

## Al – Jahiz’s Rational Epistemology : An Analysis of His Scientific Contribution to the Intellectual Dynamics of the Abbasid Dynasti

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### ABSTRACT

Islamic civilization during the abbasid era market the pinnacle of intellectual achievement, characterized by rapid advancements in science through the integration of Greek, Persian, and Indian traditions. In this context, Al-Jahiz emerged as a multidisciplinary thinker who combined rational and empirical approaches in his study aims to analyze the dynamics of knowledge development during the Abbasid era, to examine Al-Jahiz’s contributions, and to explore his rational epistemology. The research employs a qualitative approach based on library research using historical and philosophical methods, with the primary source being Kitab Al-Hayawan, analyzed through content analysis. The Abbasid era was supported by a conducive intellectual ecosystem, such as political support, freedom of thought, and openness to various scientific traditions.

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## 1. INTRODUCTION

The development of science in Islamic civilization reached its peak during the Abbasid Caliphate, often referred to as the golden age in the history of world intellectual thought. During this period, rapid progress occurred in various fields such as astronomy, mathematics, philosophy, and literature. This progress did not occur by chance but was the result of political policies that supported scientific activities, openness to various intellectual traditions, and intensive cross-cultural interactions. In this context, the development of science demonstrated the formation of a systematic scientific framework.

One of key characteristics of scientific development during the Abbasid era was the process of integrating various sources of knowledge through translation, adaptation, and the advancement of science. This process demonstrates that

knowledge in islam is constructed through active epistemological mechanisms namely, the interaction between rationality, empirical experience, and religious values. Thus, knowledge is not neutral but is shaped by the underlying worldview (Zackya & Moniruzzaman, 2023).

Within this intellectual environment, various Muslim scholars emerged who made multidisciplinary contributions. One prominent figure is Al-Jahiz, known for his rational and empirical approach to examining social, cultural, and natural phenomena. Through works such as *Kitab Al-Hayawan*, he demonstrated the use of observation as a method for understanding reality. Research by Christian Lange (2022) indicates that Al-Jahiz thought positions sensory experience as a crucial component in the formation of knowledge.

Epistemologically, Al-Jahiz's thought demonstrates an integration of reason (rationality), empirical experience, and revelatory values in the construction of knowledge. This approach reflects a form of rational epistemology that relies not only on logic but also on experience as a source of knowledge validation (Syafaq et al., 2024). Therefore, Al-Jahiz's thought is not only relevant in a historical context but also significant in the study of the epistemology of Islamic science.

In contemporary studies, the epistemology of Islamic science has once again garnered attention, particularly in efforts to integrate modern science with Islamic values. However, some research still emphasizes the scientific contributions of figures without thoroughly examining the epistemological aspects. This indicates a research gap, particularly in understanding the construction of Al-Jahiz's rational epistemology within the intellectual dynamics of the Abbasid era (Ulwania & Mutrofin, 2024). Based on this, this study aims to analyze Al-Jahiz's rational epistemology, examine his scientific methods in constructing knowledge, and identify his epistemological contributions to the Islamic intellectual tradition.

## **2. METHODS**

This study employs a qualitative approach using library research. This approach was chosen because the study aims to deeply analyze Al-Jahiz's rational epistemology and understand his contributions to the intellectual dynamics of the Abbasid caliphate.

The approaches employed include historical and philosophical approaches. The historical approach is used to trace the chronological development of science during the Abbasid period, including the social, political, and intellectual contexts underpinning it. Meanwhile, the philosophical approach is used to analyze the construction of Al-Jahiz's rational epistemology, which encompasses sources of knowledge, methods of thinking, and the validity of knowledge (Lange, 2022; Syafaq et al., 2024).

The data sources in this study consist of primary and secondary data. Primary data were obtained from Al-Jahiz's works, particularly the book *Al-Hayawan*, which exemplifies a rational and empirical approach to understanding natural phenomena. Secondary data was obtained from various scientific journals and academic literature relevant to Islamic epistemology, which affirm that science is influenced by specific epistemology frameworks (Zackya & Moniruzzaman, 2023).

Data collection was conducted through a literature review by identifying, collecting, and examining various relevant sources. Data analysis was conducted using content analysis, which includes data reduction, categorization, interpretation, and drawing conclusions. To ensure data validity, the researcher employed source triangulation by comparing different references to obtain accurate and verifiable data. Additionally, a cross check of the sources was conducted to ensure consistency of the information.

Through this method, the research not only focuses on historical description but also seeks to demonstrate that studies of classical figures are not merely retrospective but also hold relevance in addressing contemporary scientific challenges.

