



Research on *Ziziphus Mauritiana*: Bibliometric Studies

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ABSTRACT

Ziziphus mauritiana which is from the Rhamnaceae family are reported to possess bioactive compounds, recognized for traditional use and medicinal importance. *Ziziphus mauritiana* is one of the herbs that contain many benefits for humans. It has been shown from the perspective of ancient medical practice as Phophet Muhammad (SAW) has been using *Ziziphus mauritiana* in washing his deceased daughter. Trend research on publications of *Ziziphus mauritiana* were studied. The study focused on content analysis, especially in the field of primary research on *Ziziphus mauritiana*. Referring to the results of bibliometric analysis on *Ziziphus mauritiana*, researchers found that the majority of previous research on *Ziziphus mauritiana* dominated by journal articles is 90.0%. Research on the method of analysis conducted in the previous studies found that most studies on *Ziziphus mauritiana* is done through scientific analysis (laboratory studies). Studies on aspects of science has been divided into nine areas. Those areas are microbiology, biomedical, biochemistry, metabolimics, environmental science, forensic, pharmacology, botanical science and molecular science. Only one field of study that focuses on the analysis of the Islamic viewpoint is Islamic Science. Thus, the efforts of research on plants and herbs in the Al-Qur'an and Al-Hadith through bibliometrics on *Ziziphus mauritiana* in the field of Islamic Studies will produce beneficial products for Malaysia as a whole and contribute significantly in the development of science.

Keywords: Ziziphus mauritiana; traditional medical; ancient practice; scientific analysis; Islamic views.

INTRODUCTION

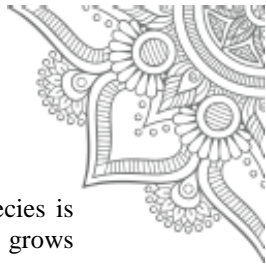
Studies based on publication can be used as an indicator of research productivity for researches in various fields. Thus, it enables us to determine the priority of research specifically through the development of research on publication. The purpose of this study is to analyse *Ziziphus mauritiana* based on articles by field or discipline research.

Articles published in any field is usually research that could be developed and can be used as the process of publishing scholarly materials must be reliable scientific reference. This is because going through the process of screening and reviews by experts to ensure that the material is published, not only adheres to rules for a publishing journal or scholarly materials.

Definition of *Ziziphus Mauritiana*

Ziziphus mauritiana or is known as '*sidr*' or '*sidrah*' in Arabic have been mentioned about four times which are in surah Saba'(34), verse of 16, surah al-Najm(53), verse of 14 and 16 and surah al- Waqi'ah(56),verse of 28 in the Qur'an. In common English term, it is known as '*Lote-tree*', '*Indian Jujube*' and '*Chinese Apple*'.

According to the *General Dictionary of the Arabic-Malay*, the word *sidr* means lote-tree. Referring to the Ar-Rahman's interpretation, the word *sidr* is also translated as a lote-tree. Allah S.W.T mentions the nature of this tree in heaven by the word *makhdud* (مخدود) which is thornless. Ibn Kathir (m. 774H) argues that the meaning of *sidr* tree as a thornless tree, in this world it has many thorns and produce only little amount of fruit. However, in the hereafter (paradise) the tree will has many fruits and become thornless.



Ziziphus mauritiana is a tropical fruit tree species belonging to the family *Rhamnaceae*. The species is believed to have originated in Indo-Malaysian region of South-East Asia. It is a medium-sized tree that grows vigorously and has a rapidly developing taproot, a necessary adaptation to drought conditions.

The fruit is of variable shape and size. It can be oval, obovate, oblong or round, and can be 1-2.5 inches (2.5-6.25 cm) long, depending on the variety. The fruit's skin is smooth, glossy, thin but tight. The flesh is white and crisp. When slightly underripe, this fruit is a bit juicy and has a pleasant aroma.

The leaves are about 2.5 to 3.2 cm long and 1.8 to 3.8 cm wide having fine tooth at the margins. It is dark-green and glossy on the upper side and pubescent and pale-green to grey-green on the lower side. Depending on the climate, the foliage of the *Ziziphus mauritiana* may be evergreen or deciduous. The leaves are alternate, ovate or oblong elliptic with rounded apex, with 3 depressed longitudinal veins at the base.

SCOPE AND METHODOLOGY

This research uses bibliometric analysis to determine the result from previous research on *Ziziphus mauritiana*. Bibliometric analysis is one method to determine and to measure texts and information in publication materials. This method is normally used in the field of library science and information science, it is also used in any other field in terms of citation and content analysis.

