

# **Breast Cancer in Adolescent and Young Women: Investigating Breast Microbiota, Estrogen, and Bacteria Impact on Biomarker Discovery**

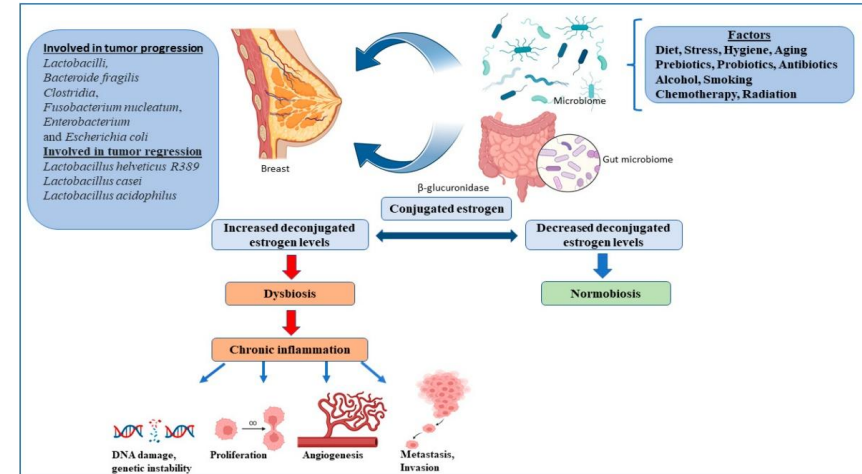
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# Background

- Breast cancer incidence among adolescent and young adult (AYA) women in the United States has notably increased over the past decades and remains one of the leading causes of cancer-related deaths in AYA women
- The surge in breast cancer cases cannot be solely attributed to genetic changes in this demographic.
- Breast cancer is linked to estrogen and changes in the breast microbiome are confirmed in breast cancer patients.
- Microorganisms (such as bacteria) inhabit the breast microbiome
- Estrogen receptors can be found in the breast tissue, and may interact with the breast microbiome.

# Background- Effect of Estrogen on Breast Tissue and the Breast Microbiome

- Estrogen plays a crucial role in developing and growing breast tissue, especially during puberty and pregnancy.
- Imbalance in the breast microbiome is linked to breast cancer.
- Estrogen can influence the immune response in breast tissue, affecting both microbiome composition and activity.
- Changes in estrogen levels may influence immune cell function, potentially affecting how the immune system interacts with bacteria in the breast.



# Motive

This study aims to understand the roles of the breast microbiome and estrogen in breast cancer with the goal of a biomarker discovery. With an expansion of knowledge about breast cancer, there is an aspiration for rapid diagnosis.

# Method and Result

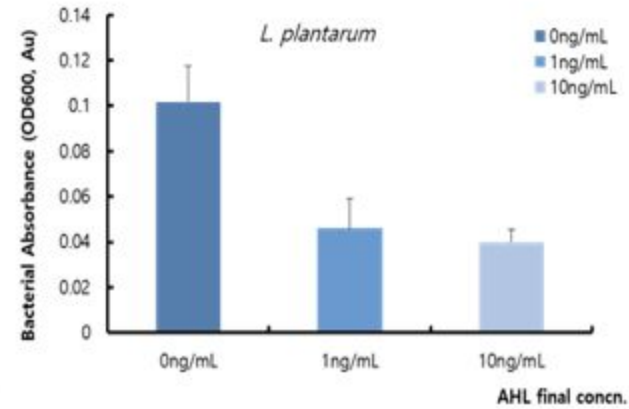
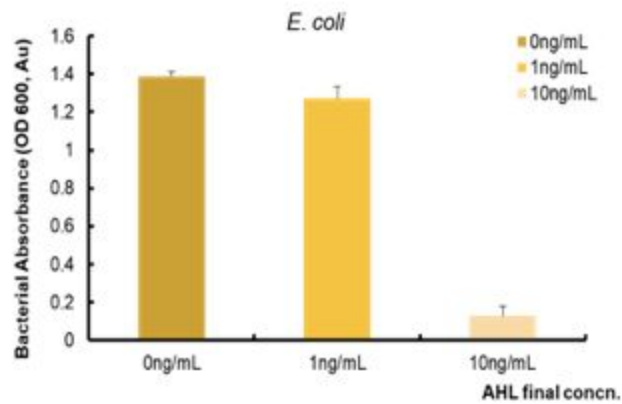
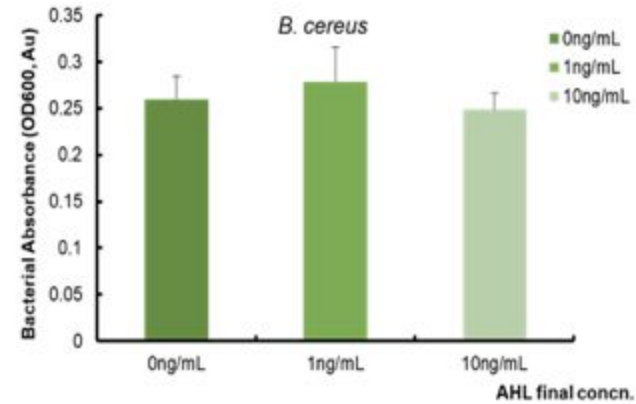
*E. coli*, *B. cereus*, *L. plantarum*

Assessing and analyzing bacterial properties, investigating AHL communication, examining estrogen effects on growth.

