Reviewer's report

Title: Photoprotection of Buddleja cordata extract against UVB-induced skin damage in SKH-1 hairless mice.

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Reviewer: Maria José Fonseca

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The manuscript provides information about the photoprotective potential of Buddleja cordata (BCME) that was evaluated by in vivo and in vitro methods. The methanolic extract, containing the polyphenolic composites, verbascoside and linarin, as the majority of actives, showed UV absorption in the UVB range and antioxidant activity. Photoprotection evaluation in vivo showed that the B. cordata extract was able to reduce the erythema, sunburn cell production, vessel congestion and epidermal thickening induced by UVB radiation in skin.

In part, the authors analyzed the photoprotective potential in vivo using complementary methods to in vitro methods, for example, in vitro absorption of the UVB radiation by the extract was evaluated in vivo by measuring the erythema.

However, some points that are not clear may cause doubts.

1. UV absorption analysis of (BCME) in vitro should be compared to UV absorption analysis of commercial organic filters. Thus, it would be possible to have an idea if the absorption capacity of the extract in the UV region could really provide a photoprotective effect with reduction of erythema. In addition, the authors should add in the legend of Figure 2, the concentration of the analysis extract solution.

2. Did the authors know the solubility of BCME in ethanol? Which was the dorsal skin area (cm²) applied with 200uL of BCME at concentration of 2mg/mL? Was ethanol evaporation observed after 15 minutes of application? The ethanol can evaporate depending on the extent of the applied area and it can occur precipitation of the BCME compounds on skin. This would complicate the UVB rays from reaching the skin or it could occur more reflection than absorption of these. Thus, the observed effects in vivo could be to reflection. For this type of study the ideal would be solubilize the extract in a solvent which does not evaporate as easily as ethanol.

3. The authors determined the antioxidant activity of BCME by three different methods. However, they did not evaluate the penetration capability of the components of the extract with antioxidant activity in the skin after 15 minutes of application. In the Results and Discussion item, “Histological analysis”, the authors mentioned that the absence of edema and the reduction of sunburn cells in treated skin with BCME is due to the presence of linarin and verbascoside in this extract, respectively. Nevertheless, the authors did not demonstrate the
penetration of these compounds in skin. These data could have been easily obtained by authors and certainly they would help a lot to discuss of the histological analysis results.

4. In the Figure 3 legend, the authors mentioned that “Normal: without treatment; N: negative control; V (UV) vehicle and UV; BCME: Buddleja cordata methanolic extract; BCME + UV Buddleja cordata methanolic extract and UV. But, in the Figure the authors used the symbols: U; C- and C+UV that are not in accordance with the legend.

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Acceptable

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:

I declare that I have no competing interests`below