

# Unlocking the Healing Powers of *Aşl Khāliš* (Honey): Exploring Its Functional and Therapeutic Potential

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## Abstract

**Background:** *Aşl Khāliš* (honey) as a natural product has grabbed the attention of researchers as a reciprocal and indispensable remedy. Honey has been used to heal both internal and external ailments for much longer than medicine has existed. Unani scholars have mentioned its action in classical literature as a nutritional agent, as well as a natural food supplement with therapeutic antibacterial, anti-inflammatory, cleansing, deobstruent, lithotryptic, and wound-healing properties. According to contemporary scientific literature, honey contains two primary bioactive compounds that function as antioxidants, e.g., flavonoids and phenols. **Aim:** We need to assess the therapeutic potential of honey (*Aşl Khāliš*) from historical and scientific viewpoints focusing on its medicinal advantages and associated risks, while underscoring the necessity for clinical validation to ensure its safe application in contemporary medicine. **Methodology:** In this study, we have presented an extensive review of the historical applications, classifications, physical properties, bioactive components, and pharmacological effects of honey. The data were selected from the classical Greek literature and prominent scientific databases. There exists a vast amount of information concerning the diverse therapeutic properties of honey, making it challenging to derive practical insights. Therefore, in this study, we have aimed to condense the elements that are most pertinent to clinical use. **Conclusion:** Unani scholars have mentioned its action in classical literature as a nutritional agent, as well as a natural food supplement with therapeutic antibacterial, anti-inflammatory, cleansing, deobstruent, lithotryptic, and wound-healing properties. According to contemporary scientific literature, honey contains two primary bioactive compounds that function as antioxidants: flavonoids and phenols. The composition includes glucose, fructose, water, maltose, trisaccharides, sucrose, various minerals, proteins, vitamins, and enzymes. A highly helpful ingredient, honey has preventive properties against several illnesses and ailments, including diabetes mellitus, respiratory, gastrointestinal, cardiovascular, and nervous system disorders. It is also used for increasing the serum testosterone level and for the enhancement of fertility, and it is even helpful in cancer treatment.

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## INTRODUCTION

Honey, referred as '*Aşl*' in Arabic, *Angabin* in Persian, *Shehed* in Urdu, and *Madhu* in Hindi, is a delightful, primarily amber-hued viscous substance known for its exquisite flavor and recognized as one of the most prominent functional foods or *ghidha-i-dawai* [1]. It is the only consumable item that an insect produces. *Apis mellifera*, honeybees belonging to the *Melipona* and *Trigona* genera, are

called stingless bees, and they contribute to the natural production of honey [2]. *Apis mellifera*, a special kind of honeybee, generates two types of honey: blossom honey, which is created from nectar secreted by flowers, and honeydew honey, sometimes called forest honey, which is made from honeydew produced by insects, like aphids, that graze on plants. The bee is skilled in gathering nectar or honey from flowers or other plant sources and storing it in hives; this process takes three to six weeks. It is usually collected twice a year, in June, August, or September [3].

*Based on different characteristics, honey can be divided into various classes like [4]:*

- Based on Bee species.
- Based on type of flower.
- Based on Nectar source.
- Based on color intensity.

*We get three types of honey*

- Honey of citrons.
- Honey of clover.
- Honey of cotton.

It has been used as a flavoring and sweetening agent in a variety of foods and drinks for a very long time by humans. Since ancient times, it has been valued for its nutritional and therapeutic properties [5].