Definition of bibliometrics according to *The British Standard Institution* is the use of document and publication trend by setting a mathematical and statistical method. Therefore, the purpose of this bibliometric analysis is to explain the process of communication writing, properties and development direction of research using descriptive and analysis towards a variety of stages of communication. In fact, the main object of bibliometric research is publication material that is published from the product of research in a scientific journal. Publication is assumed as an important media in scientific communication and general knowledge that can be obtain and read by anyone at any time. Possibilities in the form of print format or electronic. Progress in the form or publication format assist in gaining the main data in bibliometric analysis. Besides that, there is also a clarification that bibliometrics as an application of mathematical and statistical method towards books and all communication media. The definition expands bibliometrics' scope to all media that are not just books and scientific journal articles.

Searching mechanism is important to ensure that every data related to research that we want to review can be found effectively. From the keywords, researchers found that research on *Ziziphus mauritiana* focused on all previous scientific materials. The way to obtain the best result of studies, researchers use these mechanisms;

	Keywords
1.	<i>Ziziphus mauritiana</i> + PDF
2.	<i>Sidr</i> + PDF
3.	<i>Bidara</i> + PDF

LITERATURE REVIEW OF ZIZIPHUS MAURITIANA

Ziziphus mauritiana contain composition of nutrients which are moisture, energy, protein, fat, carbohydrate, ash, carotene, Vitamin C, iron and calcium. The herbs contain galactose sugar, fructose, glucose, organic citric acid, malonic acid and malic acid. Parts of *Ziziphus mauritiana* also have benefits in the aspect of antioxidants, hepatoprotective, antidiarrheal, antimicrobial, antihyperglycemic/ hypoglycemic and antiplasmodial (Alghasham et. al., 2017).

Furthermore, antimicrobial activities of methanolic extract of *Ziziphus mauritiana* leaves have revealed that, the plant extract has a significant level of antimicrobial activities against bacteria; *Bacillus cereus* ATCC 10876,



Staphylococcus aureus ATCC 25923, *Streptococcus pneumoniae* ATCC 49619 and a pathogenic fungus; *Candida albicans*. These results further suggested that, the plant extract could be used in herbal preparations for the treatment of some skin diseases caused by these pathogens (Alghasham et. al., 2017).

Ziziphus mauritiana solution which also known as *bidara* solution are used in bathing the deceased. This is according to the sunnah of Prophet Muhammad SAW that used the *bidara* solution in bathing his deceased daughter. The benefit obtained is to soften the body of the deceased. Also, there are some opinions that *bidara* solution can strengthen the skin of a deceased body and prevent the skin from decaying faster (Yusof @ Salleh, 2017).

The fruit of *Ziziphus mauritiana* contain saponins and tannins. Saponins are used in hypercholesterolemia, hyperglycemia, antioxidant, anticancer, anti-inflammatory and weight loss etc. according to the medical field. It is a bioactive antibacterial agent of plants. Tannins have general antimicrobial and antioxidant activities. Current reports show that tannins may have potential value such as cytotoxic and antineoplastic agents. Saponins have antifungal properties. These contents are shown to have different types of activity against different pathogens. Therefore, *Ziziphus mauritiana* can be used in the treatment of diseases (Rathore et. al,2012).

Further Studies on *Ziziphus mauritiana*

The field of health based on herbs is a wide field. There are many aspects that we can study with more detail in the future either in the aspect of religion or scientific studies. The following are some of the suggestion of field and aspect of studies related on;

- I. Scientific study of *Ziziphus mauritiana* from the perspective of religion are very lacking. Most general studies need to be specifically studied in the aspect of the nourishment and benefits of the *Ziziphus mauritiana* that can be obtained from discussion on *Al-Quran* verses through works of interpretations and discussions on *hadith sahih* related to *Ziziphus mauritiana* based on research of *kitab syarah hadith*.
- II. The combinations of research on *Ziziphus mauritiana* in the Islamic and science perspective need to be intensified. Recently only three publications discuss *Ziziphus mauritiana* by combining Islamic and scientific studies, while the rest is just in general. This result will prove the truth of Islamic teaching through scientific analysis development.

Products containing *Ziziphus mauritiana* that already exist or having potential to become new products that can be observed from the *halalan tayyiban* perspective. Product of *Ziziphus mauritiana* can be very valuable. Thus, the content of *Ziziphus mauritiana* needs to be studied from the effective aspect to fulfill the needs of the ummah.

