

Coqui Hawaiian Integration and Reeducation Program
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Leslie K. L. Lau, M. Sc.
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Honolulu, HI 96801

Dear Ms. Lau:

Thank you for your letter about the permeability constants of caffeine.

Essentially, your position is that, according to non-human animal research and in vitro skin slice studies, the permeability of caffeine through human skin is most likely too low to pose a threat to people exposed to spray residues.

There are some problems with your assumptions regarding the skin research you cite. Those studies use concentrations of caffeine well below that proposed for spraying to kill frogs. The effects of caffeine on the skin differ at these higher concentrations, as evidenced by the fact that spray applicators are required to wear protective clothing and gear to avoid caffeine exposure. Spraying a cup of coffee would not require such protection. The point is that the physiological effects of certain substances change beyond certain concentrations of that substance.

In addition, the concentrated caffeine irritates the skin, altering its permeability. That is, it is a well-known medical fact that irritated, inflamed skin has greater permeability than intact, healthy skin, due to a breakdown of the skin's integrity. The research studies you cite assume the skin has the same integrity throughout the experiment. However, the real life exposure to caffeine spray residues can damage the skin, lowering its integrity, and increasing its permeability to the caffeine. And the skin wouldn't be irritated if the caffeine did not get inside the skin.

Also, many people have skin cuts and irritations, particularly on the feet, which automatically increase caffeine absorption as compared to healthy, uncut, non-fungal feet. And many people in Hawaii wear open-toed shoes, sandals, thongs, or go barefoot, bringing the skin directly in contact with the caffeine residues. So your citation of skin permeability studies fails to consider the reality of skin health and disease.

Besides these problems with your skin permeability argument, you fail to consider the ingestion of caffeine by hand to mouth contact. Let me give the following scenario as an example.

A young mother takes her asthmatic toddler for a walk, bringing along their poodle, Fifi. They walk through an area that has been recently sprayed with caffeine, and Fifi runs through the area, collecting caffeine residue on her fur. The child pets the dog, transferring the caffeine to her little hands. The family then goes to MacDonald's for a hamburger, fries, and a Coke. The child ingests the caffeine on her hands with the fries and hamburger, and washes it down with the caffeinated beverage. The high level of caffeine that enters the child's small body interacts with the asthma

medication, causing the child to experience respiratory failure, which can lead to death. (This ignores the effect of caffeine exposure to poor Fifi, who will have to lick the caffeine off.) There could be other stories. If the mother was pregnant and the family lived near a sprayed site, and the mother has a birth defective child, it could have been caused by the spray, since caffeine is a powerful mutagen. And the State will be liable for the damages caused.

It is clear that the DOH cannot make the statement that exposure to caffeine spray residues are no threat to human health. Even the EPA, which is surely aware of the research on caffeine and skin exposure, acknowledges the risk of caffeine exposure to humans.

However, the real issue is whether the DOH can impose this human experiment on the Hawaii public. As I have written in prior correspondence with your office, human experimentation requires informed consent. The government has no right to expose the public to this caffeine hazard without the public's consent, meaning the consent of everyone involved in this experiment. And deeper yet is the question that nobody in your office has responded to. Why is the DOH supporting a project that poisons tree frogs and may poison everything else at the same time? The frogs are not a health threat. Exposure to concentrated caffeine is a health threat. Why endanger the public's health to kill something that is no threat at all? And since the frogs eat mosquitoes, why not be supportive of their being in Hawaii? We're never going to get rid of them, anyway. Which raises the irony that this debate is not about eliminating the frogs, but simply attempting to control their numbers. This means that the need for spraying will continue, which will continually expose the public to the caffeine. At what point the environment becomes excessively caffeinated remains to be discovered, and will surely be realized only by hindsight.

In fact, the DOH seems to have no foresight on this issue. DOH arguments have reflected a bias towards spraying, with the onus of proof of its hazards being placed on me to establish. The burden of proof of safety should be placed on those proposing caffeine use. To proceed with this experiment is poor public health policy, and shows that the interests of the public are not paramount at the DOH.

Again, thank you for your scientific response to my letter. I hope, however, that you can see the bigger picture now, and understand that the killing of little tree frogs is not worth the liability and risk of exposing people to potentially damaging, if not lethal, doses of caffeine.

Sincerely,

Sydney Ross Singer
Medical Anthropologist and Biochemist
Director, CHIRP