

CHEMICAL COMPOUNDS OF HONEY IN THE QUR'AN

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ABSTRACT

Qur'an surah An-Nahl verses 68 and 69 provide information about the nature of bees and their benefits for human life. Allah inspires bees to build nests and find food in trees, mountains, and places made by humans. This study aims to examine scientific information on bees in Surah An-Nahl verses 68 and 69. The research method is library research. The results showed that bees in Surah An-Nahl verses 68 and 69 produce honey, have a good life, have great teamwork, and give benefits to human life. Bee gives people good role models for human society, teamwork, and lifestyle. In science, bees produce pheromone chemical compounds that play a role in communication between bees in the colony. The pheromones produced by the queen bee can regulate the male bees and worker bees to be loyal to the queen bee and carry out their duties well. Qur'an Surah An-Nahl verses 68 and 69 give us information about the bee and honey. Allah gives a message to people to live like a bee to have a good social, good lifestyle, don't destroy the environment, and give benefits to people like honey. Rasullullah advised us to consume honey for treatment. Honey functions as an antioxidant, anticancer, and energy source, healthy heart, control sugar level, and maintain a healthy body. Bee food is nectar, good nectar will produce high-quality honey. Chemical compounds that are often found in honey like glucose, flavonoid, alkaloid, saponin, and glycoside.

Keywords: Chemical compounds, bee, honey, Qur'an

INTRODUCTION

Every Muslim must believe what is in the Qur'an and implement it in his daily life. The Qur'an is a revelation from Allah which was conveyed to the Prophet Muhammad through the intermediary of the angel Gabriel (Jahangir, 2019). The verses in the Qur'an are a guide for humans to carry out the process of life in the world. The information in the Qur'an is true and must be believed by all the people of the Prophet. Information about science in the life of this world and knowledge about life after death is a very accurate reference because it comes from Allah who rules the heavens and the earth (Al Hafiz et al., 2016)

A lot of scientific information from the Qur'an helps humans in research in the fields of medicine, physics, chemistry, biology, astronomy, mathematics, psychology, politics, and so on (Mukri et al., 2019). The information inspires humans to do good and useful things for humans. When Allah swears on something or Allah gives the names of animals in the names of

the Surahs of the Qur'an then there is wisdom that humans need to learn. In the 16th sura, Allah uses the name An-Nahl which means bee. There must be wisdom, lessons, and benefits that Allah gives to humans through bees (Haris, 2013).

Allah gave revelations to bees to make nests and produce honey that is useful for humans (Šarić et al., 2020). In chemistry, it turns out that the honey produced has chemical compounds such as flavonoids (Pyrzynska & Biesaga, 2009). These compounds are very useful for human health such as antioxidants, anti-cancer, and neutralizing free radicals (Masad et al., 2021) (Silva et al., 2021).

The existence of honey is proof of God's love for humans for people who want to think. It is very interesting to examine the wisdom and features of honey from the point of view of the Qur'an. The benefits of honey for herbal medicine provide an alternative for the community to always live a healthy life and be grateful for the blessings that Allah has given (Martinotti & Ranzato, 2018; Meo et al., 2017; Tauber et al., 2019). Therefore it is very important to study honey from the point of view of the Qur'an and science so that there is scientific evidence about the chemical compounds in honey that are privileged in the Qur'an.

RESEARCH METHOD

This research is library research, literature by collecting data from several references related to the research theme. References used such as journals. Meanwhile, the data analysis technique used in this research is the concentration analysis technique. This method is a data analysis technique that is carried out with the aim of making a conclusion by identifying information from journals about chemical compounds, bee characters and the benefits of bees for humans based on Surah An-Nahl verses 68-69 in the Qur'an.

