BIBLIOMETRIC ANALYSIS ON RESEARCH STUDY OF POMEGRANATE: a review towards new findings

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ABSTRAK


Kata Kunci: bibliometrik, tren penelitian, delima, produk Malaysia

ABSTRACT

Pomegranates are an antioxidant-rich superfood with alternative and natural medicine resources for the natural health community. From the perspective of ancient medical practice, pomegranate is in a highest ranking of healthy fruits because of its diverse beneficial in curing diseases. Trend research publications pomegranates were studied. The study focused on content analysis, especially in the field of primary research on pomegranate. Referring to the results of 'literature review' on pomegranate, researchers found that the majority of previous research on pomegranate dominated by journal articles by 85.5 percent. Research on the method of analysis conducted in the previous studies found that most studies on pomegranate done on a scientific analysis (laboratory studies). Studies on aspects of science has been divided into seven areas. Focus areas include scientific discussion of pomegranate is pharmaceutical, Food Science, Botany, Bio-Medical, Bio-Chemistry and Microbiology. Only one field of study that focuses on the analysis of Islamic view focusing on Islamic Education. Additional fields of Environmental Education (Flora) are also included by researchers to collect data and find a results on plants that contain pomegranate. Comparative evaluation of research found that a total of 188 kinds of studies involves the study of the scientific aspects compared to only 11 studies based on Islam (Islamic Education) and 10 studies based on environmental education. Thus, the efforts of researchers from Universiti Malaya through grants TRGS (TR001A-2014) entitled 'Safe and Health Uses of Fruits and Herbs Mentioned in Al-Quran and Ahadith: An Analysis of ethnomedicinal Importance in Islamic Products in Malaysia' are very significant in the development of science. Advanced new study of henna is expected to produce benefits to Malaysia as a whole.

Key Words: bibliometrics, research trend, pomegranates, Malaysian product
1. INTRODUCTION

Study design can be used as an indicator of research productivity and trends of research in various disciplines. This study could also determine research priorities in matters related to publishing. The aim of this study is to analyze the writing of articles by field or specific research discipline. Articles published in any discourse is usually a result of recent research that can be developed, shared and distributed to serve as a reliable scientific references. This is due to the process of publishing scientific materials that have to go through a screening process and a review by experts in the field to ensure that the published material, not only to comply with the characteristics for publication in scientific journals or materials, but also to ensure that research conducted in accordance with proper procedures.

2. POMEGRANATE: DEFINITION AND DESCRIPTION

The pomegranate, botanical name ‘Punica Granatum’, is a fruit bearing deciduous shrub that contain thousands of health benefits. This fruit is called three times in the Holy Quran, thus showing it advantages and privileges as fruits that are beneficial to human being. In English terms, the pomegranate is known as the 'pomegranate' and 'al-Rumman' or 'al-Rummanah' in Arab.

Oxford English Dictionary defines Pomegranate as a word derives from medieval Latin pōmum (apple) and granatum (seeded). According to ancient French language, pomegranate are called pomme granatum which means apple (pomme) and granatum that refers to the seedless fruits that originated from Granada. In fact, the Encyclopedia Britannica states that the city of Granada in southern Spain got its name from the pomegranate as a local fruit’s in there.

Pomegranate or Punica granatum, is a fruit-bearing deciduous shrub or small tree growing between 5 and 8 m (16-26 ft) tall. The pomegranate is considered to have originated from the area of Southwest Asia and has grown naturally in the entire Mediterranean region and the Caucasus since ancient times. It is widely cultivated throughout Afghanistan, Algeria, Armenia, Azerbaijan, Iran, Iraq, India, Pakistan, Syria, Turkey, Peninsular Malaysia, Eastern India and tropical regions of Africa. Pomegranate brought into Latin America and California by Spanish settlers in 1769 and grown in California and Arizona for some juice production.

Pomegranates are an antioxidant-rich superfoods as having four parts that can be exploited by human. It consists of fruit, bark, roots and juice (water landing). In the food industry, pomegranate fruit species categorized as exotic and nutritrious food supply. Types of pomegranate are different shapes, colors, grains and different levels of sweetness and acidity. Type the best pomegranate pomegranate color is the brightest, thin-skinned and many water content.

3. SCOPE AND METHODOLOGY

This study applied the bibliometric analysis to study the results of previous research related with pomegranate. Bibliometric analysis is a method for assessing and measuring the information in the text and publications. It is not only frequently used in the field of library of information science but
also widely used in other areas in the form of citation analysis (citation) and content analysis.

