Kaunia, Vol.XII, Num.2, October 2016, pp. 29~32
ISSN 1829-5266 (paper), ISSN 2301-8550 (online)
Available online at http://ejournal.uin-suka.ac.id/saintek/kaunia

The Reconstruction Concept of Musa Jabir ibn Hayyan Thought: Study on Chemistry for Establishing Civilization in Islamic Integration of Science

Aminatul Husna

Department of IPA Education, Faculty of Tarbiyah and Teacher Training
State Islamic Institute of Religious Study Jember - Indonesia
Correspondance; Email: aminatulhusna62@gmail.com

Abstract

The background of this paper was declining of historical thinking of Islamic civilization in science. The aims of the research were to know: 1) how the concept of Jabir Bin Hayyan thought for developing chemistry; 2) how the application of Jabir Bin Hayyan's concept of thinking in the integration of Islamic science and technology; 3) how the restoration of chemistry to build civilization. This paper used library research by using descriptive analysis. Musa Jabir Bin Hayyan was a pioneer in modern science and inherited Alchemy. The work that is still used today such as reduction, sublimation, and distillation. Jabir Bin Hayyan creates alembic material that can turn wine into alcohol. This discovery is not necessarily abused into liquor. In contrast, alcohol production became a key process for developing a number of chemical industries during Islamic civilization. Alchemy has declined in the end of the 14th century and also as the lag progress of science in the Islamic world momentum, including chemistry. The decline of chemistry-science is the lack of moral support in Islamic civilization. Inserting the history and concepts of Muslim intellectual thought in science is the way to raise the age of Islamic civilization in present today. Integrating science with Islamic values needs to be applied. Because it can produce people who have intellectual and akhlakul karimah. Currently, the development of chemistry is increasing rapidly, both in terms of applied chemistry and pure chemistry. Those things are not separated from Muslim intellectuals' struggle in developing science.

***Keywords**: Jabir Bin Hayyan, Chemistry-science, Islamic civilization, Integration.*

Introduction

Science and technology modern were born from the content of Islam: discovering the scientific method (*meth empiric inductive experiment* which became the key of secretive universe as the pioneer of modernization Europe and America) (Burhanuddin Salam, 2000: 84). Meanwhile, the chemical method (Arabic: *al-chemical*) was born as the beginning of modern-day chemistry (Burhanuddin Salam, 2000: 85). Science is unique because it has a scientific method. As long as science is still used primarily in education, it will develop. The more frequent and widespread the use of science, the greater chances of frictional science. In other words, science as basic education gradually begins to shift. Character education needs to be inserted into the learning method. Especially with the rapid development either in pure chemistry or applied chemistry. Those thing cannot be separated from the concept of Muslim intellectual Musa Jabir ibn Hayyan.

Inculcating character education to learners need to be conducted not only because intellectuals are needed, but also the spiritual character needs to be built. *Takabbur* will occur when science not accompanied with spiritual character. Thus, a scientist must concern to social aspect and selfless. All forms of experimental results must also have causal properties. In other words, there is a positive and beneficial reciprocity. In the process of learning and teaching we need "intermezzo" in the form of deep knowledge. Not only in visual level but also the auditory level can be absorbed. Deep knowledge level is necessary so that intellectual intelligence, spiritual intelligence, and emotional intelligence can be balanced. So the learners not only able to understand the material but also understand the meaning of life values contained in the material.

The integration of Islam in science becomes an alternative in instilling Islamic values. So not only intellectuals are acquired, but also the spiritual and life values. Chemistry is interesting to be studied if the concept of thought of Musa Jabir ibn Hayyan inserted to build a civilization of Islamic integration in chemistry. By integrating science and Islamic values, intellectual and spiritual can be balance. The restoration of the

concept of Musa Jabir ibn Hayyan's thought in chemistry can be studied further. Based on the description can be drawn the problem of how the concept of thinking Musa Jabir ibn Hayyan in chemistry, how the integration of Islamic values in chemistry, and how the restoration of chemistry in building civilization of Islamic integration in science.

Theoritical Review

The Views and Concepts of Musa Jabir Ibn Hayyan's Thought in Chemistry

One of the greatest Muslim alchemists was Abu Musa Jabir Ibn Hayyan (± 700-777, triumph 721-766) (Burhanuddin Salam, 2000: 100). Meanwhile, in Edy Chandra's quote (2012: 5) Jabir Bin Hayyan was born on about 100 H/721 in Khurasan. His name is Abu Musa Jabir bin Hayyan Al-Shufy Al-Azadiy. As a form of love towards science, will have a self-reflected view of something favored, like Abu Musa Jabir Ibn Hayyan about the educational paradigm. The concept of Mizan (equilibrium) and divinity is characteristic of Abu Musa Jabir Ibn Hayyan's chemical concept. These concepts will be combined with a spiritual concept when interacting with chemistry. The concept of balance (Mizan) is not synonymous with the concept of chemical equilibrium in modern chemistry treasures. Apparently, the balance contained in the Mizan sense is more related to the proportion in substance composition and degree of intrinsic properties of the substance itself (Edy Chandra, 2012: 10).

