

For a long and fruitful life, consult fruit flies

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Under certain conditions (a simple sugar diet), dietary supplementation with acai could triple fruit flies' lifespans. The flies' lives were made shorter by a mutation that made them more sensitive to oxidative stress.

(Phys.org) -- Bewildered by the array of antioxidant fruit juices on display in the supermarket and the promises they make? To sort out the antioxidant properties of fruits and berries, scientists at Emory University School of Medicine turned to fruit flies for help.

They found that a commercially available acai berry product can lengthen the lives of [fruit flies](#), when the flies' lives are made short through additional oxidative stress. Under certain conditions (a simple sugar diet) acai supplementation could triple flies' lifespans, from eight to 24 days. Acai could also counteract the neurotoxic effects of the herbicide paraquat on the flies.

The results were recently published by the journal *Experimental Gerontology*, which [awarded the paper](#) its inaugural "Outstanding paper" prize. The lead author is Alysia Vrailas-Mortimer, a postdoctoral fellow in Emory University School of [Medicine](#)'s Department of Cell Biology.

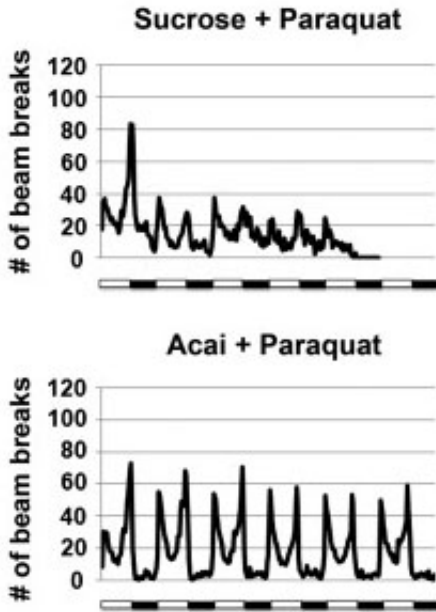
Vrailas-Mortimer says she didn't start out focusing on acai. But acai worked better than several other antioxidant products such as vitamins, coenzyme Q10 and lutein.

"One thing that makes our work distinctive is that we tried commercially available supplements," she says. "We went to a health food store and filled up a basket."

She says she began the project with the help of undergraduate student Rosy Gomez, and narrowed her focus after initial success with acai. Vrailas-Mortimer took advantage of a discovery she had made working with Subhabrata Sanyal, assistant professor of cell biology, PhD. They had previously found that flies with mutations in the "p38 MAP kinase" gene have shorter lives and are [more sensitive](#) to heat, food deprivation and oxidative stress.

P38 mutant flies lived an average of only eight days when they were given a simple sugar water diet. However, their lifespans tripled when their diet was supplemented with acai. Ginger was used as a control for the diet supplements.

Acai also protected normal flies against oxidative stress, in the form of hydrogen peroxide or paraquat. Acai can protect against oxidative stress when flies are exposed to hydrogen peroxide before being given acai, but the protective effect does not hold up if the order is reversed.



Paraquat is an herbicide that has neurotoxic effects that resemble Parkinson's disease. Under the influence of paraquat, flies' sleep-wake cycles gradually become chaotic (see graph). Acai can also help soften the effects of paraquat on flies' circadian rhythms.

"I think this is important," Vrailas-Mortimer says. "We show that whatever is in acai that is lengthening lifespan, it can also keep the flies functioning better for longer when faced with paraquat exposure. It is maintaining quality of life rather than just preventing them from dying."

When flies were fed a more enriched diet of a standard cornmeal/molasses mush, the effects of supplementation with acai were more pronounced in males than in females. Males' lifespans were almost doubled with acai (20 to 40 days) but the effects on females were not as strong (30 to 34 days). On an enriched diet, male flies were more sensitive to paraquat than females as well.

Implications for human clinical trials of antioxidants:

Large clinical trials studying the effects of antioxidants such as vitamin C and E have not

shown clear benefits on human health. Using [fruit flies](#) under oxidative stress as a model can be a way to dissect which components of acai are beneficial. Probing the effects on flies' circadian rhythms can be a way to quickly screen several compounds or regimens, since the effects are apparent even before most of the [flies](#) die.

Acai [berries](#) contain a variety of antioxidant and anti-inflammatory compounds, such as anthocyanins. Sanyal says it may be better to study the components of acai together rather than in isolation.

"There may be a combinatorial effect, and if you separate the components from each other, you may lose the active principle," he says. "In addition, it seems to me that anti-oxidant therapy will not work after the damage has been done. So human [clinical trials](#) that don't take this into account are likely to have disappointing results."

More information: Reference: A. Vrailas-Mortimer, R. Gomez, H. Dowse and S. Sanyal. A survey of the protective effects of some commercially available antioxidant supplements in genetically and chemically induced models of oxidative stress in *Drosophila melanogaster* *Exp. Gerontol.* (2012).

Provided by Emory University

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