

# Effect of a sugarcane polyphenol extract on growth, fertility and lifespan of *Caenorhabditis elegans*

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## Introduction

- Polyphenols are a class of phytochemicals, abundant in many food plants, including sugarcane.
- Claims of health benefits of consumption of polyphenols are attributed to their anti-oxidant and anti-inflammatory properties.
- However, limited evidence exists on the long-term health effects of consumption of polyphenols.
- *C. elegans* therefore is a useful screening tool to study the effect of the sugarcane extract Polynol™ over a full lifespan.

## Research Question

**Q: Does the inclusion of sugarcane extract, Polynol™ in the diet impact health over a lifetime?**

**A: Worms fed Polynol™ lived longer, growth rate faster, without reduction in fertility.**

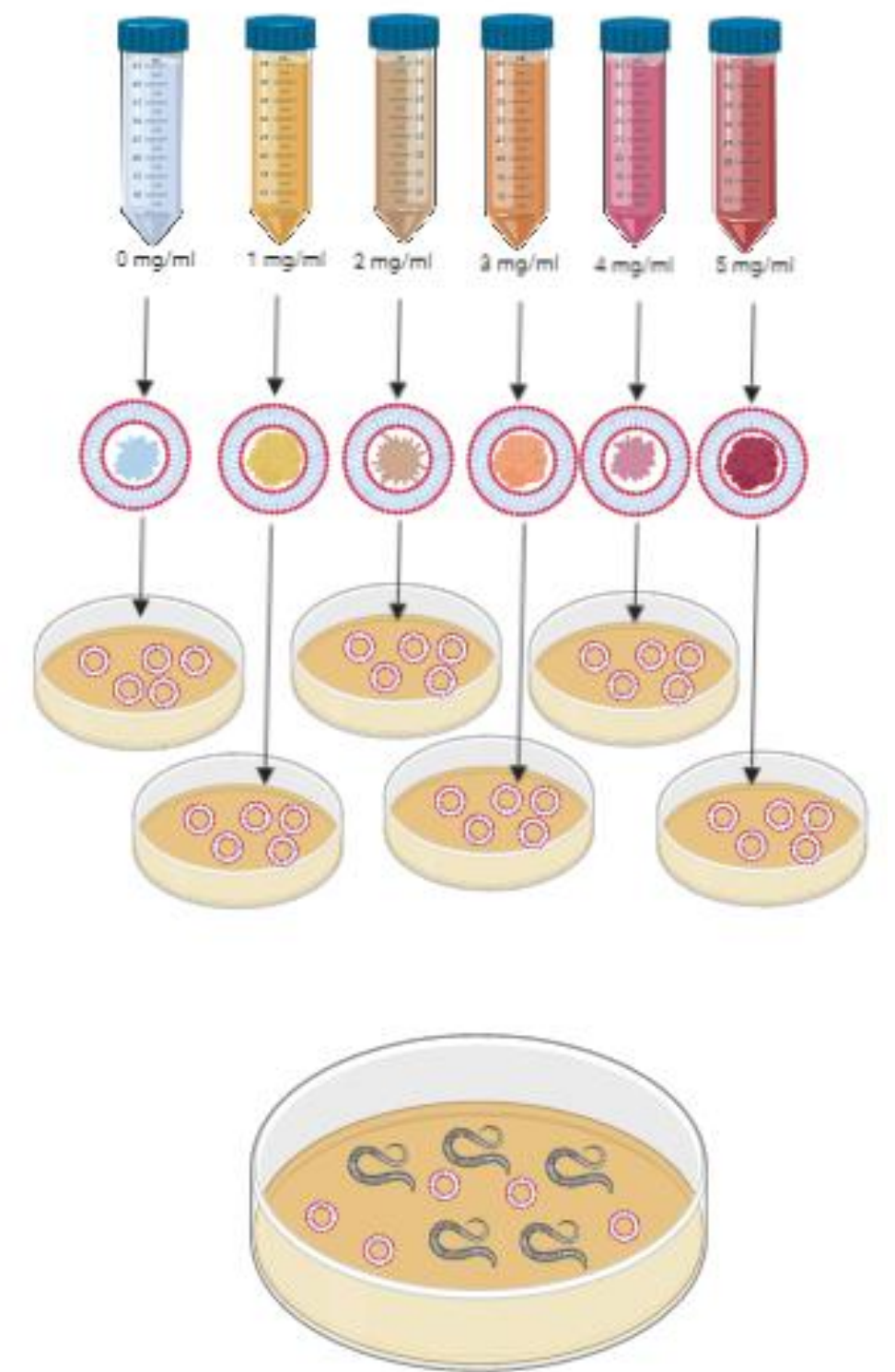
## Methods

1. Prepare axenic nutrient medium with various dosage of sugarcane extract

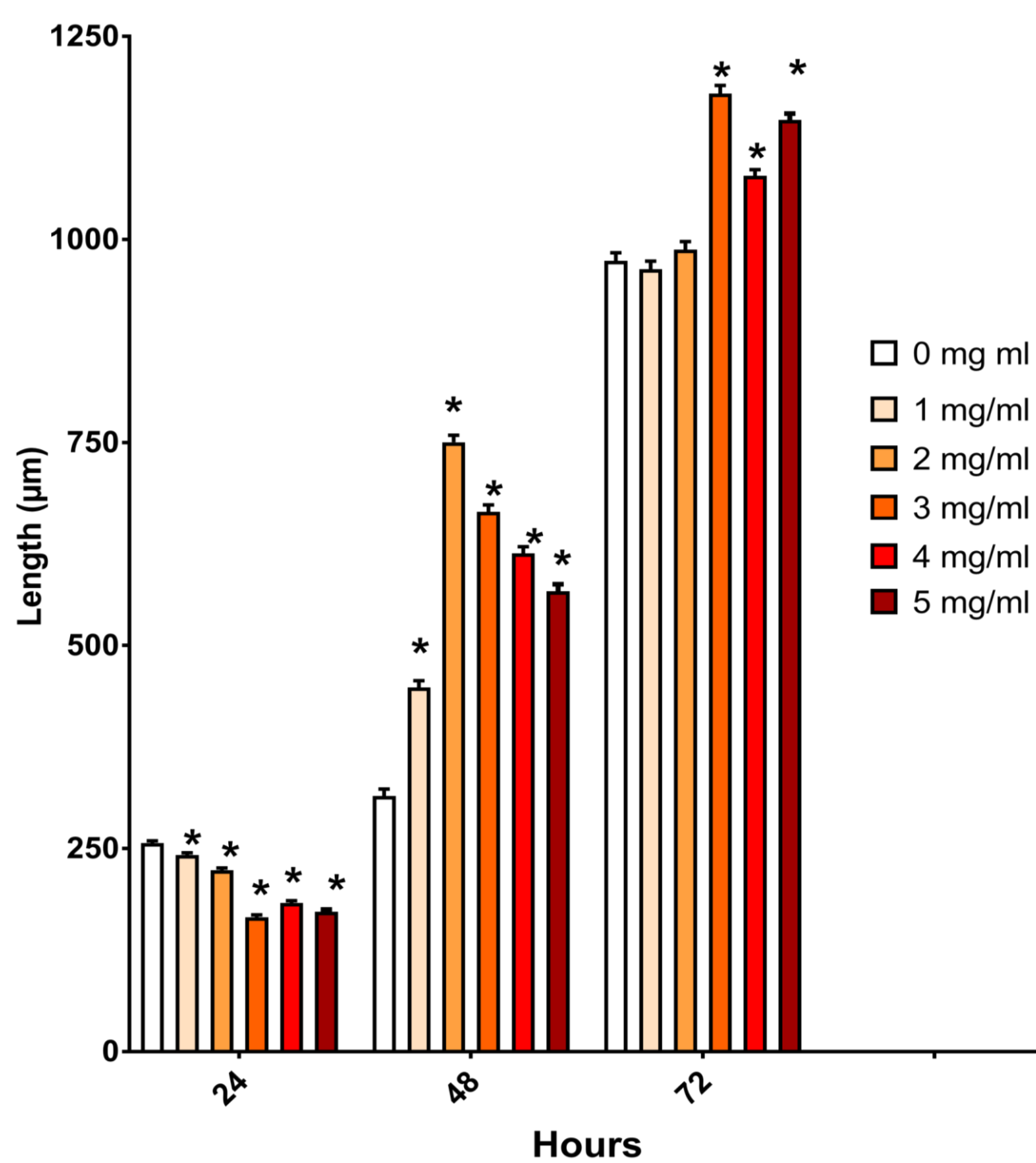
2. Load nutrient medium into liposomes

3. Plate liposome encapsulated media and allow suspension liquid to evaporate.

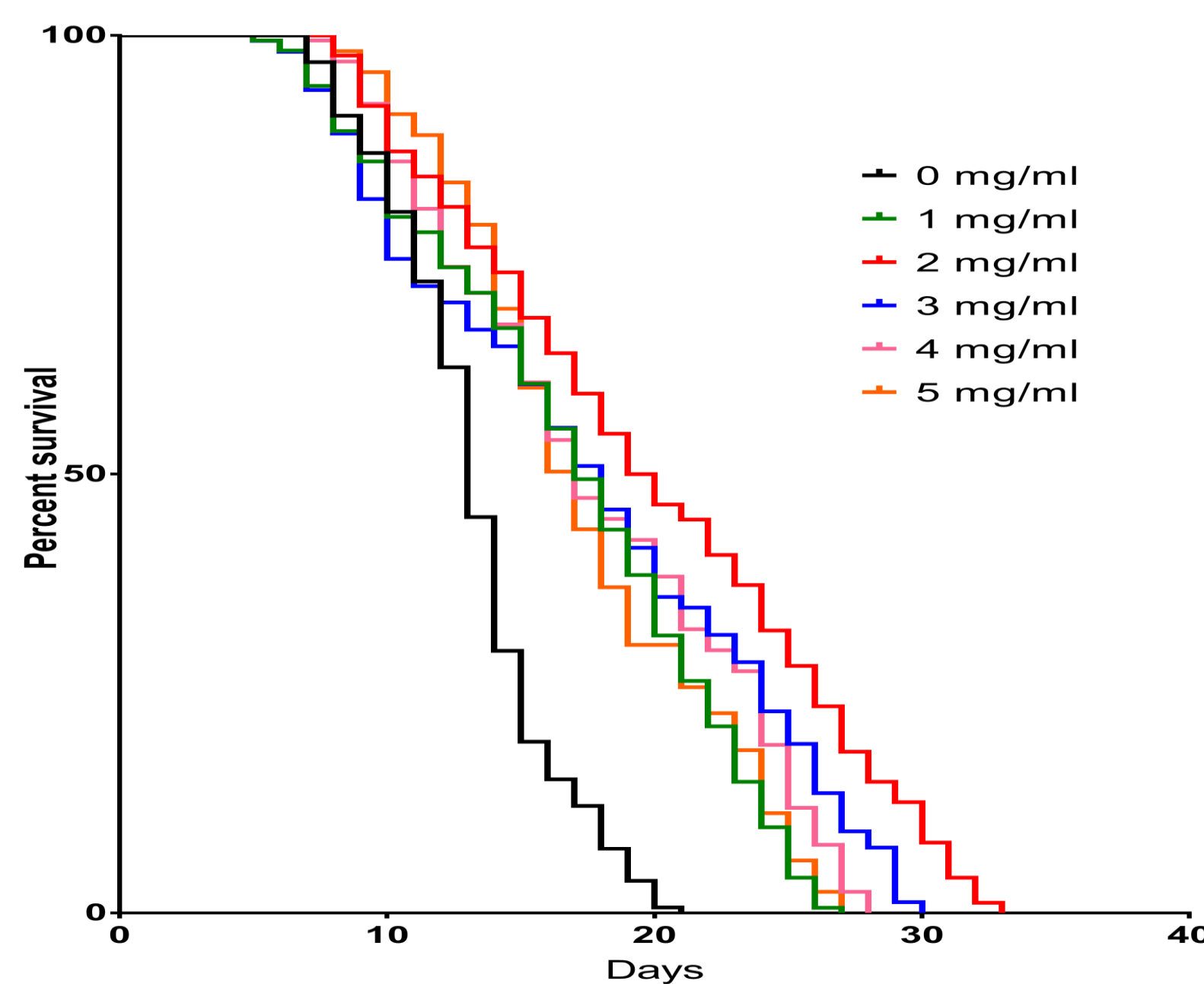
4. Add synchronous L1 worms, replate daily once adult.



