

## pTeroWhite®

**pTeroWhite®** (natural pterostilbene 90%) is extracted from the dried heartwood of *Pterocarpus marsupium*.

Stilbenes have been isolated from diverse plant families, including grape (Vitaceae), pine (Pinaceae), peanut (Fabaceae) and sorghum (Poaceae). Over the last 15 years, research and commercial interest in plant stilbenes has escalated, in the light of their biological activities and possible pharmacological applications (Chong, et al; 2009). Resveratrol (Figure 1(a)) which was postulated to be involved in the health benefits associated with a moderate consumption of red wine (Pendurthi, et al; 1999) (the “French paradox”) is the subject of extensive research (Lekli, et al; 2009). Several published reports on the health benefits of resveratrol exist, describing its potential to slow the progression of a wide variety of chronic conditions, (including various forms of cancer, and cardiovascular diseases), as well as to extend the life spans of various organisms. A major breakthrough in anti-aging research was the identification of genetic pathways that are regulatory master keys in the aging process, a prominent one being the Silent information regulator (SIRT) pathway. Resveratrol was found to increase SIRT1 (the type found in humans) activity 13-fold, with potentially beneficial effects in healthy aging and life-span. (Howitz, et al., 2003) Resveratrol “mimics” the effects of caloric restriction, which is known to increase lifespan. Caloric restriction is associated with increased SIRT1.



Pterostilbene, a structural analog of resveratrol, is more stable *in vivo* than resveratrol. Pterostilbene (3,5-dimethoxy-4-hydroxy-trans-stilbene) (Figure 1(b)) was originally isolated from the heartwood of red sandalwood (*Pterocarpus santalinus*) (Spath and Schlager, 1940). Its presence in grape vines and blueberries was also reported later (Adrian et al., 2000; Langcake, 1977; Langcake et al., 1979; Rimando et al., 2004).

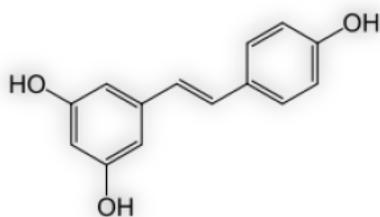


FIGURE 1(a): Resveratrol

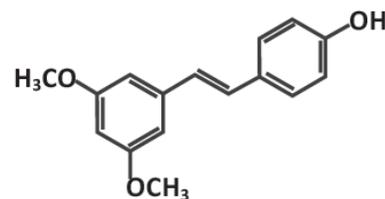


FIGURE 1(b): Pterostilbene

Interestingly, Pterostilbene was identified as the major phenolic compound in *drakshasava*, a traditional Ayurvedic medicinal preparation used to treat cardiovascular and related problems (Paul, B. et al., 1999), and in wood of *Pterocarpus marsupium*, (Indian kino) used by Ayurvedic practitioners in the treatment of diabetes (Manickam et al., 1997).

### Cosmeceutical Applications

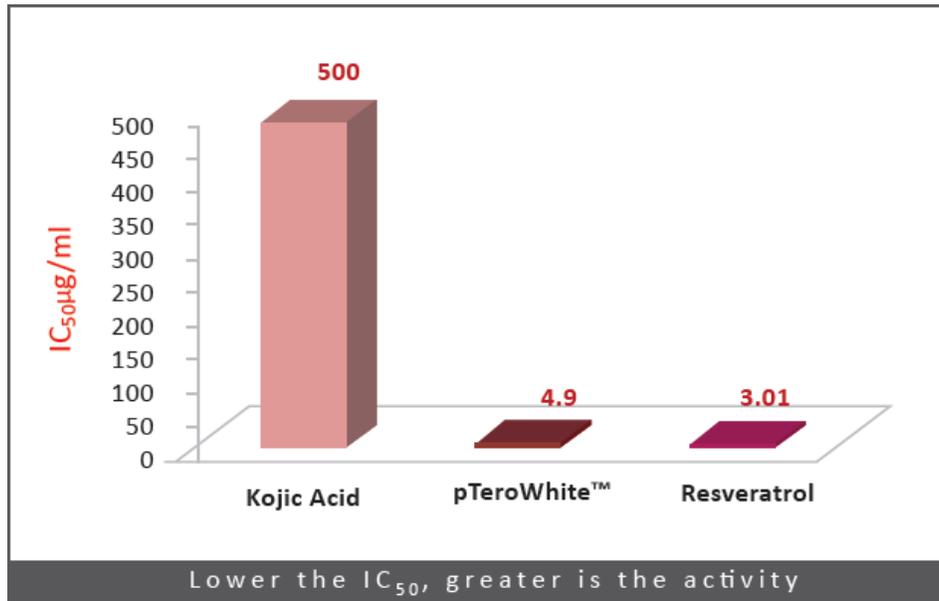
pTeroWhite® offers antioxidant and anti-inflammatory (anti-aging) support, lightens skin tone; supports dyschromia management, and is a valuable adjunct to sun-care and after sun-care compositions.

