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Antibacterial Activity of Different Types of Honey

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Abstract: *The aim of the current study was to look at antibacterial drug activity of three varieties of honey. The antibacterial drug activity was examined against the expansion of Staphylococci aureus (S. aureus) and genus Pseudomonas aeruginosa (P. aeruginosa) by the agar well diffusion assay. The results disclosed that each one tested honey sorts exhibited antibacterial drug activity against S. aureus and P. aeruginosa. additionally, the overall polyphenolic content (TPC) of the honey sorts perceived to contribute to the antibacterial drug activity against P. aeruginosa. The current study is that the initial that extensively examined the bioactivities of various varieties of honey.*

Keywords: Honey, *S. Aureus*, *P. Aeruginosa,* antibacterial activity, TPC

I. INTRODUCTION

Honey, a sweet natural product famed for its alimentary worth and helpful health effects, is made by honeybees (*Apis mellifera L.*) that directly choose nectar from plants or from excretions of plant suck insects (i.e., honeydew) (1). Honey is basically a targeted solution ofcarbohydrates, primarily laevulose (~38%) and aldohexose (~31%) and alternative oligo- and polysaccharides, consisting ~95% of the dry weight of honey (2). Except for carbohydrates, different types of honey contains >200 completely different compounds, like enzymes (e.g., aldohexose enzyme and catalase), proteins, vitamins (e.g., vitamins C and E), amino and organic acids, lipids, minerals and phytochemicals (e.g., polyphenols)(2). Though these elements represent a minor i.e. very smallpart of honey, they considerably contribute to its helpful effects on health (3). However, the chemical composition among differing kinds of honey varies greatly because of the biology and entomologic supply, furthermore because the climate and environmental conditions(4,5). Honey exhibits potent antibacterial drug activity; so, its use in fashionable drugs represents a pretty different treatment to combat multidrug resistant pathogens (6,7). The antibacterial drug activity of honey is owing to various factors, as well as oxide, a coffee pH and high osmolarity (7,8). Methylglyoxal (MGO) and also the antibacterial drug amide, bee defensin-1, are known as vital factors of the antibacterial drug activity exerted by sure varieties of honey. what is more, it's been shown that the antibacterial drug factors of honey might exhibit overlapping activity (9-11). The antibacterial drug efficiency among completely different honey sorts is variable, on its biology, seasonal and geographical supply, though gathering, process and storage conditions might have an effect on the antibacterial drug properties of honey (7,12).

There square measure variety of studies documenting the antibacterial drug activity of honey against numerous microorganism pathogens (7,13,14). However, recent studies on the antibacterial drug properties of numerous honey sorts made worldwide.

These Findings Have instructed that more analysis might establish medically helpful honey sorts which can have distinct benefits (6,7,15,16). Apart from the antibacterial drug effects of honey, its inhibitor properties are thought of vital (17). The inhibitor activity of honey is attributed primarily to its polyphenols (e.g., flavonoids and phenolic resin acids), inhibitor enzymes (e.g., enzyme and peroxidase), vitamins (e.g., vitamin C), Maillard reaction product (e.g., melanoidins), and carotenoids and amino acids (e.g., proline). many studies have according that the inhibitor compounds of honey might stop aerobic stress-induced pathological conditions (18,19).

II. MATERIALS AND METHODS

2.1 Honey Samples

A total of three differing kinds of honey, that were offered in market space were provided by individual apiculturists and beekeeper associations. Every sample was assigned a novel reference variety. Honey samples were keep in glass containers at temperature within the dark. Different brands of honey Patanjali, Saffola and Zandu were used as a

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positive management throughout this study, whereas laboratory-synthesized honey was used as a negative management. Laboratory-synthesized honey was ready by dissolving three g disaccharide, fifteen g disaccharide,80.1g laevulose and 67g aldohexose (all provided by Himedia) in 34 metric capacity unit sterile deionised water. This answer was heated to 56°C during a water bath tub to help dissolving, as antecedently delineated (7, 20, 21).

2.2 Bacterial Strains and Growth Conditions

The antibacterial drug activity of the various varieties of honey was tested against *Staphylococci aureus* strain and genus Pseudomonas aeruginosa that were procured from the laboratory.

