

# Effect of Antidepressants on Bacterial Resistance to Antibiotics

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## BACKGROUND:

Studies have shown that prescribed antidepressants increase bacterial resistance to antibiotics. This experiment aims to establish whether natural antidepressants have the same effect on bacterial resistance to antibiotics in *E. coli* as prescribed antidepressants.

## METHODS:

1. Prepare LB agar plates and LB broth
2. Dilute the antidepressants according to Table 1
3. Add 100µl of *E. coli* to each LB broth tube containing the different antidepressants
4. Incubate all tubes overnight at 37°C
5. Streak LB agar plates for individual colonies
6. Spread 250µl of *E. coli* from each culture tube onto a new Petri dish. Add antibiotic disks to each quadrant and conduct the Kirby-Bauer test.
7. Incubate plates for 16-24 hours at 37°C
8. Compare the morphologies of the colonies and measure the zone of inhibition

## RESULTS:

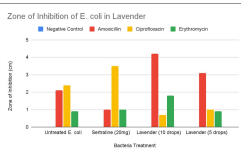


Figure 1: Results from lavender-treated *E. coli*

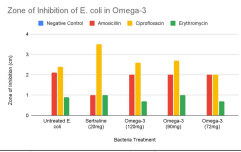


Figure 2: Results from omega-3-treated *E. coli*

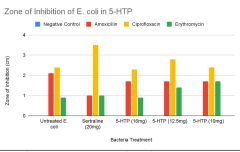


Figure 3: Results from 5-HTP-treated *E. coli*

# Increased resistance of *E. coli* to antibiotics depends on the type of natural antidepressant and its concentration and can have the same effect as prescribed antibiotics.

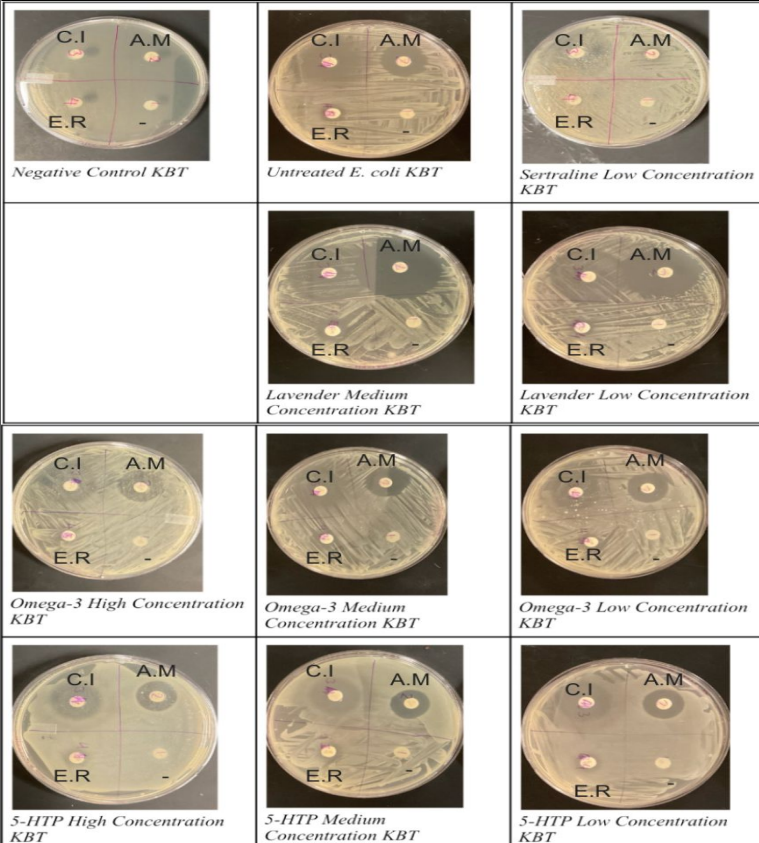


Figure 4: Kirby Bauer test results

## DISCUSSION:

### Streaking:

- The only significant morphological change to the bacteria was its form. Sertraline-treated bacteria produced circular colonies, unlike bacteria treated with natural antidepressants which produced punctiform colonies similar to the untreated *E. coli*. This may suggest a genetic change in bacteria grown in sertraline cultures.

### Kirby-Bauer Test:

Comparing to the untreated *E. coli*, the following observations were concluded:

- In Figure 1, the sertraline-treated *E. coli* shows increased resistance to amoxicillin and decreased resistance to ciprofloxacin compared to the negative control.
- In contrast, figure 1 shows lavender-treated bacteria with the least resistance to amoxicillin and an increased resistance to ciprofloxacin.
- In figure 2, the omega-3-treated *E. coli* results were similar to those of the untreated *E. coli*, with only a slight decrease in resistance to ciprofloxacin and a slight increase in resistance to erythromycin.
- Similar results were also found in 5-HTP compared to untreated *E. coli*, as seen in figure 3, with only a slight decrease in resistance to ciprofloxacin and erythromycin and a slight increase in resistance to amoxicillin.

## REFERENCES:

The University of Queensland. (2023, February 1). *Common antidepressants can increase antibiotic resistance*. UQ News. <https://www.uq.edu.au/news/article/2023/01/common-antidepressant-s-can-increase-antibiotic-resistance#:~:text=%E2%80%9C9CSertraline%2C%20duloxetine%20and%20fluoxetine%20had>

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