### **3. FINDINGS AND DISCUSSION**

#### **3.1 The Dynamics Of Scientific Development During The Abbasid Period**

##### **3.1.1 The Massive Translation Movement**

The development of science during the Abbasid era cannot be separated from the massive translation movement that systematically translated works from Greek, Persian, and Indian civilization into Arabic. This process involved not merely translation but also filtering, adaptation, and even critique of existing theories, thereby producing new knowledge better suited to the needs of the Islamic community at the time (Nispi Syahbani et al., 2025). One of the main centers of this activity was Bayt al-Hikmah in Baghdad, which served not only as a library but also as a research center, observatory, and organized translation hub. There, scholars from diverse backgrounds collaborated to advance knowledge collectively (Pratama et al., 2023).

Furthermore, this translation movement also received full support from the Abbasid caliphs, particularly al-Ma'mun. He provided facilities, funding, and protection for the scholars, enabling scientific activities to flourish rapidly. This support created a stable political environment as well as an open intellectual climate. In fact, scientific activities during that period were already regarded as part of civilization-building, not merely individual pursuits. In this regard, Bayt al-Hikmah became a symbol of Islamic intellectual progress, demonstrating that the development of science was significantly influenced by state policies and support (Erkan, 2025).

Furthermore, the translation movement during the Abbasid era also served as a vehicle for cultural exchange and the integration of knowledge from various civilization. Translators did not merely translate texts but also understood, developed, and even critiqued the content of those ideas. This demonstrates that the Islamic scientific tradition of that era was active and creative, not merely a replication of existing knowledge. From this process emerged various scientific advancements in the fields of philosophy, medicine, mathematics, and astronomy. This, the translation movement during the Abbasid era can be understood as a crucial foundation in building an integrative and sustainable Islamic scientific tradition (Aziz et al., 2025).

### **3.1.2 The Integration Of Science And The Role Of The State**

The Abbasid era was marked by significant success in integrating various external scholarly traditions-such as Greek philosophy, the Persian administrative system, and Indian mathematics-into the Islamic intellectual heritage (Handayani & Azahara, 2025). This integration did not occur instantly but through a lengthy process involving translation, adaptation, and even re-development to meet the needs of the Muslim community at the time. This demonstrates that Muslims did not merely accept knowledge but critically processed it, thereby generating new knowledge (Putri & Priyoyudanto, 2023).

The role of institutions such as Bayt al-Hikmah in Baghdad was crucial in this process. This institution served not only as a library but also as a center for reaserch, translation, and scientific discussion that brought together scholars from diverse backgrounds (Nafis et al., 2025). State support and the intellectual freedom granted to scholars fostered a thriving intellectual environment and encouraged collaboration in the advancement of knowledge.

Furthermore, scientific progress during the Abbasid era was also supported by political stability and the caliphs' patronage of the sciences. This enable Baghdad to emerge as a global center of civilization. The scientific tradition the emerged was not merely theoretical but also produced various innovations in medicine, astronomy, and philosophy (Nispi Syahbani et al., 2025). Moreover, this movement of translation and scientific development played a role in transmitting knowledge to other civilization, including the West (Pratama et al., 2023).

Thus, the integration of various scientific traditions during the Abbasid era not only produced multidisciplinary advancements but also laid a strong foundation for the development of science that is open, critical, and sustainable.

## **3.2 Biography and Intellectual Background of Al-Jahiz**

### **3.2.1 Full Name and the Basra Environment**

Al-Jahiz (Abu Ustman Amr bin Bahr al-Basri) grew up in Basra, an important city during the Abbasid era known as a dynamic and open center of scientific development. Basra served as a meeting point for various scientific traditions, both from the Arab world and from Greek, Persian, and Indian influences that had been translated into Arabic. These conditions created an intellectual environment that encouraged discussion, debate, and rational thought. From a young age, Al-Jahiz actively participated in scholarly gatherings at the Basra mosque, where scholars and thinkers discussed various fields such as theology, language, and philosophy. Although he came from a modest economic background, this did not hinder his pursuit of learning; rather, it spurred him to seek knowledge even more diligently on his own (Ulwania & Mutrofin, 2024).

Basra's influence on the development of Al-Jahiz's thought is also evident in the strong tradition of rationalism, particularly through the Mu'tazilah school that flourished in the city. This school of thought emphasized the importance of reason in understanding religious teachings, which subsequently shaped Al-Jahiz's way of thinking to become more critical and open-minded. He did not merely follow prevailing intellectual currents but actively engaged in debates and boldly expressed his own views, including on theological and social issues (Sef & Abu Bakar, 2024).

Furthermore, as a port city, Basra served as a melting pot of diverse cultures and social experiences. This helped enrich Al-Jahiz's perspective, particularly in his ability to combine direct observation with rational analysis. In his works, it is evident that he did not rely solely on theory but also paid close attention to the social realities and natural phenomena around him. Thus, Al-Jahiz's intellectual development can be understood as the result of a fusion between Basra's cosmopolitan environment, the rationalist traditions of the Mu'tazilah, and the spirit of scholarship during the Abbasid era (Hamid, 2025; Muchlisin, 2022; Lange, 2022).