## **HISTORICAL ASPECTS OF CONSUMPTION AND USES OF HONEY**

Honey is one of those remedies that is used both as food and as a treatment. Through the course of the history of mortal civilization, feeding habits also evolved along with the development and advancements of civilization. Several staple foods, particularly wheat, rice, sludge, and different kinds of vegetables and fruits, became a part of mortal food with the emergence of Agrarian practices when groups of humans started settling down. All these practices, including agreements, husbandry, and beast parentage, substantially revolve around the assurance of food and safety [6]. New methods were developed to process food in different ways and became a mark of identification for artistic communities. Honey is a similar kind of major food that does not need any processing. It remains sweet, delicious, and energy-rich indeed in its natural form. It can also be used as a natural sweetener to make certain sweet dishes. It surely attracted humans due to its agreeableness and energy-thick nature. The use of it as food by humans' dates to the Stone Age. It remains a major source of energy for ethnic people around the world. Mesopotamian people used to offer it to divinities and consumed it as food. Beeswax, another important commodity related to it, is also utilized as fuel, for waterproof boats, and in religious ceremonies [7].

The foremost evidence dates to the seventh Renaissance BCE in the Neolithic period in present-day Anatolia, Turkey. Around 2500 BCE, Egyptians started beekeeping to produce honey and beeswax for colorful purposes. During excavations of conglomerations and sepultures, archaeologists have set up the world's oldest samples of honey in pots, approximately 3000 years old, interestingly in comestible condition. All major religious textbooks have little mention of it and indicate its significance for mortal well-being [8].

## **METHODOLOGY**

In this study, we have presented an extensive review of the historical applications, classifications, physical properties, bioactive components, and pharmacological effects of honey. The data was selected from classical Greek literature and prominent scientific databases. There exists a vast amount of information concerning the diverse therapeutic properties of honey, making it challenging to derive practical insights. Therefore, in this study, we have aimed to condense the elements that are most pertinent to clinical use.

## **PHYSICAL PROPERTY OF HONEY**

Honey has several physical properties that make it a better natural sweetener and functional ingredient in food systems. The Pfund scale is used to rate the color, which can vary and can be seen as being colorless to dark amber in color. The color is mostly based on the type of flower it comes from. Honey is very thick, and its flow depends on the temperature, sugar content, and water content. This makes it great for keeping moisture in cooking [9].

Honey is denser than water, with a density of 1.38–1.45 g/cm<sup>3</sup>. This helps to keep things fresh. It also absorbs moisture from the air, which helps it work as a natural humectant but means it needs to be stored carefully to keep it from fermenting [9].

Honey crystallization occurs naturally, influenced by glucose content and temperature. This process affects the texture but does not affect safety or quality. The pH of honey generally ranges from 3.4 to 6.1, and its natural acidity increases shelf life and antimicrobial activity [9].

## **NUTRITIONAL PROPERTY AND CHEMICAL COMPOSITION OF HONEY**

The composition primarily differs based on the floral source; however, seasonal and environmental factors, along with processing parameters, also have a big impact. The principal components of honey include water (17.1%), carbohydrate (82.4%), vitamins, minerals, amino acids and various other compounds (0.5%). Approximately, 181 different composites have been categorized, which vary according to diverse factors, such as geographical origin, flower types, and season of production [10].

### **Carbohydrates**

The primary ingredient in honey is carbohydrates, constituting approximately 82% of their overall makeup. These carbohydrates consist of monosaccharides like fructose (38.2%) and glucose (31%), as well as disaccharides, such as sucrose, maltose, isomaltose, maltulose, turanose, and kojibiose (9%). Furthermore, honey has 4.2% oligosaccharides, which include loze, tenderize, and pinose, formed through the partial hydrolysis of complex saccharides found in nectar and honey [11].

### **Amino Acids and Protein**

A variety of enzymes are found in it, similar to invertase, which breaks down sucrose into glucose and fructose; amylase, which breaks down starch into lower units; glucose oxidase, which breaks down glucose into gluconolactone, which yields gluconic acid and hydrogen peroxide; catalase, which breaks down the peroxide formed by glucose oxidase into water and oxygen, and acid phosphorylase, which separates inorganic phosphate from organic phosphates. Furthermore, it has eighteen free amino acids, the most abundant one is proline [12].

