

## Reviewer's report

**Title:** Effectiveness of Isopropyl Myristate/Cyclomethicone Solution of Removing Cuticular Hydrocarbons from Human Head Lice (*Pediculus humanus capitis*)

**Version:** 1 **Date:** 2 April 2012

**Reviewer:** Ian Burgess

### Reviewer's report:

Major compulsory revisions

Abstract:

The last two sentences of the "Background" section need to be rewritten. First, it is not acceptable to include a citation (i.e. reference number) in an abstract because this will not be available to readers on PubMed and other abstract listings. Second the general mentioning of Scherer by name is similarly not appropriate because a) he is not well enough known for a general reader to be able to make an association and b) because it is linked to the citation. These two sentences should be more impersonal, e.g. "Previous work has shown a specific pattern of hydrocarbons repeated in all of the head louse cuticular wax that can be removed using iso-octane as a solvent."

Background:

Insect Exoskeleton-Based Cuticle Hydrocarbons are Universal

This section is not particularly informative. You refer to other insects having a waxy protective layer to the cuticle but you give no information about these other than as a sideways reference to your core supporting document (Scherer's PhD, which is strictly speaking a non-peer reviewed document). There are numerous studies of insect cuticular hydrocarbons and you should refer to and consider some of these partly from the background point of view and partly with respect to how disruption can affect insect viability.

Sections: "A Challenge to Cure", "Pesticide Therapies", "Increasing Genetic Resistance to Pesticides", are actually wholly irrelevant to this study and therefore should either be pruned to the barest minimum or else deleted entirely.

The first paragraph of the section "Alternatives to Traditional Pesticide Treatments" also appears irrelevant to this manuscript and should be deleted or incorporated into the next paragraph in a shortened form. I believe you should check the references to time of action of some of what you call "suffocation" based preparations as there have since been claims for shorter application times for at least two of these products.

Section "Chemistry and Regulatory Status for Isopropyl Myristate/Cyclomethicone D5 (IPM/D5)": The sentence "Due to its hypothesized

physical mechanism of action (mechanical alteration of the waxy cuticular covering found on the louse exoskeleton), head louse resistance is not expected to develop against isopropyl myristate [3]" in the middle of this section is not relevant to either the chemistry or the regulatory status of the product.

Results:

A text reference to Figure 1 should be made at the appropriate point.

Minor essential revisions

Abstract:

Penultimate sentence of the "Conclusions" section, it should be noted that not all, in fact most resistance to insecticides is not genetic but physiological. Your wording should be changed to reflect this, perhaps by simply deleting the word "genetic".

Final sentence of the "Conclusions" section should be redrafted. The last part should be reworded from "as a recommended first line therapy for head lice infestation." to "as a viable alternative to conventional insecticides."

Background:

Head lice – A Global Issue

Please note that the suggestion that lice are transmitted by "sharing hats, hairbrushes, headbands, or clothing" is contentious and has no scientific evidence in support. It may be wiser to delete this claim unless you can support it with a scientific citation.

Methods:

Materials: The sentences "A gas chromatograph, equipped with a flame ionization detector (GC/FID), was used for sample analysis. An alkane standard mixture (C21-40, 40 ug/mL in toluene, Sigma-Aldrich), was used for GC elucidation" would be more appropriately incorporated in the later section "Gas Chromatography", which currently repeats some of the wording.

Gas Chromatography: The paragraphs "In his dissertation, Scherer reported four specific hydrocarbons present in significant amounts in every head louse sample he studied [1]. These four hydrocarbons represent approximately 50% of the cuticle hydrocarbons of head lice, and had retention time indices (RI) of 2500, 2700, 2900 and 3075.

"The peaks that corresponded to the four retention time indices attributed to the head louse by Scherer were integrated and compared qualitatively to the alkane standard" would more appropriately be incorporated into the "Results" and/or the "Discussion".

## Discussion:

**Fast Acting:** The first two paragraphs are repetitive. There is no need to repeat that the product under examination is “fast acting”/”clinically proven” to be effective in 10 minutes. This is not advertising copy.

**Overcoming Resistance:** Reference 7 does make reference to resistance but, as far as I can determine, does not talk about “genetic resistance”. Genetic resistance is widely investigated in North America, Japan, and some other countries but work in Argentina, UK, Israel and other states indicates that physiological (i.e. breakdown of insecticide by enzymatic processes) resistance is probably a significantly more important factor in the failure of conventional insecticides.

I am not clear on the significance of insects having an “open circulatory system” relative to water loss. If the wax coating protects from dehydration there is probably a similar risk of dehydration in such small creatures whether the circulatory system is open or closed. For example humans who have the protective waterproof coating of the stratum corneum and skin disrupted by burns or other forms of radical desquamation also run the risk of death by dehydration even though their circulatory system is closed. If there is a link or particular point you wish to make you should explain it more clearly.

## Conclusions:

The second paragraph of this section should be shortened as it appears to be “advertising copy” as mentioned earlier in these comments.

**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 am a consultant to the pharmaceutical industry and have performed work and provided consulting services both to companies collaborating with the authors and to companies who are competitors with the authors. I have no financial interest beyond these points. In setting out my comments on this manuscript my only interest is to see the scientific elements presented in the public domain in as dispassionate and objective manner as can be achieved.