### **3.3 Connection to Mu'tazilah and Style of Thinking**

Al-Jahiz had a fairly strong connection to the Mu'tazilah school, a theological tradition that emphasizes the importance of reason in understanding religious teachings (Nafis et al., 2025). In the Mu'tazilah tradition, reason serves not only as a tool, but also serves as the foundation for interpreting revelation in a rational and systematic manner. This influenced Al-Jahiz's way of thinking, which tended to be critical, open-minded, and willing to accept an opinion at face value.

Furthermore, a distinctive feature of Al-Jahiz's thought is evident in his ability to

combine empirical observation with logical analysis. He did not rely solely on texts or theories but also conducted direct observations of natural and social phenomena, then processed them rationally (Ulwania & Mutrofin, 2024). This approach demonstrates that is thinking was already oriented toward the scientific method, where knowledge is constructed through a combination of experience and reasoning.

Furthermore, the influence of Mu'tazilah is also evident in the emphasis on the values of rationality, freedom of thought, and justice, which from the foundation of Islamic intellectual development. These values not only impacted the field of theology but also opened the door to broader and more contextual scientific development (Riduan et al., 2025). Indeed, this rational approach remains relevant today, particularly in fostering a more critical and adaptive understanding of religion in response to changing times (Hamdi et al., 2025).

Thus, Al-Jahiz's connection to the Mu'tazilah is not merely ideological but also methodological, as he successfully integrated rationality with empirical observation in developing a scientific approach to thinking.

### **3.4 Al-Jahiz's Scientific Contributions**

#### **3.4.1 Biology and Zoology: Analysis of *Kitab al-Hayawan***

In *Kitab al-Hayawan*, Al-Jahiz demonstrated an approach that was quite advanced for his time because he not only described animals descriptively but also based his descriptions on direct observations of their behavior and environment (Ulwania & Mutrofin, 2024). He frequently linked animal life to the natural conditions around them, such as food, habitat, and interspecies interactions. This indicates that Al-Jahiz was already using an empirical approach to understanding natural phenomena.

Furthermore, Al-Jahiz also explained the relationship between living organisms and their environment, noting that change in environment conditions can influence the characteristics of a species (Nispi Syahbani et al., 2025). In some modern studies, his ideas even suggest regarding the continuity between humans and animals as well as living organisms' ability to adapt to the environment (Tan, 2023).

Furthermore, in *Kitab al-Hayawan*, Al-Jahiz also discusses various aspects such as animal behavior, relationships among living organisms, and the spread of diseases related to the environment. This indicates that his work is not merely theoretical but also addresses biological and ecological aspects more broadly (Al-Sarraf, 2023).

Thus, Al-Jahiz's ideas in *Kitab al-Hayawan* are often regarded as one of the earliest forms of a scientific approach in the study of living organisms. Although not as complex as modern evolutionary theory, his concepts regarding adaptation and the relationship between organisms and their environment reflect a level of intellectual advancement that

was quite advanced for his time (Ulwania & Mutrofin, 2024).

### **3.4.2 Literature, Rhetoric, and Rational Thought**

Al-Jahiz did not view the Arabic language merely as a common tool for communication, but also as the primary means for conveying ideas and shaping the way society thinks (Sef & Abu Bakar, 2024). In his works, he emphasized that language use must take into account context, purpose, and audience so that the message conveyed can be effectively understood. This demonstrates that, for Al-Jahiz, language serves both communicative and intellectual functions.

Additionally, Al-Jahiz is known for employing an argumentative style often infused with satirical elements to deliver social criticism (Handayani & Azahara, 2025). This style makes his writing not only informative but also persuasive and engaging. In fact, modern studies note that the use of satire in Al-Jahiz's works, such as in *al-Bukhala*, is not merely humor but also a serious means of social criticism directed at societal behavior (Sata, 2023).

Furthermore, Al-Jahiz's mastery of language is also evident in his attention to rhetoric and the structure of message delivery. He was able to connect language, meaning, and social context, thereby producing effective and influential communication (el-Banjary, 2025). In fact, several studies indicate that his thinking already pointed toward modern concepts of communication, in which language is understood as a process of conveying meaning, not merely an arrangement of words (Derbali, 2023).

Epistemologically, Al-Jahiz also demonstrates that reason and revelation are not two conflicting things, but rather complement each other in building a comprehensive understanding (Handayani & Azahara, 2025). He employed a rational approach to interpret religious texts while simultaneously acknowledging the authority of revelation. Thus, Al-Jahiz's thought contributes not only to the fields of language and literature but also to the development of critical thinking that remains relevant to this day.