### **Minerals, Vitamins, and Antioxidants**

Vitamins B, such as riboflavin, niacin, folic acid, pantothenic acid, and vitamin B6, are each present in trace quantities in it. It also contains ascorbic acid (vitamin C), together with minerals, calcium, iron, zinc, potassium, phosphorous, magnesium, selenium, chromium, and manganese. The primary class of honey's antioxidants are flavonoids, of which honey and freak propolis are the only sources of pinocembrin. Other antioxidants include selenium, ascorbic acid, and catalase [13].

### **Other Compounds**

Along with a variety of sweet acids, it also contains organic acids like acetic, butanoic, formic, citric, succinic, lactic, malic, pyroglutamic, and gluconic acids. Gluconic acid is the main acid present here and is created when glucose oxidase breaks down glucose. Also, it contains hydroxymethylfurfural, a natural derivate of simple sugars breaking down below pH 5 [11, 12].

## **MEDICINAL PROPERTIES OF HONEY**

It is also known to possess a strong antioxidant capacity, which acts in modulating free radical products, therefore, guarding cell factors from their dangerous action [3].

### **Anti-Inflammatory**

It has antibacterial and anti-inflammatory effects with an advanced healing grade and improve skin graft adherence. It significantly decreases the infection rate on the 5th day of the injury and decreases pain and hospital stay. Moreover, it has durable, tenacious characteristics for skin graft obsession with minimal graft compression [14].

### **Antibacterial, Antiviral and Anti-Parasitic Activity**

It is used therapeutically in ultramodern medications. Scientists studying biology and pharmacology must determine which flower species have antimicrobial properties [13, 15–16]. It is an ancient remedy for the treatment of infected injuries, which has lately been “rediscovered” by the medical profession, particularly where conventional ultramodern remedial agents fail. The first written reference to it is a Sumerian tablet document, dating back to 2100–2000 BC, which mentions its use as medicine and an ointment. Aristotle (384–322 BC), when arguing about different kinds of honey, referred to pale honey as being “good as a dressing for sore eyes and injuries”. Manuka honey is a promising functional food for the treatment of wounds or stomach ulcers since it has been shown to have antibacterial action against pathogenic bacteria like *Helicobacter pylori* (*H. pylori*) and *Staphylococcus aureus* (*S. aureus*) [13, 17].

### **Cough Reducing**

Cough is a major concern for all people and one of the most common complaints presented consistently to almost all general practitioners, most common in children linked to multi-factorial etio-pathological causes. A lot of relief has been seen in cough with the use of honey. According to modern research, it has found that the use of honey has provided symptomatic relief and reduced cough [5].

### **Wound Healing**

According to historical scientific literature, honey has many medicinal values. Its ability to heal wounds is primarily attributed to its antibacterial activity, ability to keep wounds moist, and its high viscosity, which acts as a protective barrier to keeping infections at bay [13].

### **In Diabetes**

A low glycemic index of honey was found effective in controlling blood sugar levels in diabetes as well as in normal subjects as compared to sucrose and glucose [18].

### **In Cancer**

Honey possesses antiproliferative, apoptotic, mitochondrial membrane depolarization, anti-mutagenic, and immunomodulatory actions that might be attributed to its anticarcinogenic effect. Exploration of it in the treatment of cancer is relatively in the infancy stage; therefore, more studies are warranted to investigate its mechanistic role as an anticancerous mixture [6].

### **In Asthma**

Honey is very effective in treating cough and fever and has been recorded as a common cough and fever medication in folk medicine. It has shown the ability to prevent the induction of asthma and reduce chronic asthma-related symptoms [19].

### **In Cardiovascular Diseases**

It is an excellent antioxidant, reduces cardiovascular risk by lowering hyperlipidemia and oxidative stress, (a) it is a good vasodilator, (b) it inhibits platelet aggregation to make a clot, and (c) it prevents oxidation of low-density lipoproteins (LDL) [6].

### **In Neurological Diseases**

Several studies have proposed neuroprotective properties of honey-derived polyphenols. It has been proven to have antidepressant, anticonvulsant, antinociceptive, anxiolytic, and antioxidant properties [6].

### **In Gastrointestinal Diseases**

Honey consumption has been shown to prevent gastrointestinal disorders, such as *Helicobacter pylori*-induced gastritis, duodenitis, and gastric ulcers [6].