2.3 Agar well Diffusion Assay

The assay was performed on the idea of the the Clinical and Laboratory Standards Institute(CLSI) tips as antecedently delineate (7). Briefly, long microorganism cultures fully grown in Mueller-Hinton broth were adjusted to 0.5ml (~1.8×108 CFU/ml). Mueller-Hinton agar plates were inoculated with roughly 106 CFUs over the whole surface of the plate. 3 wells of 6 millimetre in diameter were withdraw the surface of the agar employing a sterile cork borer. after, a hundred µl [50% v/v in phosphate-buffered saline (PBS)] of the tested honey sorts and laboratory-synthesized honey were additional singly to every well. The plates were incubated at 37°C for 16-18 h. The diameter of the inhibition zones, as well as the diameter of the well, was recorded. The diameter of the inhibition zone, if present, within the negative management was recorded and the inhibition zones of the tested (22,23,24). Every Assay has carried in triplicate

2.4 Assessment of the Overall Phenolic Resin Content (TPC)

The TPC of the honey samples determined in accordance with a changed version of the Folin-Ciocalteu methodology (25). A twenty µl of the sample was additional to a tube containing one metric capacity unit of deionized water. after, a hundred µl of Folin-Ciocalteu chemical agent were additional to the mixture, and also the flask was closed and allowed to face at temperature for three min. Thereafter, 280 µl of twenty fifth w/v salt answer and 600 µl of deionized water were additional to the mixture. Following one h of incubation at temperature within the dark, the absorbance was measured at 765 nm versus a blank containing Folin-Ciocalteu chemical agent and deionized water while not the tested sample. The measuring of absorbance was conducted on a Hitachi U-1900 beam photometer (serial no. 2023-029; Anadrasi S.A., Salonica, Greece). The optical density of the sample (20 µl) in twenty fifth w/v answer of salt (280 µl) and water (1.7 ml) at seven65 nm was conjointly measured. The TPC determined employing a customary curve of absorbance values related with customary concentrations (50-1,500 µg/ml) of acid. The results square measure expressed as acid equivalents (GAEs) victimisation the quality curve (absorbance versus concentration) ready from authentic acid (25,26).

III. RESULT

3.1 Antibacterial Activity of the Honey Types against *S. aureus* and *P. aeruginosa*

Initial screening with the agar-well diffusion assay revealed that all the tested honey types exhibited antibacterial activity against *S. aureus* and *P. aeruginosa* (Table 1). In any case, the antibacterial effects exerted by the tested honey types were more potent against *S. aureus*, as demonstrated by larger inhibition zones, compared to the effects against *P. aeruginosa*.

Table 1: Antibacterial activity of honey against pathogens

Sr. No.	Honey Brand	*S. aureus*	*P. aeruginosa*
1	Patanjali	21 mm	17 mm
2	Saffola	19.5 mm	15.5 mm
3	Zandu	21.5 mm	15 mm

3.2 Total Polyphenolic Content (TPC) of the Honey Types

The TPC of the honey samples, as measured by the Folin-Ciocalteu method, ranged from 0.55 (sample 1) to 0.92 mg GAE/gr sample (samples 2 and 3).

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IV. DISCUSSION

In this study, 3 honey types were screened for their antibacterial activity determined. Initial screening with the agar well diffusion assay demonstrated that all tested honey types exhibited antibacterial activity against *S. aureus* and *P. aeruginosa*. Nevertheless, the tested honey types demonstrated smaller inhibition zones of *P. aeruginosa* compared to those of *S. aureus*, thus indicating that *P. aeruginosa* is less susceptible to the antibacterial activity of honey. This finding is in accordance with the findings of previous studies (7,27,28), possibly reflecting a higher intrinsic resistance of *P. aeruginosa* to the antibacterial potency of honey.

V. CONCLUSION

In conclusion, the present study was the first to examine antibacterial activities of honey types. The tested honey types exerted antibacterial activity against *S. aureus* and *P. aeruginosa*. Importantly, some of the honey types had a higher antibacterial activity, which is used as an alternative medicine. It seemed that hydrogen peroxide and proteinaceous compounds found in the honey types were responsible, at least in part, for the observed antibacterial activity. In addition, the TPC of the honey types accounted for the antibacterial activity against P. aeruginosa. Further investigation, as this may lead to applications in medicine and food industry.

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