

UV Rays and the Skin



You probably understand that a higher SPF means that you have greater protection and can therefore stay out in the sun longer. Technically, that is true, but as the chart below shows the differences are not as much as you think and, as we will show you later, formulas with higher SPF's do not always give you better protection.

As a different way of understanding what the SPF level can do for you, consider the following chart:

SPF LEVEL	% OF UVB SUNRAYS ABSORBED	% OF FORMULA WHICH IS HEAVY OIL (ABSORBERS)
45	98%	50 to 60%
30	97%	40 to 50%
15	93%	30 to 40%
8	88%	20 to 30%
4	75%	15 to 25%

From our studies, we believe that reducing the impact of the sun by 88% in most cases is about all the body needs to supplement its natural defenses. Quite frankly, how liberally you apply the sunscreen and how well it is able to set up generally have much more impact on the effectiveness of the application than the actual level of SPF. One study showed that over 91% of the population put on about half as much sunscreen as is required by the FDA to qualify for the SPF level of protection.

Therefore, in most cases, you only got half as much true protection in the past than you thought. The SPF 30 which you put on lightly, worked like an SPF 15, blocking out 93% of the UVB rays. The SPF 15 you put on lightly worked like an 8, blocking out 88% of the UVB rays, and that should have been enough -- assuming it was able to stay in place. All this being said, **THE ABILITY OF THE BASE MECHANISM TO HOLD THE SUNSCREEN ONTO THE SKIN IS FAR MORE IMPORTANT TO THE SUNSCREEN'S PERFORMANCE THAN THE SPF LEVEL.**

UVA and UVB Rays



The SPF in a sunblock is only a measurement of your protection from UVB rays. Label claims of Broad Spectrum or UVA protection do not tell you how much protection against the UVA rays you are getting and, generally, it is not much.

The sun emits energy over a large range of wavelengths. **We call sun rays that are between 290 and 320 nanometers short UVB rays. We call sun rays that are between 320 and 400 nanometers long UVA rays.** There are sun rays shorter than UVB rays which we call UVC rays, but since UVC rays do not damage your skin, we will ignore them. Rays that are longer than UVA rays begin to fall into the range of invisible and visible light.

UVB rays, the shorter of the skin damaging rays, penetrate deep and quickly burn your **Mid Layers** of active skin. Within 15 minutes these rays cause damage to cells which will turn red within one hour. **NOTE THAT THE DAMAGE IS DONE BEFORE YOU SEE IT.** The damaged skin sends signals to the bottom layer of the epidermis, which responds by forming "Melanin" to protect the active skin. It is the melanin which results in "tanning" and as the melanin remains higher in the skin you set up some natural defense against the sun but only after damage has been done. A peeling burn occurs when active skin "commits suicide" and prematurely dies creating extra top layers of skin which then peel.

UVA rays are longer, do not penetrate as deeply, but still cause damage. Often because sunblocks focus on absorbing UVB rays, you increase your exposure to UVA rays when you stay in the sun longer than you would without sunblock protection. The magnitude and total consequences of exposure to UVA rays is not fully understood, but is generally agreed that UVA rays at least increase the aging and wrinkling of the skin and perhaps more.



In the process of absorbing UVB rays, the formulas also absorb some UVA rays. You cannot tell how much UVA protection is offered by label claims. But we can demonstrate how much UVB and UVA rays are absorbed with our System 1 SPF 15 formula, for instance. This formula absorbs about 96% of the UVB rays (between 290 and 320 nanometers) and about 25% of the UVA rays (between 320 and 400 nanometers). If you were to compare this with other non-Sawyer® formulas, you would see this is an excellent result for an SPF 15 formula!

Increasing the level of UVA absorption is one of our goals. A formula can, in theory, start out with more UVA protection than the diagrammed formula in "lab condition" skin, but in the real world, we have only seen such approaches fall well below our coverage in real use situations. With the advent of System 2 formulas, we are finally solving the real world inadequacies of these traditional formulas. The frontier upon which we will now concentrate our Sunblock research is towards improved UVA protection which can hold up to real world conditions.