Beside to keep ikhtiar, Jabir also suggest a spiritual solution, to be not easily discouraged in learning the concept of mizan. Jabir also gave advise to purify himself use water, wear clean clothes, then pray istikharah, and convey his intent to Allah (Edy Chandra, 2012: 18). From the description, Jabir emphasizes the spirituality in science. Because basically knowledge comes from Allah SWT. Abu Musa Jabir Ibn Hayyan also emphasizes the character of constancy, perseverance, and having spirit in learning the Mizan concept which is implicitly admitted quitely difficult (Edy Chandra, 2012: 19). From that view, Jabir does not forget the importance of character education (Character Building). Jabir Ibn Hayyan also emphasized the balancing of cognitive, affective, and psychomotor aspects. Therefore, Jabir demands teachers not only to develop their knowledge mastery (cognitive aspect) but also in terms of ethics and student behavior (Edy Chandra, 2012: 22).

Chemistry is identic as an experiments that is not enough to do just once. Experiment is used as a proof the hypothesis is accepted or not. According to Edy Chandra (2012: 22) in Jabir's view, chemistry is identical to experiments. Before the experiments, Jabir emphasized the importance of theoretical mastery of experiments to be performed. Meanwhile, Arifin (1995: 110-111) who states that experimental method is one of the learning methods that support the learning process activities, to find a certain principles and explain the principles developed. This experimental method will also enrich the student experience, develop a scientific attitude, and learning outcomes will last longer in the students' memories (Edy Chandra, 2012: 22).

Integration of Islamic Values in Chemistry

Character education values if being inserted in the learning system can balance the intellectual, spiritual and emotional intelligence. Intermezzo is needed in science learning that more emphasizes factual information and reasoning development. Salovey and Grewal (Sawitri, 2004) states that emotional intelligence is an ability to identify, express, and manage emotions in self and others.

Sinetar defines spiritual intelligence as an inspirational mind, encouragement, inspirational effectiveness, and devotion to which all human beings are part of it. From that description, spiritual intelligence can synergize emotional intelligence and intellectual intelligence. Agung Nugroho CS (2008) states that in learning chemistry required the existence of religious values, in order to become the provision of life in the world. In conveying religious values in learning system not only through writing, but also verbally. So that students are able to understand the material explicitly or implicitly.

Examples of the integration of Islamic values in chemical materials are: redox reaction material that explains simple ions to meet octet rules. This example, has inserted Islamic and life values. Agung Nugroho CS (2008) quotes verses of the Qur'an relating to redox and electrochemical reactions in sura Al-Kahf: 96 which means: "Give me pieces of iron" Until if the iron has been equal to the second (peak) the mountain, said Zulkarnain, "Blow (the fire)". Until when the iron has become (red like) fire, he said, "Give me copper (boiling) so I pour over the hot iron" (Surah al-Kahf: 96).

The relationship of surah Al-Kahf verse 96 with redox and electrochemical reactions the result of Zukarnain intelligence in studying science. Zulkarnain has knowledge about copper which is resistant to corrosion, therefore copper can be used as an iron surface coating so that it does not rust. This story also contains valuable lessons about the servant of Allah who has the nature of tawadhu', humble, and not arrogant with the cleverness it has.

Chemistry in Building Civilization of Islamic Integration in Science

According to Imelda Fajarini (2010: 1060) the figures who gave the characteristics of Islamic alchemy were

Jabir ibn Hayyan, ar-Razi and Izz al-din al-Jaldaki. Some of the substances found by Muslim alchemists who are still used and even developed into important compounds include:

1. Sulfuric Acid (H_2SO_4)
   The findings of valuable substance by Muslim alchemist scientists ultimately influence the development of science and technology in the later era. Sulfuric acid is the base material for the manufacture of various modern products. Such as making medicines, household appliances, soap production, fertilizers as well as for equipment such as car battery water.
2. Nitric Acid (HNO_3)
   According to Jabir ibn Hayyan, this compound is used to purify the alum and salt, resulting from the distillation process potassium nitrate ($K(NO_3)$) and sodium chloride (NaCl). Utilization of nitric acid in the era of modern chemistry is increasingly widespread. Aside from being the main constituent of TNT explosives, nitric acid is also an agricultural fertilizer.
3. Aqua regia
   Known as a strong solvent over HCl, H_2SO_4, and HNO_3. Today's are greatly helped by the finding of aqua regia solvent because it can dissolve materials especially pure metals, gold, silver, alloys and solid and rigid polymeric materials.
   a. Iron (Fe)
      Iron as one of the most abundant metals on earth, in the form of hematite (Fe_2O_3), magnetite (Fe_3O_4) and siderite ($FeCO_3$).
   b. Alcohol
      Alcohol and its derivatives have been widely used and developed by scientists in the current era.

