The Origin of Life From a Chemical Perspective

Interdisciplinary Study of The Qur'an

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Abstract:

This article examines the origins of life using an interdisciplinary approach, combining the perspectives of the Qur'an and chemistry, particularly the Oparin-Haldana theory of chemical evolution. This study is motivated by the need to integrate science and revelation to address modernist accusations that religion is irrelevant to scientific development. This research uses a qualitative method with a literature review, collecting data from classical interpretations, scientific literature, and modern research. The results show that the Qur'an emphasizes water as the source of life, as stated in Surah al-Anbiya' verse 30, al-Baqarah verse 164, and an-Nur verse 45. This view aligns with the Oparin-Haldana theory, which explains that chemical elements in Earth's early atmosphere reacted to form organic compounds through the role of water and energy. Furthermore, research by Daly et al. (2021) strengthens this theory by finding that water can also originate from asteroid particles exposed to the solar wind. Thus, both the Qur'an and modern science demonstrate conceptual harmony that water is a fundamental element for the birth of life, although they differ in their explanatory mechanisms. This study emphasizes the importance of an interdisciplinary approach in understanding the relationship between revelation and modern science.

Keywords—Origin of Life; Chemical; Qur'an

I. INTRODUCTION

The Qur'an should be our concern, especially for Muslims in this modern era, one of which is interpreting or criticizing the interpretations of others whose object of study is the Qur'an, because previously the Qur'an was only seen as a truth value which resulted in people who had different opinions with other people, both from Islam and non-Islam, would cause violence (Izadi & Farideh, 2014). Modernists view religious people not only reduce violence but also make it worse. Therefore, to refute the accusations made by modernists, we must take part in discussions on other sciences that can be compared with the Qur'an (Schwehn, 1993).

How can we contribute by integrating other sciences based on the Qur'an? Interdisciplinary studies are a solution. Interdisciplinary studies are an approach that connects the Qur'an and other sciences to understand a phenomenon. This means that the contents of the Qur'an can be extracted and then represented from the perspective of other sciences (Anisa & Khoiruddin, 2023).

To understand the entire text of the Qur'an is certainly not easy, because of the differences in language which is certainly very different from the current standard of Arabic, then the differences in cultural culture, and its historical period, besides that many studies have previously tried to integrate the Qur'an with other disciplines but failed, because apart from being complex, the context presented by the Qur'an is very rich (Barid et al., 2023).

The science that will be integrated in this article is chemistry, specifically to discuss Oparin & Haldana's theory regarding the origin of life from chemical evolution. This study is of interest due to the interest in contributing to the treasury of knowledge, especially among Muslims, because in the past five years, only a few have discussed the integration of the Qur'an with chemistry, let alone those that discuss or connect it with the Oparin-Haldana theory in this study.

From previous studies, there are 5 articles taken in this study that are still relevant to what will be discussed in the future, including articles from;

(Afifah, 2022), (Sani et al., 2023), (yusriyah et al., 2024), (Djurniyah & Andriani, 2024), (Fatah & Badrudin, 2025), which both discuss and examine the text of the Qur'an or hadith regarding the creation of living things including humans, things that are not mentioned in the previous articles, namely specifically raising the biochemical theory, namely the Oparin-Haldana theory, this shows that this study can be developed because of the novelty that will add knowledge in the problem of interdisciplinary studies of the Qur'an.

Therefore, there is a problem formulation, namely, what is the perspective of the Qur'an and Oparin's theory regarding the origin of life?, and what is the relationship between the origin of life in the perspective of the Qur'an and Oparin's theory?, from the problem formulation, the aim of this study is to describe the perspective of the Qur'an and Oparin's theory regarding the origin of life, and also analyze the relationship between the origin of life in the perspective of the Qur'an and Oparin's theory.

II. EASE OF USE

In the context of this research, ease of use refers to the degree to which researchers can easily apply an interdisciplinary approach between the Qur'an and chemistry to explain the origins of life. This ease includes the ability to access classical exegetical sources and modern scientific literature, as well as the ability to understand scientific concepts (such as the Oparin-Haldana theory) with Qur'anic teachings without the need for complex methodological procedures. In other words, ease of use indicates that the integration of revealed texts and scientific theories can be carried out logically, systematically, and easily understood by readers and other researchers.

III. RESULTS AND DISCUSSION

A. *The perspective of the Qur'an and Oparin's theory regarding the origin of life*

In this section, the researcher will explain two points: the first regarding the verses about Water as the Source of Life, and the second regarding Oparin's theory regarding the origins of life.

