Reduction in the appearance of facial solar lentigines following use of either 4% Hydroquinone or a cosmetic “anti-ageing” regime

Hydroquinone (HQ; 4% w/v) is an established, effective topical treatment for hyperpigmentary disorders. However, there is a lack of published clinical evidence of its effectiveness at reducing the appearance of solar lentigines. We have performed a 4-month randomised, split face controlled trial to evaluate the effects of daily application of HQ as well as a cosmetic “anti-ageing” day and night serum regime (R) on solar lentigo colour and size. The cosmetic products contained a blend of ingredients with suggested skin lightening activity. Healthy volunteers ($n = 76$) were recruited with at least one solar lentigo of size >4 mm on each side of their face. Each half face received daily applications of either: (1) HQ + SPF15 cream; (2) R + SPF15 cream; (3) SPF15 cream only or; (4) remained untreated. Both colour and size of the solar lentigines were assessed by visual expert grading on validated 15-point scales at baseline and after 1-, 2-, 3- and 4-months of treatment. No discernible changes to untreated solar lentigines were observed over the 4 months. In contrast, compared with the SPF15 cream alone, a significant mean reduction in solar lentigo colour was observed with HQ after 1 month and with R after 2 months by expert grading (At 2 months: HQ: -1.16 mean grade versus control $p=0.0001$; R: -0.36 mean grade versus control $p=0.005$; Wilcoxon signed ranks test). For both treatments, the benefit progressed with time such that after 4-months, HQ showed a 1.57 mean grade reduction ($p=0.0001$) and R showed a 1.19 grade reduction ($p=0.0001$) versus control. Both HQ and R were additionally significantly effective at reducing solar lentigo size after 2-, 3- and 4-months (HQ: mean of 1.12 size grade reduction at 4-months $p=0.0001$; R: 0.27 size grade reduction $p=0.005$). Self assessment compared well with expert colour reductions with 79% and 91% positive perception for the fading of “age spots” after 4 months for R and HQ respectively. We demonstrate here that both 4% HQ, the clinical gold standard for hyper-pigmentation and a cosmetic ‘anti-ageing’ regime, lighten and reduce the size of facial solar lentigines with the HQ effects occurring more rapidly. The reductions in colour grade achieved after 4 months use of either HQ or R are not statistically significantly different from each other whilst the apparent size of solar lentigines was reduced more with HQ than R ($p<0.05$; Wilcoxon ranks sum test).

The Effects of Sophora angustifolia and other Natural Plant Extracts on Melanogenesis and Melanin Transfer in Human Skin Cells

Skin pigmentation is the result of melanin synthesis by melanocytes, its transfer to recipient keratinocytes, and its degradation during epidermal cell turnover. There is significant interest in the control of both clinical (e.g. melasma) and cosmetic (e.g. solar lentigines) manifestations of hyperpigmentation. This is important given that the most effective topical depigmentary agents (e.g. hydroquinone) have well-known side effects.

In this study we examined a number of plant extracts for their effect on melanogenesis and melanin transfer in pigment cell monocultures (both human melanoma and adult human epidermal melanocytes) and in co-cultures with HaCaT and normal keratinocytes respectively. Melanogenesis was assessed by melanin assay, western blotting, and dopa oxidase activity, while melanin transfer was examined by confocal immuno-microscopy of co-cultures and by SEM analysis of filopodia (conduits for melanin transfer) in epidermal melanocytes. Sophora root, Kiwi and Mulberry extracts were assessed against IBMX (stimulator of melanin synthesis and transfer), niacinamide and hydroquinone (inhibitors of melanin synthesis and transfer) and Vitamin C.

Compared with the unstimulated control, all 3 extracts significantly reduced melanogenesis (melanin synthesis, dopa oxidase activity, and tyrosinase protein expression) in both FM55 human melanoma cells (12%-20% melanin reduction) and in normal adult epidermal melanocytes (26%-36% melanin reduction). Similarly, all 3 actives reduced melanin transfer to normal adult epidermal keratinocytes, and reduced filopodia expression on melanocytes. Surprisingly, these test actives exhibited comparable activities to well-known inhibitors of melanogenesis (e.g. hydroquinone) and melanin transfer (niacinamide).

In summary, we have demonstrated that extracts of Sophora angustifolia, mulberry and kiwi can significantly reduce both melanin production in normal human skin melanocytes and its transfer to recipient keratinocytes, and with activities comparable to known downregulators of pigmentation. Thus, these data provide supporting evidence that these natural plant extracts may provide alternative topical approaches in the reduction of skin hyperpigmentation.