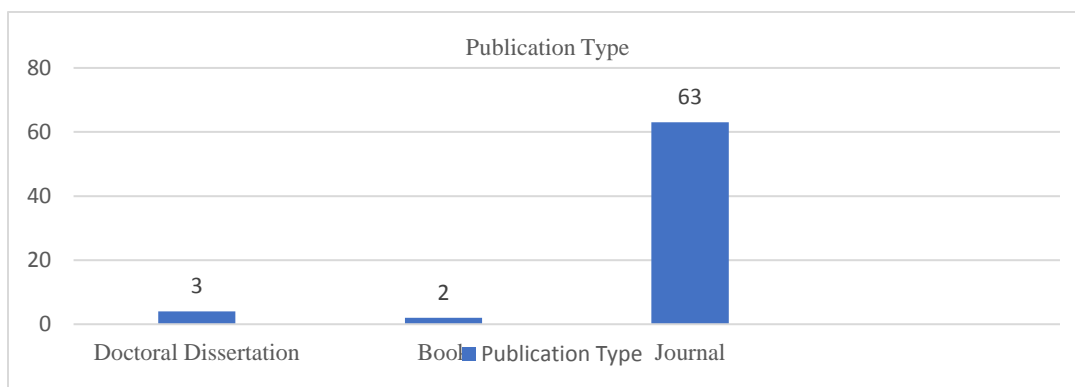


Figure 1. Publication Types of Previous Studies

Based on the graph above, researchers found that majority of previous research on *Ziziphus mauritiana* dominated journal articles by as much as 92%. The second highest percentage is doctoral dissertations which is 4.8%, followed by 3.2% for books. The list of publication materials of *Ziziphus mauritiana* can be seen in the following table;



List of Publication Materials of *Ziziphus Mauritiana*

1

Doctoral Dissertation	
1.	Putri, R. A. Z. (2017). Uji aktivitas daun bidara arab (<i>Ziziphus spina-christ L.</i>) sebagai antikanker pada sel kanker kolon (WiDr) melalui metode mtt dan identifikasi senyawa aktif dengan metode LC-MS (Doctoral dissertation, Universitas Islam Negeri Maulana Malik Ibrahim).
2.	Mohd Tamizi, S. (2015). Tumbuhan terpilih menurut perspektif Islam dan sains kesihatan/Sumaiyah binti Mohd Tamizi (Doctoral dissertation, University of Malaya).
3.	Malla, B. (2018). Ethnobotanical study on medicinal plants in Parbat district of western Nepal (Doctoral dissertation).
Book	
1.	Mehdi Miri S, Cultivation, Chemical Compositions and Health Benefits of Jujube (<i>Ziziphus jujuba Mill.</i>), 2018, The First National Congress and International Far of Medicinal Plants and Strategies for persian medicine that affect diabetes, p. 2-11.

RESULTS

According to the field of study on *Ziziphus mauritiana*, previous research on *Ziziphus mauritiana* were divided into 8 main fields. Division into the 8 main fields are based on research of other researchers that are based on information of publications obtained in this study. It fits into the fields of research in Malaysia. There are results from the previous research on *Ziziphus mauritiana*;

Microbiology

1. Abu-Taleb, A. M., El-Deeb, K., & Al-Otibi, F. O. (2011). Assessment of antifungal activity of *Rumex vesicarius L.* and *Ziziphus spina-christi (L.) Willd.* extracts against two phytopathogenic fungi. *African Journal of Microbiology Research*, 5(9), 1001-1011.
2. Mahesh, B., & Satish, S. (2008). Antimicrobial activity of some important medicinal plant against plant and human pathogens. *World journal of agricultural sciences*, 4(5), 839-843.
3. Bukke, A. N., Hadi, F. N., & Produtur, C. S. (2015). Comparative study of in vitro antibacterial activity of leaves, bark, heart wood and seed extracts of *Caesalpinia sappan L.* *Asian Pacific Journal of Tropical Disease*, 5(11), 903-907.
4. Adnan, M., Tariq, A., Bibi, R., Abdelsalam, N. M., Rehman, H., Murad, W., ... & Akber, A. (2015). Antimicrobial potential of alkaloids and flavonoids extracted from *Tamarix aphylla* leaves against common human pathogenic bacteria. *African Journal of Traditional, Complementary and Alternative Medicines*, 12(2), 27-31.
5. G. H., Patil, G. E., Savale, A. R., Ghotekar, S. K., Pore, D. M., ... & Deshmukh, K. K. (2017). Biosynthesis of copper oxide nanoparticles using leaves extract of *Leucaena leucocephala L.* and their promising upshot against diverse pathogens. *International Journal of Molecular and Clinical Microbiology*, 7(1), 776-786.
6. Abalaka, M. E., Daniyan, S. Y., & Mann, A. (2010). Evaluation of the antimicrobial activities of two *Ziziphus* species (*Ziziphus mauritiana L.* and *Ziziphus spinachristi L.*) on some microbial pathogens. *African Journal of Pharmacy and Pharmacology*, 4(4), 135-139.
7. Al Ghasham, A., Al Muzaini, M., Qureshi, K. A., Elhassan, G. O., Khan, R. A., Farhana, S. A., ... & Abdallah, W. E. (2017). Phytochemical Screening, Antioxidant and Antimicrobial Activities of Methanolic Extract of *Ziziphus*

