of ultraviolet radiation is not only related to the appearance of melanoma, it is also connected to sunburn, photoageing, many eye disorders -especially cataracts-, weakness of the immune system and DNA damage.

The earth's atmosphere is a natural barrier that reduces the harmful effects of UV rays, but experts recommend the use of others such as umbrellas, pieces of clothing, hats with a brim over 7cm, sunglasses with protection and sun creams. They also recommend reducing the exposure time and avoiding hours when the [sun](#) is at its highest (between midday and 4pm local time).

In any case, rational use of ultraviolet rays also has beneficial effects for human health, as they help to treat dermatological disorders and form vitamin D3. Some studies even highlight its properties for limiting hypertension and reducing the appearance of certain internal cancers, such as prostate cancer.

**More information:** Utrillas, María P., Martínez-Lozano, José A. y Núñez, Manuel. "Ultraviolet Radiation Protection by a Beach Umbrella". *Photochemistry and Photobiology* 86 (2): 449-456, 2010. [Doi: 10.1111/j.1751-1097.2009.00677.x](#)

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