

EXAMINING THE PRACTICE OF PRE-WASHING PYRETHROID TREATED NETS TO MITIGATE TOXICITY IN INVERTEBRATES

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The distribution of insecticide treated mosquito nets (ITNs) is a great public health success story, with studies suggesting these nets reduced the global burden of Malaria by approximately 40%. ITNs are typically treated with pyrethroids, which are known to have a low toxicity to mammals and high toxicity to aquatic organisms. Recent studies have shown that ITNs are being used for alternative use, including fishing. In a study from a waterside community located on Lake Tanganyika, 87.2% of people utilized their mosquito net for fishing as opposed to malaria protection. Coinciding with reports of off label fishing, there are reports of a decrease in fish quality and quantity. Our previous research has shown that pyrethroids from ITNs can rapidly leach into water, causing overt toxicity in both larval fish and Daphnia. However, it is unclear whether this leaching persists beyond the initial submersion of the net. The first goal of our study is to determine whether prewashing the nets reduces leaching and toxicity associated with ITN fishing. The second goal of our study was to determine whether or not this practice is effective for two different pyrethroid compounds; alpha cypermethrin and Deltamethrin. We conducted a series of exposure experiments using *D. magna* by introducing them to different sized ITNs. These nets ranged from 1cm²-20cm². The nets were pre-washed once, twice, or three times before being used in exposure experiments. Each washing consisted of submerging the net for 30 minutes in 300mL of moderately hard water and dried for 30 minutes prior to exposure. Once the nets were placed in exposure beakers, they remained for 30 minutes and were then removed and discarded. We quantified the leaching using liquid-liquid hexane extractions at different time intervals as well as using varying net sizes. The time intervals tested were dip, 12,24,48 and 72 hours. The extracts were analyzed by gas chromatography with electron capture detection. For pre-washing experiments, there was a reduction in toxicity when the nets were prewashed for 30 minutes, when compared to non-prewashed nets from previous experiments. For our leaching experiments, we observed the highest concentration of pyrethroids after 12 hours and the lowest concentration leaching after 72 hours. Results from these studies indicate that the use of ITNs for fishing represents a significant potential hazard to aquatic organisms and that leaching from the nets is occurring. However, we have found that prewashing the nets may be useful to reduce aquatic organism toxicity. Educational strategies may need implementation alongside ITN distribution to decrease this practice and reduce risk to aquatic organisms.

PRESENTER BIO: Deirdre Love is a 3rd year PhD student in the BIO department of Environmental and Global Health. Her research revolves around the off label use of insecticide treated nets for fishing; and the impact these chemicals have on ecosystem health.