¹ As the amount of journal article is too much and to avoid repeated data, researchers didn't insert journal article of *Ziziphus mauritiana* in the table of publication material. All the journal article directly insert in the section of results.



mauritiana Lam. Leaves Collected from Unaizah, Saudi Arabia. International Journal of Pharmaceutical Research & Allied Sciences, 6(3).

8. Ajayi, A. I., & Ojelere, O. (2014). Evaluation of the antimicrobial properties of the ethanolic extracts of some medicinal plants seeds from southwest Nigeria. IOSR J Pharm Biol Sci, 9(4), 80-5.

9. Uzair, A., Bakht, J., Iqbal, A., Naveed, K., & Ali, N. (2016). In vitro antimicrobial activities of different solvent extracted samples from *Iris germinica*. Pakistan journal of pharmaceutical sciences, 29(1).

10. Abdulla, G., Abdel-Samie, M. A. S., & Zaki, D. (2016). Evaluation of the antioxidant and antimicrobial effects of *Ziziphus* leaves extract in sausage during cold storage. Pak J Food Sci, 26(1), 10-20.

11. Sameera, N. S., & Mandakini, B. P. (2015). Investigations into the antibacterial activity of *Ziziphus mauritiana* Lam. and *Ziziphus xylopyra* (Retz.) Willd. International Food Research Journal, 22(2), 849.

12. Crippen, T. L., Benbow, M. E., & Pechal, J. L. (2015). Microbial interactions during carrion decomposition. Carrion ecology, evolution, and their applications, 31-64.

13. Panseeta, P., Lomchoey, K., Prabpai, S., Kongsaree, P., Suksamrarn, A., Ruchirawat, S., & Suksamrarn, S. (2011). Antiplasmodial and antimycobacterial cyclopeptide alkaloids from the root of *Ziziphus mauritiana*. Phytochemistry, 72(9), 909-915.

14. Dube, A. N., Shahbazker, S. N., Nasim, M., & Kar, H. Evaluation of Anti-Microbial Activity of *Ziziphus mauritiana* (Ber), *Ocimum sanctum* (Tulsi) and *Ficus religiosa* (Peepal) on *Staphylococcus aureus* Strains Isolated from Environment of Various ICUs. International Journal of Health Sciences & Research. Vol.9; Issue: 1; January 2019

15. Annathurai, K., Palaniyandi, K., & Raamaiah, R. (2015). Callus induction and antimicrobial activity from *Ziziphus mauritiana*. Lam cotyledon kernels. Indian Journal of Applied Microbiology, 18(2), 32-39.

16. Sivasankari M.P & Sankaravadivoo.(2015).A Studies on Antimicrobial Activity of *Ziziphus mauritiana lam*. International Journal of Ayurveda and Pharma Research 3(7): 52- 55

17. Mbahi M.A, Mbahi A.M, Umar I.A, Ameh DA, Joseph I & Amos PI, (2018) Phytochemical Screening and Antimicrobial Activity of the Pulp Extract and Fractions of *Ziziphus mauritiana*, Biochemistry & Analytical Biochemistry 7(1):352

18. Bukar, A. M., Kyari, M. Z., Gwaski, P. A., Gudusu, M., Kuburi, F. S., & Abadam, Y. I. (2015). Evaluation of phytochemical and potential antibacterial activity of *Ziziphus spina-christi* L. against some medically important pathogenic bacteria obtained from University of Maiduguri Teaching Hospital, Maiduguri, Borno State–Nigeria. Journal Pharmacognosy Phytochemistry, 3, 98-101

19. Finley, S. J., Benbow, M. E., & Javan, G. T. (2015). Potential applications of soil microbial ecology and next-generation sequencing in criminal investigations. Applied Soil Ecology, 88, 69-78.