Progress in chemistry has an impact on the cosmetic field. The Prophet Muhammad was famous for using perfume and exemplified by his followers, for example men were advised using perfume during Friday prayers (Burhanuddin Salam, 2000: 102). Muslim scholars had a positive impact on scientists in the aftermath. As well as further development of basic chemistry (pure chemistry, reine Chemia) and applied chemistry, angewandte chemie will be used in medicine (pharmacology).

Method

This research used library method with analytical descriptive. Descriptive analytics used to describe the concept of Musa Jabir Ibn Hayyan's thought. Furthermore, the results of these thoughts are studied by linking Islamic integration in chemistry. Therefore, it was found the integration of concept Abu Musa Jabir Ibn Hayyan's thought with the application of chemical disciplines.

Results and Discussion

The results of the analysis concept of Musa Jabir Ibn Hayyan's thought cannot be separated from the religious nature. Chemistry is closely related to experiments that are not enough to only be done once. Jabir Ibn Hayyan emphasized about theoretical understanding in experimenting that, patience and caution in experimenting affect the results obtained in the scientific method process. Knowledge without religion will be blind as well as chemistry which must have spiritual values in supporting intellectual intelligence. Jabir Ibn Hayyan also emphasized the character of determination, perseverance, and attitude not easy to give up. Therefore, the value of character education is very important to be instil in students, especially in chemistry. Many scientists who succeed in achieving success, but easily fall because they are unable to deal with the problems experienced. The weak of faith and piety is one of the factors. Jabir Ibn Hayyan also emphasized aspects of cognitive, affective and psychomotor balance. So that educators not only provide knowledge, but also educators are required to pay attention in terms of student behavior. Thus the importance of character education is instilled in the prospective young scientist.

Agung Nugroho CS (2008) states that materials of science-chemistry contain the values of order and beauty that lead to the religious values. The insertion this values into the material can conducted by quoting the verses of the Qur'an and their related meanings. Besides that, it can insert Islamic inspirations and stories as intermezzo, and provide memorable conclusions about the values of life. Thus students not only understand the material, but also provide encouragement to apply the material in everyday life.
Chemistry in building a civilization of Islamic integration in science is also inseparable from the thoughts of Muslim scholars. Progress in chemistry is a form of contribution of Muslim scholars during the Islamic civilization. Jabir Ibn Hayyan's invention such as sulfuric acid solution, nitric acid, aqua regia, alcohol and iron are the pioneer of the development of modern chemistry. until now the invention of Muslim scholars is still being used and continues to be developed. Therefore, chemistry have an important role in building a civilization of Islamic integration in science. Chemistry have an important role in life such as daily necessities. Applied chemistry also role as appropriate technology that is an alternative solution in the modern era. Therefore, chemistry is growing rapidly and has a very broad scope of fields.

Conclusions

The concept of Ibn Hayyan's Musa Jabir thought in chemistry strongly emphasizes the values of divinity, perseverance, and attitude of not giving up easily, in conducting experiments. The importance to instill character education in students who not only master knowledge, but have good ethics and morals. Thus a balance of intellectual, spiritual and emotional intelligence will be obtained. Integration of Islamic values in chemistry is important because scientist without faith and piety will be lost and complacent. So as a prospective young scientist besides having knowledge, also able to dedicate the knowledge for wide society.

References

Chandra, Edy. 2012. Religiusitas dalam Pendidikan Kimia (Esensi Pemikiran Pendidikan Kimiawan Klasik Jabir Bin Hayyan). Jurnal Scientiae Educatia Volume 1 Edisi 1.

Fajriati, Imelda. Perkembangan Ilmu Kimia di Dunia Muslim. Vol. 9, No. 3, May 2010.

Salam, Burhanuddin. 2000. Sejarah Filsafat Ilmu dan Teknologi. Jakarta: PT Rineka Cipta.

Saputro, Agung Nugroho Catur. 2008. Pengintegrasian Nilai-nilai Religius dalam Buku Pelajaran Kimia SMA/MA Sebagai Metode Alternatif Membentuk Karakter Insan Mulia Pada Siswa.