There are actually quite a number of verses in the Qur'an that discuss the origins of creation from water. However, the author only takes three verses from the Qur'an: Surah al-Anbiya' verse 30, al-Baqarah verse 164, and an-Nur verse 45.

First about Surah al-Anbiya' verse 30 and its interpretation, the Qur'an says "Do the disbelievers not know that the heavens and the earth were of one piece, then We separated them and made every living thing from water? Will they not then believe?".

The interpretation of this verse according to Ibn Katsir, God reminds us of His power so that we do not blaspheme. God tells us about the creation of the universe that in the past the heavens and the earth were united, then God divided them into two and between the heavens and the earth were divided into seven parts, then separated by air so that rain in the form of water fell from the sky, and grew plants and other creatures so that it became proof that God is the Almighty Creator that humans can witness (Katsir, 2005).

In other verse al-Baqarah: 164 says "Indeed, in the creation of the heavens and the earth, the alternation of night and day in an ark that sails on the sea with (cargo) that is useful for humans, what Allah sent down from the sky in the form of water, then with it He gave life to the earth after it had died (dry), and He scattered in it all kinds of animals, and the controlled distribution of the winds and clouds between the heavens and the earth, (all of that) are truly signs (of Allah's greatness) for a people who understand".

The interpretation of this verse according to Ibn Katsir, this verse is similar to Surah Yasin verses 33-36, where God brings everything on earth to life from water, from the dead to life, such as grains, plants, and fruit, so that humans can use them for food.

Then, in the verse section starting from *wabatsa fiiha min kulli daabbah*, Ibn Katsir explains that among the plants and seeds that God brings to life, animals are also likewise, both small and large, of various colors, useful, where they know that they are brought to life by God, and remain under His control.

The last verse in this study is an-Nur: 45 that says "Allah created every kind of animal from water. Some of them crawl on their bellies, some on two legs, and some on four. Allah creates whatever He wills. Indeed, Allah has power over all things."

The interpretation of this verse according to Ibn Katsir, here God conveys His most perfect power and His Kingdom which has created all kinds of creatures in shape, color, appearance and movement

and they are all made from the water element (Katsir, 2004).

From several interpretations by Ibn Kathir, a scholar of interpretation, it can be seen that the interpretation of the Qur'an itself says that all life originates from the element of water, be it animals, plants, or all living things on earth, and Allah sends it through rain.

Now we talk about the Oparin-Haldana theory emerged in the 1920s, this theory suggests that organic substances are formed from abiogenic elements, namely elements that were originally dead. They say that when life first formed on earth, the earth experienced a reduction in its atmosphere at that time, and because of UV radiation, it resulted in the presence of oxygen containing some of which include ammonia (NH3), and water vapor (H2o), then underwent a chemical process to become basic organic elements into lipids or fats where this is a precursor or element needed with other compounds to form living cells (Oparin, 1952).

Oparin-Haldana argued that in the past the oceans contained warm water, and at that time the existing substances were heterotrophic, that is, they obtained nutrients that had existed in ancient times, and not autotrophic, that is, they produced nutrients. In the hypothesis carried out by these two people, finally on May 15, 1953, Harold C. Urey and Stanley L. Miller tested this theory by making a special test tube for this test and succeeded in proving the theory.

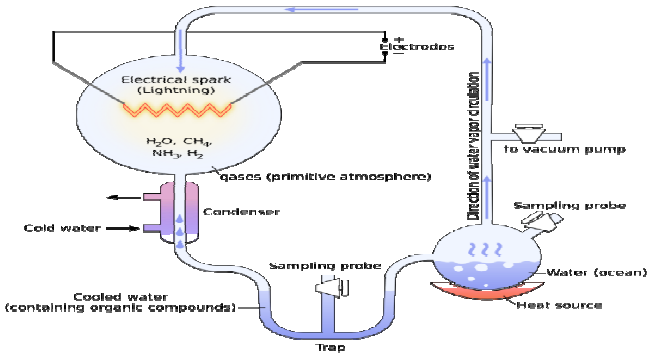

Fig. 1. Miller's test

This illustration is taken from Pinterest that water is made to boil as a simulation of the ocean in the prebiotic era (the second era before the earth was rich in oxygen) at that time, and evaporates, then mixes with other compounds such as ammonia, hydrogen, methane (CH4) which are simulated as the atmosphere of the primitive era, besides that UV rays are also produced by simulating the light produced from the spark of two electric lighters, then entering the cooling condenser, the final stage is just waiting for the coarservat droplets containing carbohydrate molecules, proteins containing acetic acid, amino acids, urea, lactic acid which are important organic compounds for the human body (Miller, 1953).