20. Finley, S. J., Benbow, M. E., & Javan, G. T. (2015). Microbial communities associated with human decomposition and their potential use as postmortem clocks. International journal of legal medicine, 129(3), 623-632.

21. Priyanka, C., Kumar, P., Bankar, S., Karthik, L., & Nagari, V. (2014). In vitro antibacterial activity and GCMS analysis of *Acacia karoo* and *Ziziphus mauritiana* extracts.

22. Javan, G. T., Finley, S. J., Abidin, Z., & Mülle, J. G. (2016). The thanatobiome: a missing piece of the microbial puzzle of death. Frontiers in microbiology, 7, 225.

23. Karon, B., Ibrahim, M., Mahmood, A., Huq, A. K. M. M., Chowdhury, M. M. U., Hossain, A., & Rashid, M. A. (2011). Preliminary antimicrobial, cytotoxic and chemical investigations of *Averrhoa bilimbi* Linn. and *Ziziphus mauritiana* Lam. Bangladesh Pharm J, 14(2), 127-131.

24. Muharrami, L. K., Munawaroh, F., Ersam, T., Santoso, M., Setiawan, E., Hidayati, Y., & Rosidi, I. (2019). Antibacterial Activity of Leaves Extract of Bukkol (*Ziziphus mauritiana* Lam) against *E. coli* and *S. aureus*. KnE Engineering, 1(2), 180-189.



25. Jahan, F., Lawrence, R., Kumar, V., & Junaid, M. (2011). Evaluation of antimicrobial activity of plant extracts on antibiotic-susceptible and resistant *Staphylococcus aureus* strains. *J Chem Pharm Res*, 3(4), 777-789.
26. Nagumanthri, V., Rahiman, S., Ahmad Tantry, B., & Nissankararao, P. (2012). In vitro antimicrobial activity of *Acacia nilotica*, *Ziziphus mauritiana*, *Bauhinia variegata* and *Lantana camara* against some clinical isolated strains. *Iranian Journal of Science and Technology (Sciences)*, 36(2), 213-217.
37. Saddiq, A. A. N. (2014). Antiagnostic effect of musk and sidr leaves on some of the opportunistic fungi that cause Lung toxicity. *Life Science Journal*, 11(2s), 99-108.

Biomedic

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3. Hamiduzzaman, M., Sarkar, A. M., Hossain, M. J., & Rashid, A. (2014). Neuropharmacological, Analgesic, Antidiarrheal and Antimicrobial Activities of Methanolic Extract of *Ziziphus mauritiana* Leaves (*Rhamnaceae*). *American Journal of Advanced Drug Delivery*, 183-190.
4. Raghavendra, H. L., Prashith, K. T., Akarsh, S. M., & Ashwini, H. S. (2015). Phytochemical Analysis, Antifungal and Antioxidant Activity of Leaf and Fruit of *Zizyphus xylopyrus (Retz.) Willd. (Rhamnaceae)*. *Science, Technology and Arts Research Journal*, 4(4), 83-88.



5. Tranchida, M. C., Berruezo, L. E. B., Stenglein, S. A., & Cabello, M. N. (2018). Mycobiota associated with human cadavers: First record in Argentina. *Canadian Society of Forensic Science Journal*, 51(2), 39-47.
6. Keita, S., Wélé, M., Cisse, C., Diarra, N., Kirkman, L., & Baba-Moussa, L. (2018). Antibacterial and Antiplasmodial Activities of Tannins Extracted from *Zizyphus mauritiana* in Mali. *International Journal of Biochemistry Research & Review*, 1-8.
7. Naji, K. M., Abdullah, Q. Y. M., Al-Zaqri, A. Q. M., & Alghalibi, S. M. (2014). Evaluating the Biodeterioration enzymatic activities of fungal contamination isolated from some ancient Yemeni mummies preserved in the national museum. *Biochemistry research international*, 2014.

