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Activity Allium nigrum extracts on inhibition of Enterococcus faecalis bacteria

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Abstract---This study was conducted at the University of Kufa, Faculty of Science / from November 2021 to February 2022, and Allium nigrum and A. platensis from the laboratories of the College of Science, Al-Mustansiriya University. Crush them and put them in two separate micelles to obtain an extract of ethanol and methanol. The diagnosed bacteria were obtained from the Al-Ameen Center for Research and Advanced Biotechnology in Najaf the Gram-positive was Enterococcus faecalis to evaluate antibacterial efficacy at three concentrations (100, 150, 200) mg/mL each extract in three replicates by spreading the soft-agar method. The results proved that there was good antibacterial activity against Enterococcus faecalis.

Keywords---anti-bacterial, activity, inhibition, allium nigrum, enterococcus faecalis.

Introduction

Allium nigrum is dark brown in color and produces asymmetric bulbs up to 5 cm across. Each plant has 3-6 leaves, lanceolate in shape, flat and bent to the side, up to 60 cm long and 2.5 cm across. Later the leaves become reflexed. Scapes are smooth and round in cross-section, *A. nigrum* during their life cycles produce a diverse array of secondary bioactive metabolites, many of which are involved in plant defense (Fritsch *et al.*, 2010). During fermentation process, alliin, ajoene, allicin, allylpropyl, trisulfide, phenyldithiene, salicysteine, diallyl, S-allylmercaptocysteine that are major compound in garlic and responsible for characteristic smells are reduced recently in Asian and European countries have been paying attention to black garlic to its lowering cholesterol levels, reducing blood clots, fighting infectious diseases, cold treatment, cancer prevention, reducing symptoms of diabetes (Qiu *et al.*, 2018b). The phytochemical diversity of antimicrobial compounds includes saponins, phenolics, and indoles. (Lanzotti *et*

al., 2012). *Enterococcus faecalis* is a gram-positive, non-sporulating, facultative anaerobes that currently rank among the most prevalent multidrug resistant hospital pathogens worldwide (Van Tyne *etal.*, 2013). *E. faecalis* is ancient members of the animal microbiome that are believed to date back least to the last common ancestor of mammals, reptiles, birds and insects. In the early devonian period, 412 million years ago (Gilmore *etal.*, 2013). This is bacteria thrive in the nutrient-rich, oxygen-depleted environment of the intestinal tract and at least in part because of shedding from animal hosts, are readily found in the environment (Mundt, 1967). They are core members of the commensal intestinal microbiota, which is densely colonized with up to 10^{11} bacterial cells/gram feces (Lawley and walke, 2013). The presence of Enterococci in the complex ecology of the gastrointestinal tract provides an ample reservoir where genetic exchange and selection can occur and is capable of causing variety of infections including endocarditis, sepsis, surgical wound infections, and urinary tract infections (Jett *etal.*, 1994 and Richards *etal.*, 2002).

Materials and Methods

Collection and preparation of A.nigrum extract

A.nigrum dried fruit is obtained from a /college science/ University of Baghdad laboratories in October 2021, then it was crushed by an electrical grinder the powder A.nigrum and it was collected in kept separate in the laboratory at room .temperature even use. Use ethanol and methanol to extract phytochemicals from black garlic because they are the best solvents for extracting phytochemicals (Al-Moati et al., 2016).

Preparation of bacterial Culture Media

- Weigh the ready-to-dry medium powder, according to the instructions on its middle container.
- Dissolve it in the volume of distilled water specified in the instructions, and it will be dissolved using the flask, and then stirred, and heat the water to dissolve completely.
- Sterilize the medium by autoclave for 15 minutes under a pressure of 15 lbs and temperature at 121°C.
- Take it out of the device and wait for it to cool down a bit and pour it into sterilized Petri dishes near Bunsen burner to prevent contamination and the dishes remain open until the steam does not condense on the plate lid after freezing it is kept in the refrigerator, then keep in the refrigerator until use (MacFaddin, 2000).