RESULTS AND DISCUSSION

The Content of Surah An-Nahl 68-69

The Qur'an contains many features that humans cannot match. The verses in the Qur'an have a high quality of language and meaning (M. Ahmad, 2016). The uniqueness of the names of the surahs in the Qur'an is also beyond the reach of human creativity. It shows how weak humans are and how powerful Allah is (Djamdjuri & Kamilah, 2021). The Qur'an is a guide for humans to be safe in this world and the hereafter. Al-Qur'an consists of 114 surahs. Some surahs use animal names such as surah Al-Baqarah (cow), surah An-Naml (ant), surah Al-Ankabut (spider), surah Al-Fil (elephant), and surah An-Nahl (bee) (Geoffroy, 2013). Some of the animal names listed in the Qur'an have many features that can be used for learning for

humans. Allah uses the names of animals for the parables of human nature and is a source of knowledge for those who think.

The 16th sura in the Qur'an is surah An-Nahl which means bee. Surah An-Nahl consists of 128 verses and belongs to the Makkiyah surah type. Allah gave revelations to bees directly to make nests and provide benefits to humans. This makes the bee its specialty (Ahmad Hilmi et al., 2016). In Surah An-Nahl verses 68-69 Allah says:

"And your Lord inspired the bee, "take for yourself among the mountains, houses, and among the trees and (in) that which they construct. Then eat from all the fruits and follow the ways of your Lord laid down (for you)." There emerges from their bellies a drink, varying in colors, in which there is healing for people. Indeed that is a sign of a person who gives thought.

Allah inspires bees to build nests, find food, and obey Allah. These activities can be an example for humans in running their lives. Choosing a place to live is a very important thing for human life. The environment will have a big impact on human development. Environmental factors influence the character and habits of humans (Liu et al., 2021). Therefore, humans need to choose a good place to live and be blessed by Allah. Bees are inspired to eat only certain foods. This teaches humans to eat only halal food and stay away from haram. Food factors will affect the human body's metabolic system, brain, behavior, and human psychology (Musdja, 2018) (Farid & Basri, 2020). Food will also affect the cleanliness of the hearts and souls of humans in carrying out their roles as servants of Allah. If a lot of unclean food enters the human body, the heart and soul will be dirty so there is a barrier to getting close to Allah. This can also make it difficult for someone to get guidance and hinder prayer (Kashim et al., 2018).

The type of food also needs to be considered, although it is halal, it is not necessarily good for consumption. Salt is good for improving the taste of food, but salt is not good for people with hypertension (Bock, 2009; de Beus et al., 2017). Likewise, with sugar, sugar can increase energy in the body but is not good for people with diabetes (Sneed et al., 2019). Islam is very concerned about the pattern of human life from big things to small things. All aspects of this life need to be carried out according to Allah's instructions so that we are safe in this world and the hereafter.

Surah An-Nahl contains several important things about faith such as the certainty of the coming of the Day of Judgment, monotheism, and the day of reckoning for all the deeds that humans have done. The field of law is also discussed in Surah An-Nahl including the law of halal food and drink, it is permissible to use jewelry from the ocean. The law is allowed to eat forbidden food in an emergency. The law must fulfill the promise and the prohibition of playing the oath. In addition, humans are also ordered to read isti'adzah as a prayer to seek

refuge in Allah from the devil, the real enemy of humans (Muiz et al., 2018). The type of insect whose name is used as the name of a sura in the Qur'an is a bee in Arabic called Nahl. Especially, Allah gave the name An-Nahl in the 16th chapter. Of course, there are certainly many lessons that humans can learn from bees, such as the nature of bees and their benefits for humans. In Surah An-Nahl verses 68-69, Allah teaches humans about the nature of bees. Bees have good qualities for humans to imitate (Haris, 2013; Humairaa et al., 2020; Kamarulzaidi et al., 2014)

Bees obey Allah's commands, bees build their nests according to Allah's orders. Often found beehives in the mountains, trees, and places made by humans. Obedience to Allah will bring blessings to humans in carrying out this life. Humans need guidelines in living the wheel of life because every action they do will be rewarded in the afterlife (Humairaa et al., 2020). Bees provide many benefits to the environment. Bees care for and preserve biodiversity. Bees benefit plants more than the amount of nectar taken from flowers. Maintaining relationships with partners is as important as a bee and flower relationship that is mutually beneficial. When you focus more on giving than demanding, human relationships with other humans will be more harmonious (Pourbafrani et al., 2014) (Lavery, 1994).