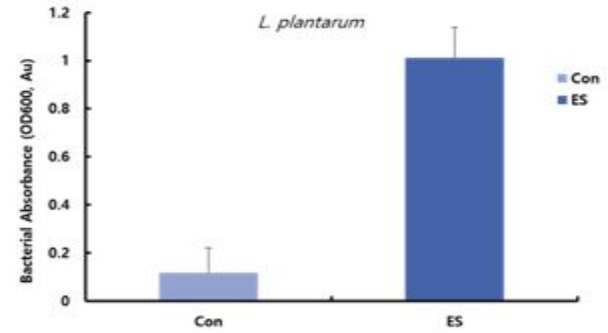
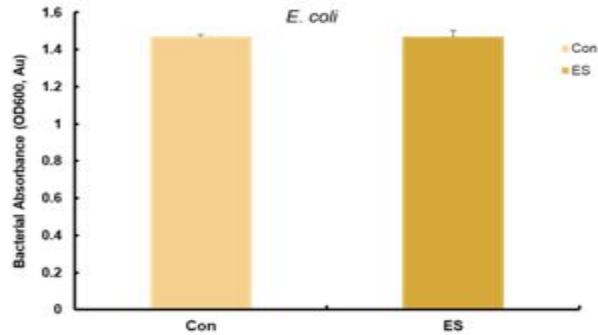
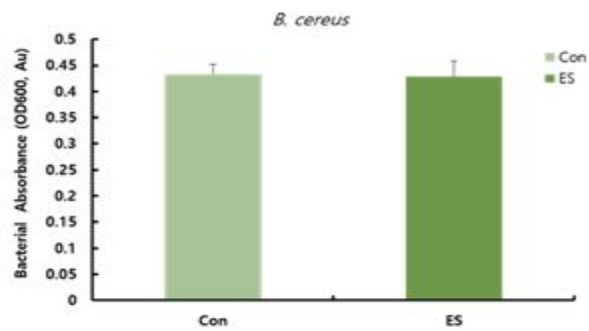
Techniques: Optical density, incubation periods, estradiol concentrations, spectrophotometry.

Additional Findings: Bacteria effects on each other, diagnostic potentials, growth changes, dosage variations, product functionality.

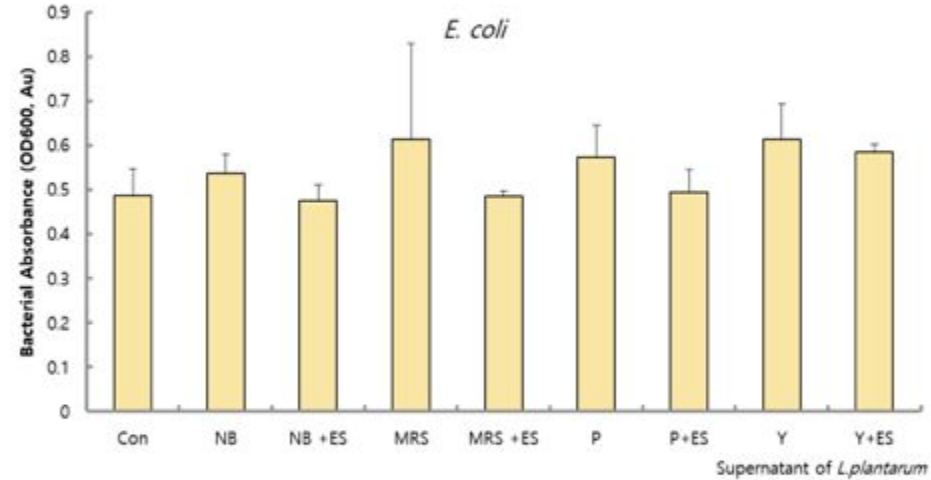
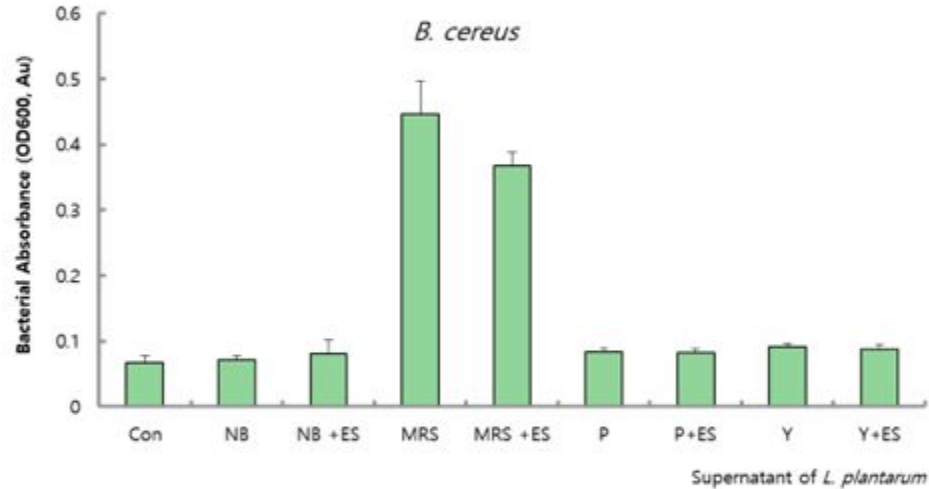
# Bacterial Growth by N-acyl-homoserine lactones(AHL) Inducing QS



