Use of Red Harvester Ant (Pogonomyrmex barbatus) as a Biomarker to Identify Glucose in Human Urine

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Regularly, the human body breaks down most of the food one eats, turns it into sugar (glucose), and releases it into the bloodstream. When there is an excess of blood sugar, the pancreas releases insulin. A capillary puncture is done do test blood sugar levels, which makes it uncomfortable for people or it may not be available in places with limited access to healthcare services. This research tested if the Pogonomyrmex barbatus (red harvester ant) can be used as a biomarker for glucose levels in human urine. Six concentrations of added glucose were made using human urine: 0%, 20%, 40%, 60%, 80%, and 100%. One hundred red harvester ants were placed in a 40L fish tank with 5cm of sand at the bottom. The habitat of the ants was covered with a plastic bag fixed to the fish tank; small holes were made in the bag to allow the ants to breathe, but unable to escape. Then, a petri dish with 10mL of 0% glucose solution was placed in the ants' habitat. The amount of red harvester ants present was recorded for 20 minutes in 2 minutes intervals. The same procedure was repeated using different concentrations of glucose in the urine samples. It was concluded that there is a correlation between the number of ants and glucose levels. This presents a new and non-invasive option that makes it possible to determine glucose levels in urine in case of emergency or where there is no access to medical services or equipment.

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