Bees only take nectar from flowers that have not been taken by other bees. It teaches humans not to take the rights of others. When making a living, humans often put other humans down for worldly benefits. We often encounter in the business world, many individuals who snatch customers from their business partners and end up with hostility. Of course, that is not the nature of people who believe in Allah (Lavery, 1994; Pamminer et al., 2019; Portman et al., 2021). Bees teach humans to take care of the flowers they infest. Bees do not demand too much from flowers, take nectar as needed, and do not damage flowers (Seeley & Tovey, 1994) (Pamminer et al., 2019). Humans need self-introspection in how much we demand others to be following our wishes. This can cause others to be depressed, uncomfortable, and hurt.

Bees are humble and not envious. Worker bees are the busiest and hardest bees but they don't complain and don't envy the queen bees and male bees, and vice versa. Each bee does its job well. Focus on work and positive things to be important in the bee colony. Bees work together and help each other for the common good (Stabentheiner et al., 2010). Halal and food hygiene is important for bees. Bees seek nectar from viable flowers, not young flowers that have not yet bloomed. Bees also do not take nectar from flowers that are already occupied by other bees. Bees look for good quality flowers like flowers that are fresh and clean. No flowers are damaged or destroyed after being infested by bees. This shows that bees are not greedy and

greedy, just take the nectar as needed and then go to another flower (Iwasaki et al., 2020) (Rodney & Kramer, 2020).

What about humans? God told people to eat halal and good food. Halal in terms of nutrients and how to obtain them. Food that is halal or haram will affect the human heart. Halal food will cleanse the heart and make it easy to be close to God. While forbidden food can pollute the human heart and distance oneself from Allah (Wilkins et al., 2019).

Miracle of Bee

Bees are insects that live in colonies and have a queen. Bees have very good complementary social properties. The nature of the bee's cooperation is a good example for humans in carrying out this life. There are several types of bees in a colony, namely queen bees, male bees, and worker bees. One colony consists of one queen bee, hundreds of male bees, and tens of thousands of worker bees (Mohammad et al., 2021).

Each bee has a different task and function. The queen bee has a very important role in the bee colony. The queen bee serves to lay eggs and regulate the survival of the bee colony. The queen bee has a bodyguard in the form of worker bees who are in charge of feeding and taking care of the needs of the queen bee (De Souza et al., 2019). Queen bees have a larger physical size than male bees and worker bees. The queen has a sting that can be used many times. The lifespan of a queen bee can be up to one year (Yelin & Kuntadi, 2019). The queen bee has many male bees that are needed for mating. The size of the male bee is slightly smaller than the queen bee but larger than the worker bee. Male bees are lazy bees whose job is to chase the queen bee to mate. All the needs of the male bees are provided by the worker bees. Male bees are unique in that they do not have a sting. Male bees live only a few months and die after mating with the queen bee (Belsky et al., 2020; Tang et al., 2019).

The bees that have the toughest jobs are the worker bees. Unlike the queen bee, worker bees are female bees that cannot lay eggs and are the most numerous in the colony. The body size of worker bees is smaller than that of queen bees and male bees (Klein et al., 2008). Worker bees have many tasks such as feeding the queen bee and larvae, looking for food in the form of nectar and pollen, looking for water needs, building nests, storing honey, and taking care of the queen bee. Worker bees are disciplined, tenacious, diligent, aggressive, and hardworking bees. The lifespan of a worker bee is about 6 weeks. Worker bees have stings but worker bees die once they sting (Belsky et al., 2020; Klein et al., 2008; Tang et al., 2019).

