

Letter to the Editor

***In vitro* skin permeation and retention of parabens from cosmetic formulations**

Dear Sir,

The recent paper published in the *International Journal of Cosmetic Science* titled '*in vitro* skin permeation and retention of parabens from cosmetic formulations' [1] raises a few issues. It is disappointing to see three references to Darbre *et al.* [2] on two counts:

(i) Two of the three references cited this paper as a primary source of the information quoted, although, in fact, it was a secondary source as the Darbre paper itself referred to earlier publications. The reference to parabens being permitted in cosmetics at concentrations up to 1% originally came from Elder [3], and the figure of 1% is relevant only to Japan and countries that follow the Japanese regulations. In the EU, and many other territories, the maximum concentration permitted is 0.8% (as total parabens, with a maximum of 0.4% for individual esters). Whilst the statement is broadly correct, it should be put in the correct context, particularly in a publication aimed at cosmetic scientists. The second quote referred to the frequency of use of parabens as being 99% in leave-on and 77% in rinse-off products. Darbre *et al.* took this information from Rastogi *et al.* [4], and stated that this was based on a survey of 215 cosmetic products. This is a very small sample from the tens of thousands of cosmetic products on the market, and the data are statistically meaningless, and presented out of context by Pedersen *et al.* as they could be interpreted as being an accurate representation of the market position. Whilst it is likely that parabens are present in a great majority of leave-on products, it is extremely unlikely that they enjoy 99% dominance.

(ii) The inclusion of the third reference to Darbre *et al.* is of particular concern, especially in a journal for cosmetic scientists, as the majority of the cosmetic science community, and many beyond it, dispute the implied connection between the presence of parabens in breast tumour tissue and breast cancer. This implied connection has been seized upon as fact by many 'anti-chemicals' groups and used to feed media with scare stories

manipulating public opinion against parabens in particular. Furthermore, there is serious doubt as to the validity of the claim that parabens were actually present in the breast tumour tissue. This is based on the fact that parabens were detected in all the negative control samples. Indeed, one of the negative controls contained higher concentrations of parabens than 12 of the tissue samples; another negative control contained higher paraben concentrations than nine of the tissue samples. Most scientists would surely agree that to find a positive result from a negative control places serious doubt over the validity of the actual test samples. The presence of the parabens in the negative controls was ascribed to contamination, but it was assumed that the parabens detected in the tissue samples had there arrived systemically after application in a cosmetic product on the skin. The problem with this assumption is that the paraben concentrations in both controls and tissue samples were broadly similar and, moreover, the ratios of the different esters were also broadly similar. This strongly suggests that the parabens detected in the controls and the tissue samples came from the same source as it is difficult to understand how the parabens detected in the tissue samples could have passed through any part of the human body, avoiding any metabolic breakdown, and embedded themselves in breast tumour tissue. Additionally, the ratios of esters correspond to average usage. For example, 62% of the parabens detected were methylparaben, which would be expected from overall parabens usage in cosmetics.

A further concern is based on the statement in the synopsis that parabens possess oestrogenic activity. This is partially qualified by later reference to the work of Routledge *et al.* [5], but could still easily be misinterpreted by the uninformed reader. The title of the paper by Routledge *et al.* uses the qualifying 'some', whereas the Pedersen *et al.* paper suggests that all parabens possess this activity. When one considers that the most potent oestrogen mimic among the parabens tested *in vivo* by Routledge *et al.* was butylparaben, and this was

100 000 times weaker than oestradiol, it is misleading to assign oestrogenic activity to all the esters. It could also be argued that butylparaben itself barely warrants the description.

I have gone into some detail on these points to highlight better the dangers of using references in an almost casual manner, as I contend that readers of the Pedersen *et al.* paper who do not pursue the references in detail, or do not have knowledge of the full background to them, receive a distorted view. There has already been a significant degree of distortion concerning the safety of parabens, and a journal specifically presenting cosmetic science should be the last place for this to occur.

Furthermore, if it is accepted that there need be any concern over the safety of parabens, then butyl- and isobutylparaben would be of greater interest, and I believe that the authors missed an opportunity to produce more relevant data by not testing cosmetics also containing these higher esters.

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References

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