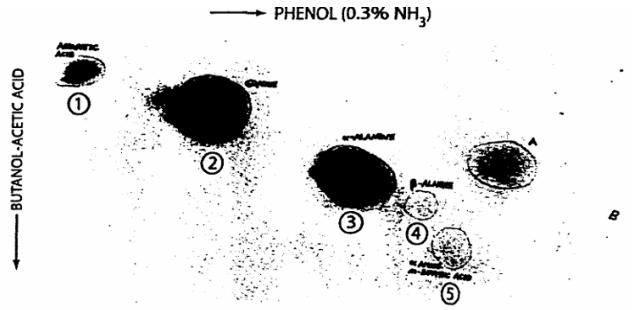

Fig. 2. formation of organic compounds

This chromatogram captured from Miller's book that provides visual evidence that simple organic molecules like amino acids—the basic building blocks of life—can form spontaneously from inorganic compounds under conditions resembling those of the primordial Earth. Miller's experimental results marked a significant milestone in the study of abiogenesis, the theory that life can arise through natural chemical processes without the intervention of preexisting living organisms (Miller, 1953).

B. The Relationship of Al-Qur'an Verses with the Oparin-Haldane Theory

From the text of the holy book of the Qur'an in Surah al-Anbiya' verse 30, al-Baqarah verse 164, and an-Nur verse 45, in short it explains that the creation of life on earth occurred when God wanted the heavens and the earth to be one, then split into two and between them were divided into seven parts, and separated by air so that it caused rain in the form of water to fall from the sky, from there God gave life to everything on earth, whether it was plants and animals, and then it was used by humans to be processed for the sake of their survival.the equation as a graphic and insert it into the text after your paper is styled.

When linked to Oparin's chemical theory, it shows that there is a connection that needs further explanation, in the surah al-Anbiya' verse 30 God says that when the division of the sky and the earth into seven parts there is a partition in the form of air that causes rain to fall, in Oparin's theory it also

states that the factor that has a large probability of rain occurring is because of the atmosphere which at that time experienced reduction due to exposure to UV rays from the sun, the next point that has relevance between the two is "water", in the Qur'an does not mention the process scientifically how the rain process occurs so that when viewed textually, the text of the Qur'an with this chemical theory has a little difference, because the fall of water according to the Qur'an comes from rain, but if in Oparin's theory, water actually already exists without rain, instead evaporation that occurs with the presence of the sun from there causes rain.

Surah al-Baqarah verse 164 adds that rain falls from "the sky." If the sky refers to outer space, this aligns with Daly's research, which states that asteroids carrying primary compounds to form water require a light isotopic reservoir, which is obtained through the solar wind. He believes this water reservoir is ubiquitous throughout the galaxy (Daly et al., 2021). Therefore, it is true that asteroids carry water elements, but they require the isotopic reservoirs Daly and others have argued.

If we continue to take the contents of Surah al-Baqarah verse 164 as stated by Daly, et al., then this verse is still relevant to the experiments conducted by Miller which strengthen Oparin's theory, so the water that was already there from the sky then evaporated and was reduced by sunlight (in Miller's practice it was replaced with light from a lamp) so that new compounds were formed when they fell which were "organic", and living things needed these compounds in the form of acetic acid, amino acids, and so on.

IV. CONCLUSION

From the study above, starting from the verses of the Qur'an which discuss the origin of life from water to the relationship between the verses of the Qur'an and the Oparin-Haldana theory, it leads to several conclusions, namely:

1) The creation of life on earth occurred when God wanted the heavens and the earth to become one, then split into two and between them each was divided into seven parts, and separated by air so that rain in the form of water fell from the sky, from there God gave life to everything on earth, whether it was plants or animals.

2) The verses of the Qur'an mentioned when juxtaposed with Oparin's chemical theory and Daly's research there is harmony between the Qur'anic explanation and modern science, namely that the atmosphere and water have a vital role in the origin of life. Oparin stated that the early atmosphere allowed the formation of water through chemical processes, while Daly suggests that water could have originated from asteroid dust particles exposed to the solar wind. Conceptually, there is harmony that water is the main element of life from both religious and scientific perspectives. The difference lies in the scientific and theological mechanisms, but both help explain where water and life on Earth originated.

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