Lifestyle & Culture

Honey: the golden substance with multiple benefits

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Since the very beginning of civilisation, honey has always been used both as a traditional medicine and as an important resource for trade. From prehistoric paintings, to Hippocrates, to excerpts from the Torah, Bible and Quran, to modern day research papers from all around the world, products derived from the beehive, especially honey, have been an integral part of civilisations and medicine. More recently, other products from the beehive, such as propolis, pollen and royal jelly, have been studied for their roles in medicine.

Apitherapy is the term used to describe the use of products from the beehive for their medicinal and pharmacological properties. It is many times termed an alternative medicine, a last resort to try when everything else fails, yet as more research is done on the subject, more information about its true therapeutic value is being confirmed.

But first and foremost, what exactly is honey? One could say that it is a thick, viscous, golden substance that tastes sweet. In reality, honey is a very complex mixture of various nutrients and components, which vary depending on numerous factors. Not all honey is the same. Some honeys are brown or amber, some are tangy, and some are even bitter-sweet.

This may be due to geographical and environmental factors, the floral source on which the bee feeds, the type of bee producing the honey and the process followed to extract the honey. This therefore means that the geographical, botanical and even seasonal differences between different honeys leads to different compositions. As these different honeys have different components, they would have different medicinal activities when interacting with the human body.

Nectar is the raw material from which the honeybee produces honey and thus the composition of the nectar from which the honey is produced will greatly affect the composition of the final product. Bees take in nectar through a long, tube-shaped tongue and it is stored within an extra stomach. While it is there, it is mixed with enzymes which transform it into a mixture which is adapted to a more long-term method of storage. Nectar itself varies greatly in its sugar content and many bees would prefer nectars with higher sugar content depending on the amount of water available to the hive. The bee then regurgitates the liquid and passes it on to other bees, which finally deposit the honey into the honeycomb.

Bees tend to fan the honeycombs with their wings to help moisture evaporate from the liquid, making the honey more concentrated. The bees then seal the comb with an abdominal secretion, which eventually hardens to form wax. In this way, honey can be stored for any amount of time, without spoiling. Even when extracted and processed in human-made containers, pure honey cannot perish. Sometimes, due to temperature and humidity fluctuations, it might crystallise, but this can be reversed by gently heating the honey, similar to the process undergone by coconut oil.

Honey is not perishable mainly because of its antimicrobial properties. It contains a high sugar content, low pH, hydrogen peroxide, polyphenol compounds and antimicrobial peptides, which all make it an ideal antimicrobial agent. This property has recently been the subject of research, which aimed to find whether these properties can be applied in practice to eliminate bacteria, especially those resistant to antibiotics. Laboratory testing has found that Methicillin-Resistant *Staphylococcus aureus* is eliminated from samples within 72 hours of treatment with honey.

Further to this, other studies have shown that *Candida* and *Rhodotorula*, two opportunistic yeasts which may become pathogenic, are inhibited from increasing in number by treatment with honey. While this is at the moment only shown *in vitro*, researchers are hopeful that the same is shown during *in vivo* and clinical studies.

There is also potential for honey in the treatment of viral lesions, such as those found in herpes simplex infections. In some trials, honey has shown faster healing than normally prescribed antivirals such as acyclovir.

In a world of ever-increasing antimicrobial resistance, there has never been a reported case of microbial resistance to honey, with it being many times used as a last resort. If this is the case, there would be in some cases a cheaper, natural alternative to antibiotics, which at times may not work.

Another application of honey in healthcare lies in trauma and wound care. Research on the treatment of pressure ulcers with honey has shown a great decrease in the time taken for these wounds to heal when compared to traditionally prescribed creams. Wound dressings and gels made from surgical-grade honey has also shown a reduction in infections and colonisation of bacteria at the site of the wound.

An emerging use of honey in healthcare is in burn wounds and skin grafts. Patients who suffer from superficial or partial-thickness burns can expedite the healing process when using dressings lined with medical-grade honey. If a graft is needed, the regeneration of skin and successful binding of the graft to the wound site is also aided by honey, especially in children.

Honey contains a number of molecules which have been shown to have antioxidant activity. Antioxidants inhibit the oxidation of other molecules, which are important for the normal functioning of the cell. Antioxidants are kept in balance by a complex system within the body and food containing antioxidants has been shown to help regulate this system and so improve health. If this balance is lost, this would harm the cells, tissues, organs and finally the body as a whole. The amount of antioxidant activity a honey has is determined by the geographical and botanical origin of the honey itself. The antioxidant activity of honey has been correlated with the prevention of several disorders such as cardiovascular diseases, diabetes and cancer.

Cancer treatment usually involves drugs which induce breakdown of cancerous cells. Honey has a similar effect in disrupting structures within cancerous cells and stimulating the cells' destruction. Honey also stimulates the expression of the p53 protein, which induces cancerous cell breakdown. Consequently, honey is thought to prevent cancer due to its activity against physical and chemical mutagens. As for other findings, this has only been shown during *in vitro* studies and is yet to be confirmed in animal and human studies.

While *in vitro* and *in vivo* experiments give a good idea on the potential therapeutic effects of honey, it is unwise to conclude that the same is true for human use. More research and most importantly more clinical trials are needed to evaluate the use of honey in medicine. A lot of potential exists surrounding apitherapy, especially with regards to honey's potential role in treating multidrug resistant infections. Although in recent years there were huge advancements in understanding the role and physiology of apitherapy, the need to delve deeper and expand upon this knowledge is still felt and more research is needed to fully understand how nature's original sweetener actually works.

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