Honey bees have an important role in the quality and quantity of honey production. All types of honey bees are grouped in the kingdom Animalia, phylum Arthropoda, subphylum Mandibulata, class Insecta, subclass Pterygota, order Hymenoptera, suborder Cheistograsta,

family Apidae, and genus *Apis* (Melo, 2014; Melo & Gonçalves, 2005). Honeybees have several types of species, namely *Apis dorsata*, *Apis mellifera*, *Apis cerana*, and *Apis trigona* (Ilyasov et al., 2020). Bees provide many benefits for the survival of life in this world. Bees help keep the plant cycle through the pollination process. Several types of plants can self-pollinate and some plants are pollinated by wind or animals. Worker bees whose job is to find nectar from one flower to another will carry the anthers (male part of the flower) to the stigma (female part of the flower). When the anthers meet the pistil, the pollination process will occur (Khalifa et al., 2021; MacInnis & Forrest, 2019; Vallejo-Marín, 2019).

Chemical Compound of Bee

The bee colony is led by the queen bee, all the bees will obey the queen bee's orders. There are chemical compounds produced by queen bees to convey messages to male and worker bees. The compound is known as a pheromone. This chemical compound influences worker bees to obediently serve the needs of the queen bee, find food, build a nest, and remain loyal to the leadership of the queen bee (Alavez-Rosas et al., 2019; Wang & Tan, 2019). Pheromones can be produced by both male and female bees. The smell of pheromones released by female bees can be detected by male bees over long distances, even miles away. The pheromone can stimulate the sexuality of the bee, the male bee will follow the scent of the pheromone until it reaches the sending female bee (Jarriault & Mercer, 2012; Maisonnasse et al., 2010). The chemical structure of pheromones is shown in the figure.1

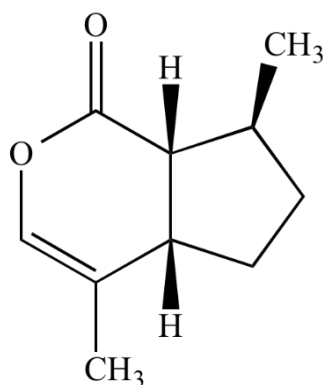


Figure 1. Chemical structure of the pheromone

Pheromones can also serve to convey messages or signals to other bees about the information on areas or places of food. Pheromones are useful for bee colonies to unite in the way of life (Wang & Tan, 2019). The aggressive movement of bees when there is an external threat is an indicator that the bees have good communication to defend their territory. Bees are animals that will not disturb, but if they feel threatened, the bees will respond to the threat with a counterattack by the worker bees (Nguyen et al., 2021; Yan & Liebig, 2021).

Chemical Compounds of Honey

Honey is a creation of Allah which is very useful for humans. Honey is made by bees from various sources of nectar. Worker bees collect flower nectar and then process it in the hive to make honey (Girma Tura & Bersissa Seboka, 2020). The nectar collected by bees comes from various types of flowers so the honey produced is also not the same. Differences in the source of nectar will affect the quality of the honey produced, such as the quality of color, taste, aroma, and efficacy (Girma Tura & Bersissa Seboka, 2020; Goggin & Baillie, 2021). Some of the main chemical compounds in nectar are sucrose, fructose, and glucose (R. S. Ahmad et al., 2017; Yelin & Kuntadi, 2019). Allah inspired the bees to produce honey. Allah gave a special substance to bees, namely saliva (Khalifa et al., 2020). The liquid has an invertase enzyme that can convert nectar into honey. The invertase enzyme functions to hydrolyze sucrose into glucose and fructose (Bakour et al., 2022; De la Cruz-Cervantes et al., 2018).

