

Wound Healing and Antimicrobial Activities of Yemeni Sidr Honey in Comparison with Manuka Honey



this contribute to 50% to 75% of hospital mortality. In many cases of poor healing, the most common bacteria found in the wound area is known as *Escherichia coli* (*E. coli*).

Though there are a number of synthetic antimicrobial and wound healing agents, some of them are associated with adverse effects that have caused various other health problems.

As an alternative, research has found honey to be a natural product for treating skin tissue infections and wound healing.

To find out more, a study was conducted to assess and compare the wound healing and antimicrobial activities of Yemeni sidr honey and manuka honey. Past researchers have invested a massive effort to reveal the effectiveness of manuka honey from New Zealand in several application fields, such as wound healing, antimicrobial activities, antioxidant properties, antiviral, anticancer, and other pharmacological properties.

On the other hand, there has been limited scientific reports and insufficient investigation on Yemeni sidr honey on its antimicrobial mechanism of action as it is not known worldwide. The possible bioactive phytochemical compounds found in both honey types that may exhibit antibacterial properties according to previous literature include methylglyoxal in manuka honey, hydrogen peroxide in Yemeni sidr honey, phenolic acids and

flavonoids such as p-coumaric acid, gallic acid, ferulic acid, myricetin, and rosmarinic acid.

The disc diffusion method was used to determine the antimicrobial susceptibility of honey samples against *E. coli*. The disc diffusion method includes a number of steps including having the bacterial suspension spread evenly on an agar plate. The honey concentration is then placed on the surface of the inoculated plate and is then incubated aerobically at 37 degree Celsius for 24 hours.

The results of the study indicated both types of honeys (700 mg/disc) had antibacterial properties against *E. coli*. However, Yemeni sidr honey exhibited better wound healing properties as it is more effective in enhancing the proliferation and migration of human and mouse skin fibroblast cells.

Other factors that contribute to the antibacterial activities of honey include low pH, osmotic pressure, bee defensin-1 (an antibacterial peptide derived from bees), low protein content, and hyper-osmolality impact. The pH of honey ranges between 3.5 and 5.5, while most bacteria grow best at neutral pH ranging from 6.5 to 7.5. The high sugar content of honey results in high osmotic pressure and causes water to flow out from the bacterial cells through osmosis. As a consequence of the dehydration and high osmotic pressure, the bacteria cells start to shrink and cannot grow in the hypertonic sugar solution. Phytochemical diversity, phenolic and flavonoid contents, and the high carbon-to-nitrogen ratio are other contributing factors to the antimicrobial activities of honey.

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Asma became interested in natural remedies such as honey, after realising that not everyone around the world may have access to modern medication. Furthermore, some modern medication may have adverse side effects depending on how one reacts to it. Honey, which is more readily available can be an alternative solution, hence why Asma felt the to develop this study and analyse its results.

Microbial infections on human wounds are a major health problem globally. These infections are usually caused by unsanitary environments. Wound infections are a major complication of injuries, particularly burns, and