

In-Vitro Analysis of Organic Extracts and Antibiotics Against Bacterial Acne

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ABSTRACT

Introduction: Acne is a chronic inflammatory skin condition primarily it typically begins during puberty and exhibits its highest prevalence in adolescents and young adults. It is caused by bacterial species. Previous research has indicated that the onset and progression of acne are closely linked to immune and inflammatory response (Li)s. During puberty, the activation of sebaceous glands results in elevated sebum production, which can contribute to the pathogenesis of acne, a widespread dermatological condition. It is the most prevalent skin disorder, the underlying mechanisms that make humans particularly prone to this condition are not yet fully understood. Nowadays acne is increasingly prevalent among adult women, significantly impacting their quality of life. Adult female acne (AFA) occurring in women over the age of 25, which may either persist from adolescence or emerge for the first time during adulthood (Muthu). The conventional treatments based on antibiotic therapy which served as the cornerstone of acne treatment for more than five decades (Nakouti), Conventional approaches, such as chemical treatments and topical creams, continue to be popular for acne management. However, there is a growing interest in plant-based products with medicinal properties are gaining attention against conventional methods. These organic products have anti-inflammatory, antioxidant and antimicrobial properties. This study was performed to identify the effect of honey, aloe vera, and banana extracts on acne causing bacteria.

Objective: To assess the antimicrobial effects of honey, banana extract, and aloe vera in comparison to conventional antibiotics against bacterial isolate associated with acne.

Methodology: 10 female individuals were selected who were infected with acne. The infected area of facial skin was swabbed and bacteria were isolated on Mannitol Salt Agar. The isolated species were identified by conventional biochemical methods after Gram Staining. Blood Agar was used to check the hemolysis. The antibiotic resistance of isolated strains was observed by Kirby-Bauer method against chloramphenicol, erythromycin, penicillin, and tetracycline. The antimicrobial activity of organic products, honey, aloe vera and banana extract were investigated via agar well diffusion technique in which bacterial culture grow in Nutrient broth then isolate on MHA. 1:10 dilutions were made of each extract. In 5mm 3 agar wells 40uL of each extract was poured and incubated at 37°C for 24hours (Kumari).

Result: The bacterial species grown were identified as gram positive Cocci in bunches. These species were found as catalase positive, coagulase negative, ferment carbohydrates without gas production and confirmed as *Staphylococcus epidermidis*. The antibiotic sensitivity obtained against chloramphenicol was 40%, erythromycin 50%, penicillin 60%, and tetracycline 60%. The antibacterial activity of honey in 1:10 dilution showed 50% inhibition. The banana extract was identified as 20% inhibition. The aloe vera extract did not showed inhibition in all bacterial isolates. With this comparative study of organic products, honey is a good source to inhibit *Staphylococcus epidermidis*.

Conclusion: In conclusion, this research assessed the antimicrobial potential of natural products, with an emphasis on honey as a potential agent against *Staphylococcus epidermidis*. The findings demonstrated that honey has significant inhibitory effect in vitro, underscoring its potential as a natural antibacterial agent. However, the study's scope was confined to laboratory environments, highlighting the need for more research in clinical applications. Future study might concentrate on optimizing from honey concentrations

to enhance its efficacy, clarifying its antimicrobial techniques, and evaluating its effectiveness against a wider array of clinically significant infections. In addition, exploring the synergistic effects of honey in conjunction with standard antibiotics may provide significant insights into its medicinal potential. This research highlights the important nature of organic substances as viable alternatives or complements to traditional antibiotics, especially when addressing the rising problem of antimicrobial resistance.

Keywords: Acne, *Staphylococcus Epidermidis*, Honey, Organic Products.