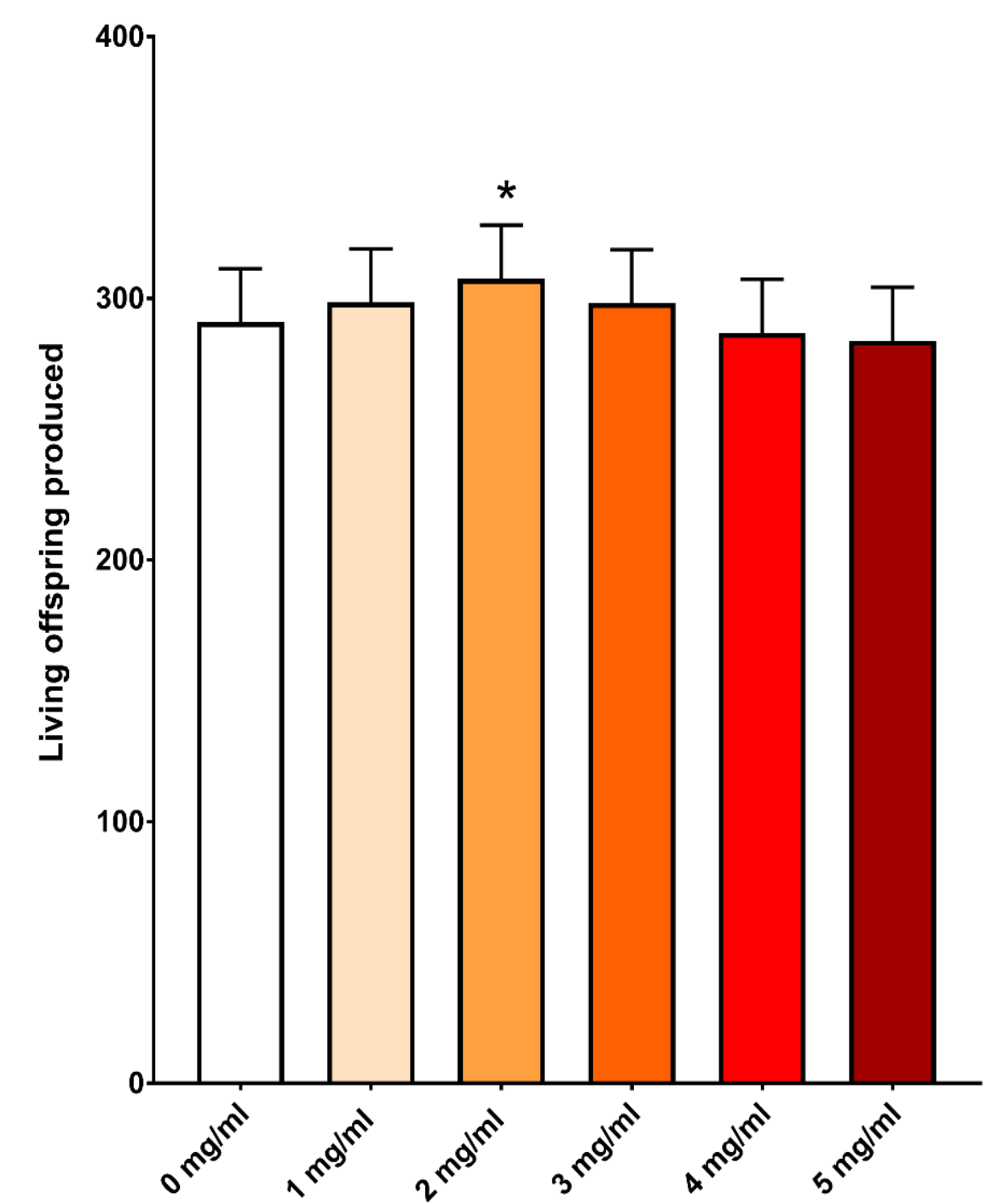
## Results



**Figure 1.** *C. elegans* length at 24-hour intervals from egg hatching to egg laying adult life stage. (\*) indicates statistically significant ( $P < 0.05$ ) difference from control (0 mg/ml Polynol™). SEM expressed as error bars.



**Figure 2.** Lifespan of N2 *C. elegans* exposed to various concentrations of Polynol™.  $n = 180$  per treatment. (All treatment conditions significantly different to control ( $P < 0.05$ ))



**Figure 3.** Fertility expressed as average of total living offspring. (\*) indicates statistically significant ( $P < 0.05$ ) difference from control (0 mg/ml Polynol™). SEM expressed as error bars..

**Table 1.** Mean Median and Max lifespan values

	0 mg/ml	1 mg/ml	2 mg/ml	3 mg/ml	4 mg/ml	5 mg/ml
Mean Lifespan	13.2 ±3.2	16.9 ±5.8 <sup>a</sup>	20.02 ±7.2	17.59 ±7.346 <sup>ab</sup>	17.79 ±6.026 <sup>ab</sup>	17.91 ±6.903 <sup>ab</sup>
Median Lifespan	13	17	19.5	18	17	17
Max Lifespan	21	27	33	30	28	27

## Conclusions:

• Sugarcane polyphenols increased overall growth rate, improve fertility and extend lifespan of *Caenorhabditis elegans*.

• Further work is seeking to understand which genes are contributing to this lifespan extension

• The Polynol™ sugarcane extract is also being further fractionated to isolate pure compounds which may be the active components driving these results.



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