### **Improves Serum Testosterone Levels and Increases Sperm Count**

It is well known that it contains a lot of vitamin B, which is necessary for the synthesis of testosterone. Some literature acknowledges a positive relationship between testosterone concentration and honey consumption. It has been suggested that because of its high nitric oxide content, which is chemically involved in vasodilatation, it can cause and enhance erection in men who suffer from impotence or dysfunctional erection. Studies show that eating 100 grams of honey can increase blood nitric oxide levels by up to 50%. According to complementary and alternative medicine beliefs, it strengthens women's ovaries and uteri and enhances the quality of men's sperm [20].

### **Enhancement in Infertility**

Researchers from a different group have demonstrated that couples who were having problems conceiving naturally experienced better results when they applied royal jelly and bee honey vaginally around the time of sexual activity [21].

## **LIMITATIONS AND RISKS OF HONEY AS A MEDICAL AGENT**

### **Heavy Metal Contamination**

Environmental pollution and industrial operations can cause honey to build lead, cadmium, mercury, and arsenic among many other heavy metals. These metals can damage many organs including the nervous system, kidneys, and liver; they are cancer-causing. Because of their growing systems and greater ingestion relative to body weight, youngsters are especially at risk [22].

### **Pesticide Residues**

Honey might have pesticide residues from beekeeping and farming methods. These leftovers might be hazardous; their effects might vary from skin irritation to more severe health problems including cancer and neurological diseases. Research in India have found raw honey samples include HCH, DDT, and malathion pesticides [23].

### **Antibiotic Residues**

Beekeeping's antibiotic usage might result in honey residues. These leftovers could aggravate antibiotic resistance, liver and kidney toxicity, and other health issues. Honey's antibiotic presence is a worldwide concern; certain nations forbid or limit its usage [17].

### **Allergic Responses**

Honey can trigger allergic responses, especially in people who are allergy-sensitive to pollens. Anaphylaxis was reported in a 5-year-old kid after eating handmade honey, presumably because of cross-reactivity with Compositae pollen [24].

### **Infant Botulism**

Particularly raw honey might have *Clostridium botulin* spores, which can cause infant botulism in infants under 12 months old. This illness impacts the nervous system and can cause muscular weakness, feeding challenges, and perhaps death [24].

### **Some Plant Sources of Toxic Compounds**

Honey from plants, such *Rhododendron ponticum* or Andromeda species, may have poisonous substances including grayanotoxins. Eating such honey can cause symptoms ranging from nausea and vertigo to paralysis and death [25].

## **CONCLUSIONS**

*Aşl Khāliş* (Honey), a natural substance has been used for medicinal and nutritional purposes since ancient times. Due to the validation of ethno-pharmacological claims, scientists also accept it as a new

effective medicine for many conditions. It is well known Modern research and observations show that honey is largely nutritive with promising properties of antioxidant, anti-inflammatory, anti-bacterial protect against cancer and wound healing as well as cough-reducing characteristics. It is a sufficient and valuable dietary supplement which improves the serum testosterone concentration, sperm count, and enhances fertility. Honey has high bioactive chemicals like flavonoids, phenols, enzymes, and minerals. It has therapeutic benefits for many diseases like diabetes, GIT diseases, cardiovascular, neurological, and reproductive ailments. Despite those concerns, such as heavy metal contamination, pesticide residues, antibiotic residues, allergic reactions and neonatal botulism highlight the necessity for prudent sourcing and responsible usage. The foremost concern in the medicinal application of it in modern medicine is variation in its composition and lack of clinical trials. In principle, it is suggested that other actions of *Aşl Khāliş* mentioned by Unani physicians in classical literature should be evaluated and further researched by the researchers.

### Authors' Contributions

All authors are involved in the searching of data and writing the manuscript. All authors read and approved of the final manuscript.

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### Conflicts of Interest

The authors of this manuscript declare that they have no conflicts of interest.

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