Hydrogen peroxide has proven antimicrobial benefits and is created in honey when honey bees add glucose oxidase.

Honey bees are self-medicating and have been found to use the antimicrobial properties found in hydrogen peroxide.

Honey bees were collected from the University of Georgia's Honey Bee Lab.

Sucrose was used as it is the sugar found in nectar. Glucose was used as it is the most prevalent sugar in honey.

We designed two major choice trials for both glucose and sucrose.

As the concentration increased from 0%-10%, more proportional honey bee deaths occurred (F=23.53, p=0.001).

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Table 1. Choice trials (24 hr wait) were given the 1mL of control and one of the 6 H2O2 concentrations. Mortality trials (48 hr wait) had 3mL of H2O2 concentrations.

Fig 1. showed an avoidance to the test solution when compared to that of the control solution (F₁= 4.88, p=0.002). The glucose trial saw an avoidance with an average of 0.28 mL more of the control solution consumed over the test solution, standard error=0.0459. The sucrose trial saw an avoidance with an effect size much stronger than that of the glucose trial. An average of 0.19 mL more of the control solution consumed over the test solution, standard error=0.0424.

Fig 2a. showcases a preference for H2O2 at the lowest concentrations and slightly at 1000 mcg/mL (F₁=34.62, p=0.854). Fig 2b. showed an avoidance of the test solution in all concentrations except 1000 mcg/mL (F₁=32.58, p=0.005). Both the type of sugar (F₂=7.47, p=0.019) and the concentration (F=2, 61.11, p=0.020) were found to be statistically significant in preference.

Fig 2c. shows a proportional increase of honey bee deaths as the concentration increased. On average less than half of the honey bees died at 4% H2O2 and lower.

Honey bees showed an avoidance of hydrogen peroxide in glucose and sucrose solutions with the effect size stronger in glucose. Both the type of sugar and the concentration were found to statistically significant in their preference. There was a proportional increase of honey bee deaths as the concentration increased. On average less than half of the honey bees died at 4% H2O2 and lower.