The Development of a Low-cost Delivery Mechanism for Denatonium Benzoate on Coin Batteries as a Deterrent Against Ingestion by Children

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As STEM programs become increasingly popular, the use of coin batteries has also increased. These batteries are used to demonstrate the wonders of electricity to children. However, they come with an unseen and potentially fatal risk: ingestion. The ingestion of coin batteries is known to be particularly dangerous for young children. Our experiment aimed to solve this problem by making a bitter-tasting sticker as a deterrent. We diluted Denatonium Benzoate with water. Then we used this solution to brush and soak adhesive foam sheets. After cutting out stickers from each, we surveyed 100 participants to determine the effectiveness of each method. No significant difference was found between the two methods; combined, they had an effectivity of 79%. Statistical tests also determined that age played a significant role, with older people less likely to find the sticker effective. This correlates with other studies that show that younger people tend to be more sensitive to bitter tastes. Therefore, we concluded the sticker would be just as effective for toddlers, if not more. Given the cost of our solution is far cheaper than Duracell's commercially produced bitter-tasting batteries, our solution provides an inexpensive and practical method for STEM programs to mitigate the risk of coin battery ingestions. This solution has already been implemented in the Adventure Science Center, allowing the Innovation Incubator to resume coin battery projects and continue teaching the wonders of electricity to young children from around the nation. We hope to create a video detailing the development of the sticker and share it with science programs throughout the country.

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