# Bacterial Growth due to Estradiol

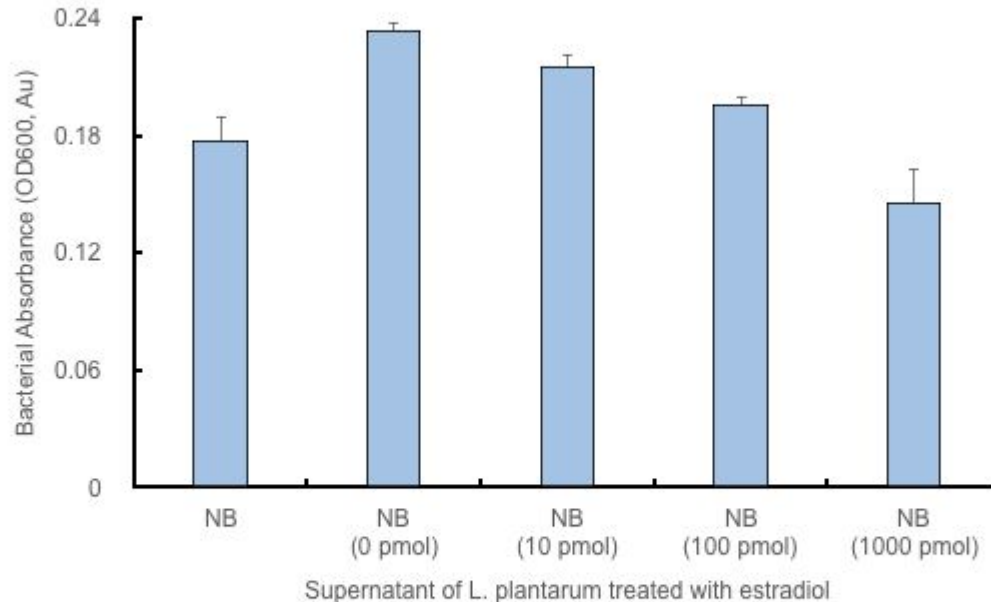


# Product of *L. plantarum* by estradiol in various media

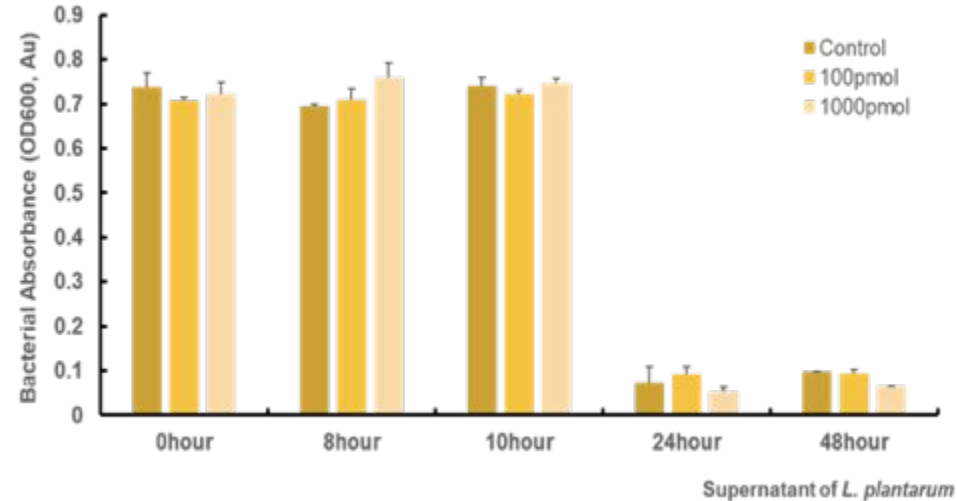
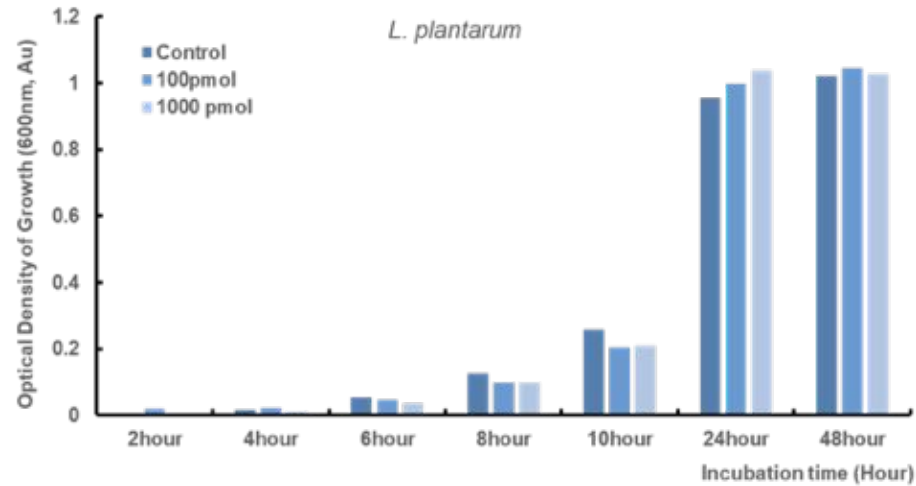




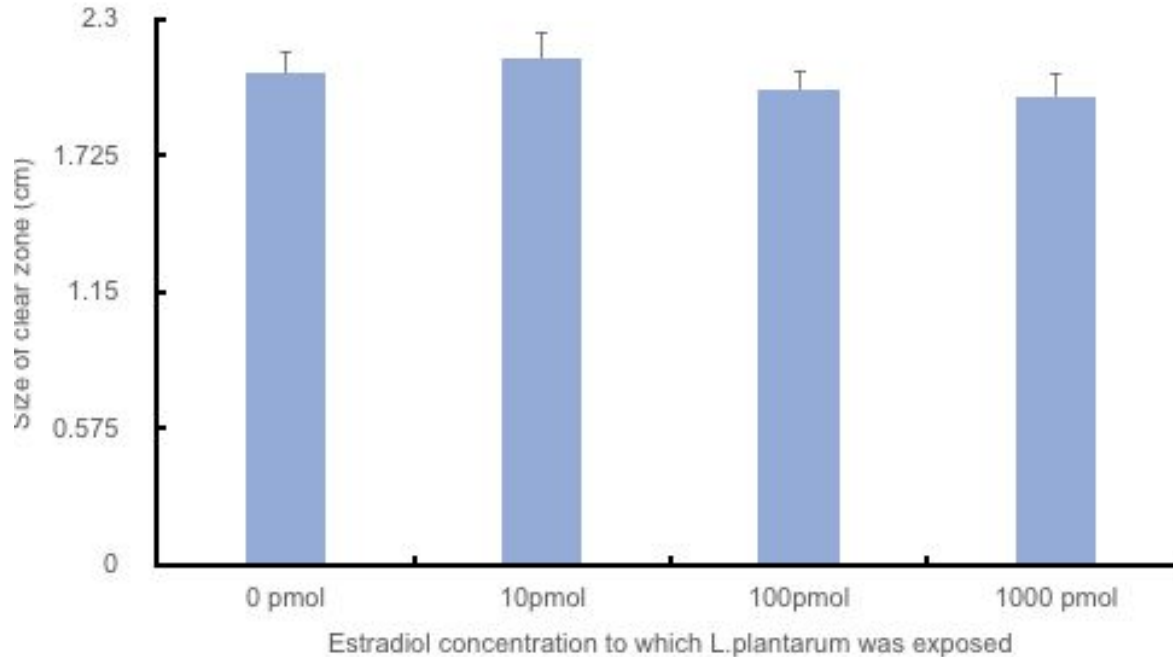
# Growth of *L. plantarum* Product and *B. cereus* According to Concentration (dosage) of Estradiol



# Estradiol exposure time following the growth of *L. plantarum* product and *B. cereus*



# Exposure of *L. plantarum* to Estradiol and Property of the Product



# Conclusion

- Estradiol increases the growth of *L. plantarum*.
- *L. Plantarum* antibiotic material is produced when the amount of bacteria is large.
- Protein degradation in *L. plantarum* exposed to estradiol is reduced.
- *L. plantarum* can be used as a biomarker for breast cancer.
- Future study: How *L. plantarum* can be used as a biomarker.