pTeroWhite™  
pterostilbene

Laboratory studies revealed its healthful role in offering protection against damaging ultraviolet radiation. The DPPH (2,2-Diphenyl-1-Picrylhydrazyl) radical scavenging test is a standard method to determine antioxidant activity. Figure 2 depicts the comparative efficacy of pterostilbene, resveratrol and a commonly used skin lightening agent, kojic acid, in quenching free radicals. Inhibition of melanin formation in *in vitro* cell culture and inhibition of the enzyme tyrosinase (that catalyzes the rate limiting step in the synthesis of melanin) are standard tests used to determine skin tone lightening potential of active compounds. Figure 3(a) shows the comparative effects of kojic acid, pTeroWhite® and resveratrol on melanogenesis in cell culture, and Figure 3(b) shows melanin formation in cells cultured with and without pTeroWhite®. pTeroWhite® perceptibly inhibits melanin formation.

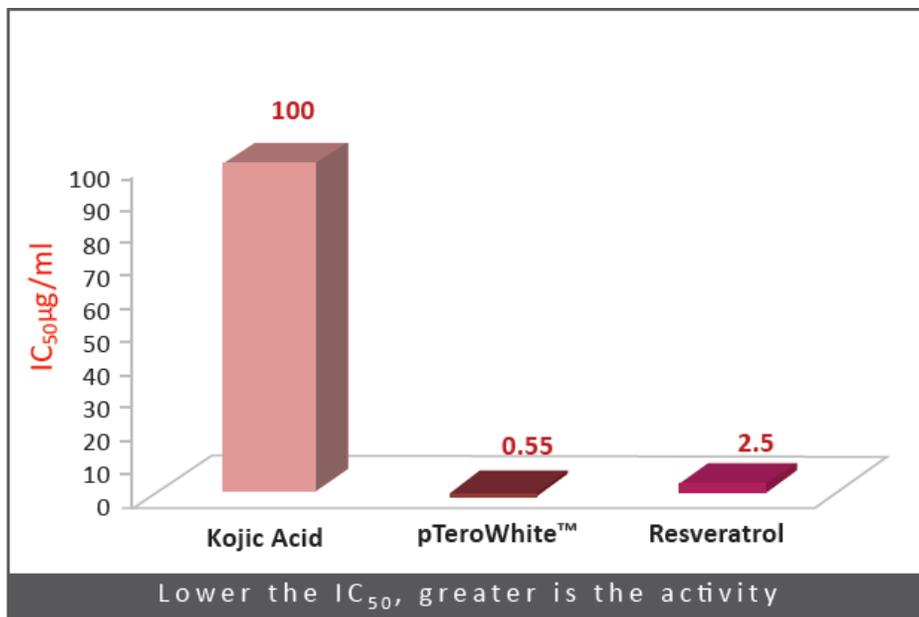
Figure 4 shows their comparative efficacy of pTeroWhite® and resveratrol in protecting cells against the effects of ultraviolet radiation, as measured in *in vitro* cell culture experiments.

