



PHOTOBIOLOGY AND PHOTOPROTECTION

## **BAICALIN AND POLYDATIN: UNIQUE ANTIOXIDANTS THAT PROVIDE COMPLEMENTARY PROTECTION AGAINST SUNLIGHT AND BEYOND UV FILTERS**

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**Background:** Numerous reports support the in vitro efficacy of antioxidants in protecting skin from UVA/UVB-induced oxidative stress, but little evidence exists to demonstrate their effects in vivo. Here, using a new, highly sensitive reactive oxygen species (ROS) probe (RCY), we show that antioxidants that quench UVA/UVB-induced ROS in vitro can provide clinically measurable inhibition of UV-induced pigmentation in the absence of SPF; and that in the presence of SPF, they provide better protection than SPF alone in human volunteers.

**Objective:** Demonstrate the strategic selection of antioxidants in quenching UVA/UVB-induced ROS and establish the clinical efficacy of the top candidates from the in vitro screen.

**Materials and methods:** Using human fibroblasts and keratinocytes, we screened 25 antioxidants for ROS quenching activity. ROS was detected and quantified under a confocal microscope using a new fluorescent RCY probe after UVA and UVB treatment.

A solar simulator was used to simulate Daily UV or long UVA exposure on the back. Volunteers were pretreated with formulas containing baicalin, polydatin and combination of polydatin and baicalin with or without SPF. Pigmentation was assessed by visual grading and chromameter.

**Results:** in vitro, baicalin and polydatin demonstrated quenching of ROS generated by UVA or UVB respectively. Combined, they had the strongest neutralizing effect due to their complementarity. In vivo, Baicalin was more effective than polydatin in preventing UV-induced pigmentation under long UVA exposure. However, both antioxidants showed similar strong efficacy under daily UV. In the presence of SPF 30, the antioxidants association showed significant reduction in Daily UV induced pigmentation than the SPF alone.

**Conclusion:** We identified baicalin and polydatin as powerful antioxidants with





complementary effects against UVA/UVB and our data suggest the combination of the biological protection from antioxidants and the physical protection from UV filters can lead to superior and more robust sun protection.