Bees secrete saliva when sucking nectar from flowers. When the nectar comes into contact with saliva, the enzyme interface immediately works to convert the nectar into honey. Then the bees carry it to the hive. The bees will improve the quality of the new honey by reducing the water content and ripening it in the hive (Erdem et al., 2020). The concentration of these chemical compounds is sometimes different from each honey produced. It is strongly influenced by the nectar collected by the bees (Adgaba et al., 2017; Sanderson et al., 2013). Some chemicals that are often found in honey are glucose, flavonoids, alkaloids, and phenolics (R. S. Ahmad et al., 2017; Syafrizal et al., 2020; Yelin & Kuntadi, 2019). The chemical structure of glucose, flavonoids, alkaloids, and phenolic are shown in figure.2.

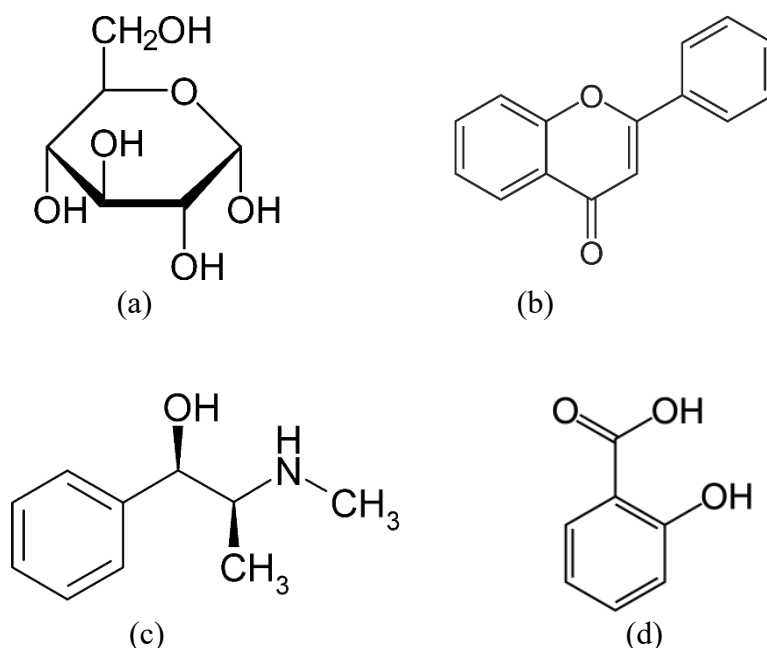


Figure 2. Chemical structure of glucose (a), flavonoid (b), alkaloid (c), and phenolic (d)

Honey is often used for herbal medicine. Prophet Muhammad advised us to consume honey to maintain health and treatment (Cinkara, 2019; Erdem et al., 2020; Goggin & Baillie, 2021; Martinotti & Ranzato, 2018; Miguel et al., 2017). Prophet Muhammad said:

”(The Prophet said), Healing is in three things: A gulp of honey, cupping, and branding with fire (cauterizing). But I forbid my followers to use (cauterization) branding with fire” (sahih Bukhari no. 5680).

The chemical content in honey can ward off free radicals that enter the human body. Every day the human body is exposed to pollution that can reduce health. Honey can repair damaged cells so that it can accelerate cell regeneration. Consuming honey regularly can increase the body's immune system and treat sugar levels, hypertension, and heart disease (Azman & Zakaria, 2019; Cinkara, 2019; Dzugan et al., 2018; Erdem et al., 2020; Erejuwa et al., 2012; Goggin & Baillie, 2021; Gül & Pehlivan, 2018; Lewoyehu & Amare, 2019; Martinotti & Ranzato, 2018; Miguel et al., 2017). The many benefits that Allah has given to bees should make people think about Allah's power and human weakness. The character possessed by bees can be a lesson for humans to always give the best and be useful to others

CONCLUSION

Allah gave special privileges to bees to provide broad benefits for humans and environmental sustainability. The Qur'an Surah An-Nahl verses 68 and 69 provide a lot of scientific information about the chemical compounds of honey. The pheromones produced by bees can function to communicate in the colony and seek nectar. Chemical compounds that are good for health are also found in honey. They are glucose, flavonoid, alkaloid, and phenolic. Honey is useful for antioxidants, sources of energy, medicine for diabetes, medicine for hypertension, and a healthy heart.

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