## DPPH INHIBITION



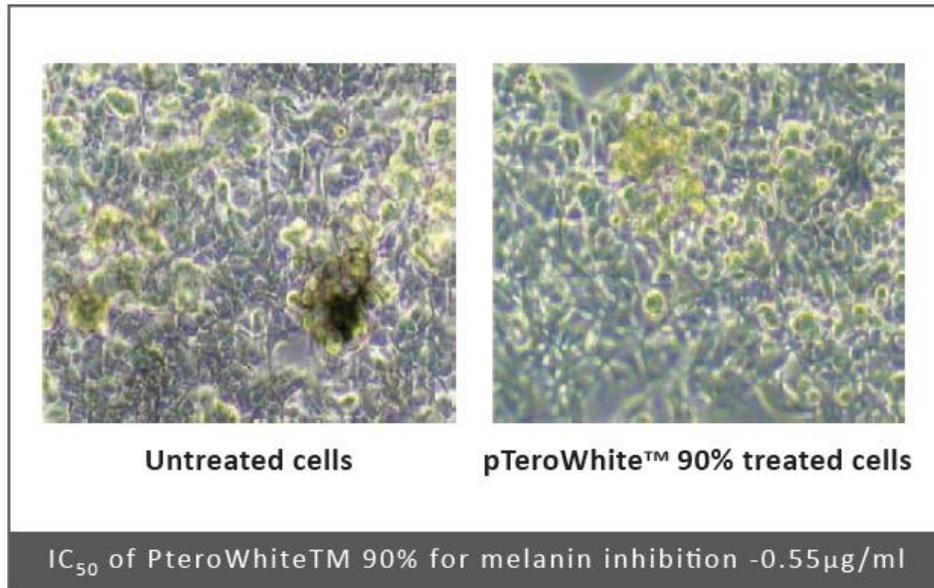
**FIGURE 2: ANTIOXIDANT ACTIVITY – DPPH INHIBITION**

## MELANIN INHIBITION



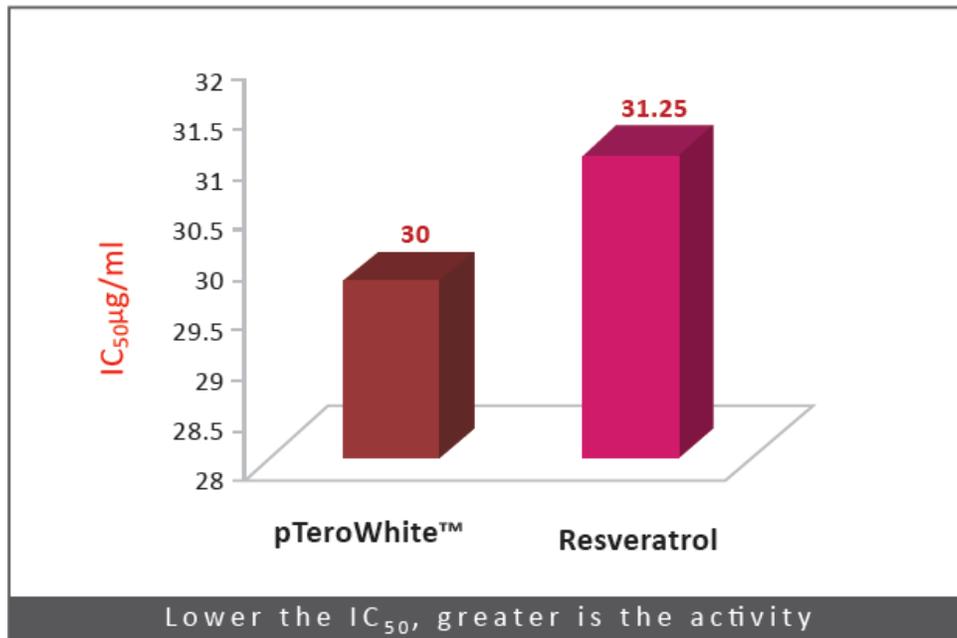
**FIGURE 3(a): COMPARATIVE MELANIN INHIBITION**

## MELANOGENESIS INHIBITION BY pTeroWhite™ 90%



**FIGURE 3(b): MELANOGENESIS INHIBITION IN CELL CULTURE**

## UV PROTECTION POTENTIAL OF pTeroWhite™ 90%



**FIGURE 4: UV PROTECTION**

### Suggested use level

At 0.1 - 0.5% w/w in cosmetic compositions, pTeroWhite® is more efficacious than resveratrol, in supporting skin texture and tone.

### Safety

pTeroWhite® is safe for use in cosmeceutical compositions. The primary skin irritation potential was found to be zero, validating the safety of pTeroWhite® for topical use.

### Conclusion

pTeroWhite® is an effective natural ingredient in cosmetic compositions that support skin texture and even tone, and in sun-care and after-sun care formulations.

### References

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