ANTI POLLUTION BENEFIT FROM BAICALIN

INTRODUCTION

Baicalin is a flavone widely used in the Traditional Chinese Medicine (TCM) as a liver - detoxifying agent. A growing set of studies conducted in vitro or on animal models, allowed to show Baicalin has strong anti-oxidant properties, alone or in mixture with other anti-oxidants such as Resveratrol, Vitamin C or Vitamin E [1-7]. Other works, using in vitro or animal models identified other biological effects of Baicalin: modulation of mitochondrial activity [8], tumor growth inhibition, mitigation myocardial infarction severity and suppression of induced contact dermatics [9-11]. Atmospheric pollution has become a major concern, in many countries. Among pollutants are volatile elements such as NO2, SO2, O3, CO, CO2 and polycyclic aromatic hydrocarbons (usually expressed in ppb) and particulate matters (PM) in suspension (usually expressed in μg/m3). Air pollution is recognized to be a threat to human health, being responsible for numerous premature deaths due to respiratory and cardiovascular diseases. Its impact on skin health is becoming a concern for many citizens of polluted cities in the world. It is known that, when exposed to air pollution, exposure causes oxidative stress on the skin surface that may in turn impact living compartments of the skin.

MATERIALS AND METHODS

Baicalin (MMP Inc, Plainfield, USA) was dissolved in a 50% methanol solvent and its concentration was monitored with a UV spectral curve. Particulate and gaseous pollutants, such as PM10, PM2.5, NO2, SO2 and O3 were measured by LC-DAD-MS/MS and expressed in arbitrary unit.

So as to be closer to the real life situation, an ex-vivo test using sebum from the forehead of volunteer was performed. Dose effect formulations of Baicalin (0.2, 0.5, 1% Baicalin in formulations) were evaluated versus placebo for their ability to prevent human sebum from oxidation induced by cigarette smoke and UVa in formula.

Figure 1: In-tubo evaluation of sebum peroxidation induced by cigarette smoke plus UVA. The resulting non oxidized squalene was quantified by LC-DAD-MS/MS and expressed in arbitrary unit.

Figure 2: Ex vivo evaluation of sebum peroxidation induced by cigarette smoke and UVa. Sebum from the forehead of volunteer was spread with 3mg/cm2 of different formulations of Baicalin to evaluate the ability of Baicalin to provide skin surface protection against global environmental stressors.

The results reported here confirm the overall good antioxidant properties of Baicalin, in models mimicking polluted atmospheric conditions, the efficacy of Baicalin was demonstrated against pollution induced oxidative stress, based on these evaluations. Baicalin is a potent cosmetic ingredient to provide skin surface protection against global environmental stressors.

REFERENCES


CONCLUSION

As the solubility of Baicalin in Ethanol is poor, the experiment was performed at concentration of 3mg/cm2 instead of 5mg/cm2. It was observed that the antioxidant activity of Baicalin is enhanced with increasing concentration in the formulation (p-value < 0.001). The results showed that Baicalin is a potent antioxidant molecule which can be used in cosmetic formulations to protect the skin from pollution induced oxidative stress.