## **3.5 Relevance and Critical Analysis**

### **3.5.1 Interconnection of Sciences and Intellectual Influence**

Al-Jahiz's thought reflects an open scientific culture that is not limited to a single discipline. He was able to connect various fields such as literature, biology, theology, and the social sciences within a single framework of interconnected thought (Nispi Syahbani et al., 2025; Handayani & Azahara, 2025). This demonstrates that the scientific tradition during the Abbasid era was integrative, where knowledge was not rigidly separated but complemented one another to understand reality more comprehensively.

Such an interdisciplinary approach is also evident in how Al-Jahiz combined empirical observation with rational analysis in his various studies. Recent research explains that Al-Jahiz's works are not merely descriptive but also demonstrate a systematic effort to understand the relationships between phenomena, thereby qualifying as an early form of structured scientific thought (Dolgova, 2024).

Furthermore, the interdisciplinary approach employed by Al-Jahiz remains relevant to the development of modern science. The integration of various scientific fields has proven capable of enriching perspectives and fostering new innovations in scholarly research (Putri & Priyoyudanto, 2023).

Al-Jahiz's method of thinking, which emphasizes rationality, openness, and observation, has also had a significant influence on subsequent scientific (Ulwania & Mutrofin, 2024). Indeed, within the history of science, the contributions of classical Muslim scientists who employed similar approaches are recognized as one of the key foundations for the development of modern science (Tan, 2023).

Thus, Al-Jahiz's thought is not only important in a historical context but remains relevant today as a model of open, integrative, and interdisciplinary scholarship.

### **3.6 Strengths and Limitations**

Al-Jahiz's thought has a primary strength in its integrative approach, which is highly relevant to the development of modern science. He was able to combine empirical observation, rational analysis, and religious reflection within a cohesive framework of thought (Handayani & Azahara, 2025; Nispi Syahbani et al., 2025). This approach demonstrates that knowledge is not understood in isolation but is interconnected, thereby yielding a more comprehensive understanding of natural and social phenomena.

Furthermore, Al-Jahiz's strengths are evident in the empirical-observational methods he employed. He did not rely solely on speculation or theoretical thought but also conducted direct observations of his subjects of study, as seen in *Kitab al-Hayawan*. This makes his thinking more contextual and aligns with modern scientific practices (Ulwania & Mutrofin, 2024; Dolgova, 2024). Furthermore, his approach linking the environment and living organism demonstrates an early awareness of the concept of adaptation, which later developed in modern scientific studies (Tan, 2023).

On the other hand, Al-Jahiz's thought also demonstrates strength in the aspect of rationality influenced by the Mu'tazilah tradition. He employed reason as the primary tool for understanding reality, while simultaneously grounding it in religious values (Nafis et al., 2025; Riduan et al., 2025). This makes his thought not only scientific but also imbued with strong philosophical and theological dimensions.

However, Al-Jahiz's thought also has limitations that cannot be separated from the context of his time. The methodology employed was not yet systematically organized as in modern scientific traditions, so some of his ideas remain descriptive and have not been experimentally tested (Sef & Abu Bakar, 2024). Furthermore, the limitations of tools and the state of scientific development at that time also influenced the depth the analysis produced, meaning it had not yet reached the level of scientific generalization known today (Putri & Priyoyudanto, 2023).

Nevertheless, these limitations do not diminish the significance of Al-Jahiz's thought in the history of scientific development. Rather, his contributions can be understood as an initial stage that paved the way for the development of more systematic scientific methods in the future.

#### **4. CONCLUSION**

This study demonstrates that the rapid advancement of science during the Abbasid Dynasty did not occur by chance, but rather resulted from the synergy between political support, an open intellectual climate, and the integration of various scientific traditions. The existence of institutions such as Bayt Al-Hikmah played a crucial role in creating a collaborative space for scholars to freely develop knowledge across disciplines. In this context, Al-Jahiz can be viewed as a key representative of this scientific ecosystem, particularly through his ability to combine empirical approaches with rational analysis.

The findings of this study also confirm that Al-Jahiz's contributions, particularly in kitab *Al-Hayawan* are not limited to zoological studies but reflect an integrative scientific mindset. He was able to link natural phenomena with rational thought and religious values, thereby demonstrating today, particularly in addressing the challenge of integrating science which is often still separated into rational and spiritual aspects.

However, this study has limitations as it focuses solely on theoretical literature reviews. Therefore, the findings do not fully illustrate how Al-Jahiz's thought can be concretely implemented in educational contexts or in the development of modern science.

As a follow up, more applied and contextual research is needed, for example, by examining how Al-Jahiz's integrative concepts can be applied in educational curricula or in the development of more adaptive scientific methodologies. Thus, the thoughts of classical scientists like Al-Jahiz do not merely remain as historical studies but can also make tangible contributions to addressing contemporary scientific challenges.

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