Statistically analysis

All data were analyzed by the SPSS software (V.25 Inc., Chicago, USA) and Microsoft Excel 2019. Kolmogorov-Smirnov test for variables distribution. Normally distributed Numerical Variables were compared between two groups by independent t-test, and among three groups by ANOVA, and post hoc test with LSD. Tests of Between-Subjects Effects comparison of main effect and identification the interaction between means of variables by two-way ANOVA

(Univariate analysis). All data expressed as (mean $\pm$ SD) standard deviation. Significance of differences was detected at $p < 0.05$.

Results and Discussion

Effect of ethanolic and methanol extract of *A. nigrum* mean inhibition zone for bacteria in which the highest zone of inhibition was by the ethanolic extract for *Enterococcus faecalis*. While the lowest concentration is 0.08 in methanol extract. The results showed that garlic's effect on these bacteria has the most antimicrobial activity, Especially against *Enterococcus faecalis* (Harzallah-Skhiri, 2014). The highest zone of inhibition was by the ethanolic extract for *Enterococcus faecalis*. This medicinal black garlic plant has gained more importance in recent days with this Bacterium, as it provides tremendous potential in the formulation of new drugs against

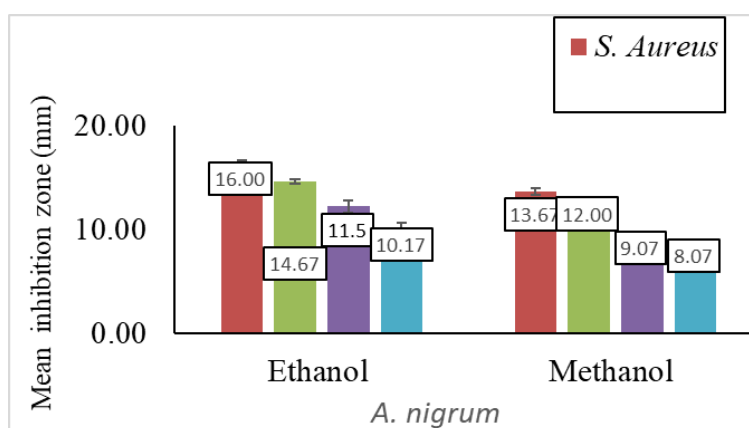


Figure 1. Effect of ethanolic and methanolic extracts of *A. nigrum* on Inhibition zone one *E. faecalis*

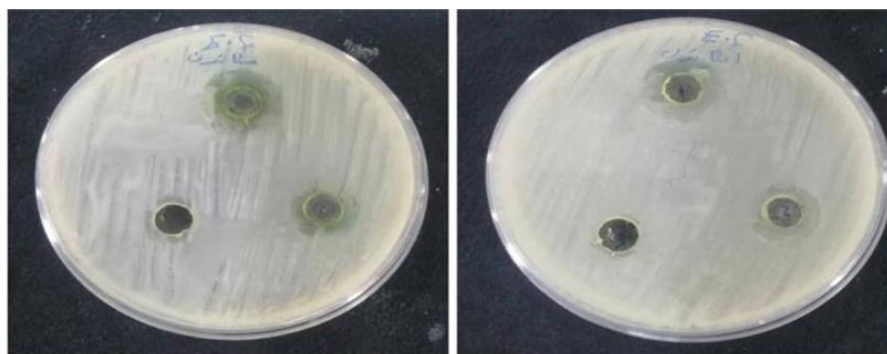


Figure 2. Inhibition zone of *E. faecalis* with *A. nigrum* Extract Ethanolic 1: 10mg/ml 2: 16mg/ml 3: 18mg/ml, Extract Methanolic 1: 10mg/ml 2: 13mg/ml 3: 15mg/ml

Many diseases and ailments that afflict humanity (Pradeep, 2003). This bacterium has been shown to be a pathogenic microbial infectious agent to the examination of several medicinal plants for its potential antimicrobial activity (Bansal, 2010;

Scazzocchio, 2001). Bacteria have found *Enterococcus faecalis* applications as naturally occurring antimicrobial agents in pharmacology, pharmaceutical botany, plant pathology, and medical and clinical microbiology. Thus medicinal plants have gained great importance (Magiatis, 2002).

Conclusion

The results proved that there was good antibacterial activity against *Enterococcus faecalis*.

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