



Sweet waste extract uptake by a mosquito vector: Survival, biting, fecundity responses, and potential epidemiological significance

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ABSTRACT

In nature, adult mosquitoes typically utilize nectar as their main energy source, but they can switch to other as yet unidentified sugary fluids. Contemporary lifestyles, with their associated unwillingness to consume leftovers and improper disposal of waste, have resulted in the disposal of huge amounts of waste into the environment. Such refuse often contains unfinished food items, many of which contain sugar and some of which can collect water from rain and generate juices. Despite evidence that mosquitoes can feed on sugar-rich suspensions, semi-liquids, and decaying fruits, which can be abundant in garbage sites, the impacts of sweet waste fluids on dengue vectors are unknown. Here, we investigated the effects of extracts from some familiar sweet home waste items on key components of vectorial capacity of *Aedes aegypti*. Adult mosquitoes were fed one of five diets in this study: water (WAT); sucrose (SUG); bakery product (remnant of chocolate cake, BAK); dairy product (yogurt, YOG); and fruit (banana (BAN)). Differences in survival, response time to host, and egg production were examined between groups. For both males and females, maintenance on BAK extract resulted in marked survival levels that were similar to those seen with SUG. Sweet waste extracts provided better substrates for survival compared to water, but this superiority was mostly seen with BAK. Females maintained on BAK, YOG, and BAN exhibited shorter response times to a host compared to their counterparts maintained on SUG. The levels of egg production were equivalent in waste extract- and SUG-fed females. The findings presented here illustrate the potential of sweet waste-derived fluids to contribute to the vectorial capacity of dengue vectors and suggest the necessity of readdressing the issue of waste disposal, especially that of unfinished sweet foods. Such approaches can be particularly relevant in dengue endemic areas where rainfall is frequent and waste collection infrequent.

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1. Introduction

Several outbreaks of dengue and related diseases, such as Zika fever, have been reported in recent years, mostly from urban centers, with smaller numbers of cases from rural areas (Banerjee et al., 2015). Urbanization and globalization have led to overcrowding of cities (Kang, 2014). Urban centers are also characterized by the gradual replacement of traditional foods by processed and ready-made foods (Hurtig, 2009), excessive purchasing, over-preparation