Metabolimics

1. Abdallah, E. M., Elsharkawy, E. R., & Ed-dra, A. (2016). Biological activities of methanolic leaf extract of *Zizyphus mauritiana*. *Biosci. Biotech. Res. Comm*, 9(4), 605-614.
2. Mohammad, J. H., Sikder, M. A., Mohammad, A. K., Mohammad, R. H., Chowdhury, A. A., & Mohammad, A. R. (2015). Phytochemical and Biological Investigations of Methanol Extract of Leaves of *Zizyphus mauritiana* Lam. *Boletín Latinoamericano y del Caribe de Plantas Medicinales y Aromáticas*, 14(3).
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Environmental Science

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Islamic Science

1. Ahmad, K., Yakub, M., Yusoff, Z. M., Yakob, M. A., Yusof, R. J. R., Fauzi, N., ... & Ariffin, M. F. M. (2015). Tumbuhan Bidara Dalam Al-Qur'an Dan Hadith: Analisis Terhadap Manfaatnya Berasaskan Kepada Penyelidikan Semasa. *Jurnal Al-Basirah*. Volume 5, 64-89.
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Pharmacology

1. Palejkar C.J, Palejkar J.H, Patel A.J & Patel M.A, A Plant Review on *Ziziphus Mauritiana*, (2012), international Journal of Universal Pharmacy and Life Sciences 2(2): 202 – 211.

2. Kaleem, W. A., Muhammad, N., Khan, H., & Rauf, A. (2014). Pharmacological and phytochemical studies of genus *Zizyphus*. Middle- East J Sci Res, 21(8), 1243-63.

Botanical Science

1. Malla, B. (2018). Ethnobotanical Study on Medicinal Plants in Parbat District of Western Nepal (Doctoral dissertation).

2. Padmaja, N., & Bosco, S. J. D. (2014). Preservation of jujube fruits by edible Aloe vera gel coating to maintain quality and safety. Indian Journal of Science Research and Technology, 2(3), 79-88.

DISCUSSION

Based on the classified field of research on *Ziziphus mauritiana*, researchers can conclude the previous research results are as follows;

Valid	Frequency	Valid Percent
Microbiology	28	45.2%
Biomedic	10	16.13%
Biochemistry	8	12.9%
Metabolimics	6	9.7%
Environmental Science	3	4.8%
Islamic Science	3	4.8%
Pharmacology	2	3.2%
Botanical Science	2	3.2%

According to the analysis method that has been done, previous research related to *Ziziphus mauritiana* are mostly about scientific analysis (laboratory research). Only for research science, there are eight fields of studies. The aspect of scientific discussion on *Ziziphus mauritiana* focus on the field of microbiology, biomedical, biochemistry, metabolomics forensics, pharmacology, botanical science and molecular science. There is only one analysis focused on Islamic study. Additionally, researchers also focused on the environmental science field to collect general research outcome related to *Ziziphus mauritiana*. Thus, if the amount of research is evaluated, there are 56 research materials in the scientific aspect compared to only three Islamic studies aspect and three environmental studies. Therefore, it can be seen that the scientific studies on *Ziziphus mauritiana* are too many.

Ziziphus mauritiana is a species that is attracting other researchers from around the world. All products obtained from *Ziziphus mauritiana* are significant in order for analysis by researchers. This includes the fruits, seeds, bark, roots and especially leaves to produce a lot of beneficial extract of *Ziziphus mauritiana*. Referring to the research on *Ziziphus mauritiana* in the perspective of Islamic studies, it clearly showed the lack of material research on *Ziziphus mauritiana*. Particular discussion related to *Ziziphus mauritiana* that already exist and the best in the aspect of Islamic



and scientific combination is the journal article titled '*Tumbuhan Bidara Dalam Al-Qur'an Dan Hadith: Analisis Terhadap Manfaatnya Berasaskan Kepada Penyelidikan Semasa*' by Ahmad, K., et.al.

Besides, there are also studies on *Ziziphus mauritiana* in the general form or only stated the uses or the benefits of *Ziziphus mauritiana* in books or journals that focused on traditional medicinal studies. One of journal is 'Funeral Management in the Malay World: Local Knowledge and Practices' by Yusof @ Salleh M.Y., et.al.

CONCLUSION

Ziziphus mauritiana is a research material based on sunnah of Prophet Muhammad SAW which is very valuable. The benefits cannot be denied. It shows a lot of advantages as it is used in many traditional medicine. All aspects in the research on *Ziziphus mauritiana* must be more detailed by academic members to produce useful products for the community. Therefore, efforts from researchers from Kolej GENIUS Insan on the research titled '*Research Of Plant and Herb In The Al-Quran and Al-Hadith: A Bibliometric Studies on Ziziphus mauritiana*' is significant in development of knowledge. Further studies on *Ziziphus mauritiana* hopely will give something beneficial for the importance of the Malaysia.