Search method is important to ensure that any data on research areas can be found effectively. Through the following search keywords, researchers are able to found the articles, books, magazines and pomegranate completely. Search keywords are as follows:

<table>
<thead>
<tr>
<th>Keywords</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>Delima (Malay</td>
<td>PDF</td>
</tr>
<tr>
<td>Punica Granatum</td>
<td>PDF</td>
</tr>
<tr>
<td>Pomegranate</td>
<td>PDF</td>
</tr>
<tr>
<td>الأرْمان</td>
<td>PDF</td>
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<td>اﻟﺮُﻣْاَﻧَﺔ</td>
<td>PDF</td>
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</tbody>
</table>

Referring to the diagram above, the results of previous research on pomegranate found that majority of study are dominated by journal articles by 85.8%. Books were in the second highest percentage of 7.6%. This was followed by a master dissertation with the percentage of 2.8%, and project paper by 0.9%. The lowest percentage recorded PhD thesis and conference papers by the same percentage by 0.5%. List of materials related publications pomegranate can be examined through the following table.

4. LITERATURE REVIEW ON POMEGRANATE

After all the data is collected, it will be scanned manually and classified using Microsoft Office Excel. Data that has been listed then be analyzed using statistical program SPSS (Statistical Package for the Social Sciences).

5. LIST OF PUBLICATIONS ON POMEGRANATE

**PhD Thesis**


4. غير بذل حسن على جي. 2009, استخلاص البكتيريا وانتان من الزمان، تحت مقدم لدبلجة للدكتور في السفولة، كلية الاقتصاد المنزلي والريادية العلمية، جامعة الملك عبد العزيز

5. Nor Azma Hannah Mazlan, 2004. Cytoprotection effects by honey alone or in combination with methanol extract of punica granatum L. and ethanol extract of nigella sativa L. on ethanol-induced gastric damage in rats.

10. Chin Hoong Fong, Yong Hoi-Sen, 2000, Malaysian Fruits in Colour, Bangsar: Tropical Press Sdn Bhd
16. فقاس ارشد، 2012، برنامج المتكامل خدمة اشجار الرمان، السلطة الوطنية الفلسطينية وزارة الزراعة، نشرة رقم: 35

Magazines
2. Purwantini, Indah dan Subagus Wahyuono. Isolation and identification of antifungal (candida albicans) compound from the hull of delima fruits (punica granatum). Majalah Farmasi Indonesia UGM Yokyakarta
3. Dr. Ong Hean Choi, Delima, Dewan Kosmik, Ogos 2003
4. Suzanne Jorgensen, Charlotte Brennard, Pomegranates, Preserve the Harvest, bilangan 7, Jun 2005

6. RESULTS

Based on previous studies, research on pomegranate are divided and analyzed according to eight key areas. Discussion of the findings are as follows;

ENVIRONMENTAL EDUCATION (FLORA)

1. Suzanne Jorgensen, Charlotte Brennard, Pomegranates, Preserve the Harvest, bil. 7, Jun 2005
2. Dr. Ong Hean Choi, Delima, Dewan Kosmik, Ogos 2003
3. , ,沃勒爾, 2012، السلطة الوطنية الفلسطينية
5. Chin Hoong Fong, Yong Hoi-Sen, 2000,
Malaysian Fruits in Colour, Bangsar: Tropical Press Sdn Bhd

**ISLAMIC EDUCATION**


**PHARMACOLOGY**

2. Tom Hsun Wei Huang, 2005, *Pomegranate Flower Improves Cardiac Lipid Metabolism In A Diabetic Rat Model: Role Of Lowering Circulating Lipids*, British Journal of Pharmacology, 145(6), pp. 769-774
9. K.B. Ajaikumar, M. Asheef, B.H. Babu, J.


NUTRITIONAL SCIENCE

1. Antonio González-Sarrías, 2010, Occurrence of urolithins, gut microbiota ellagic acid metabolites and proliferation markers expression response in the human prostate gland upon consumption of walnuts and pomegranate juice, Molecular Nutrition & Food Research, 54(3), pp. 311-322


30. Yunfeng Li, Changjiang Guo, Jijun Yang, Jingyu Wei, Jing Xu, Shuang Cheng, 2006, Evaluation of antioxidant properties of pomegranate peel extract in comparison with


37. Guangmin Liu, Xiang Xu, Qinfeng Hao, Yanxiang Gao, 2009, Supercritical CO₂ extraction optimization of pomegranate (Punica granatum L.) seed oil using response surface methodology, LWT - Food Science and Technology, 42(9), pp. 1491-1495.


91(1) pp. 157-162

**SCIENCE BOTANY**


5. Gary Sassano, Paul Sanderson, Johan Franx, Pascal Groot, Jeroen van Straalen and Josep Bassaganya-Riera, 2009, Analysis of pomegranate seed oil for the presence of jarcic acid, Journal of the Science of Food and Agriculture, 89(6), pp. 1046-1052


14. F. Khoshnam, et.al. 2007, Mass modeling of pomegranate (Punica granatum L.) fruit with some physical characteristics, Scientia Horticuluturae, 114(1), pp. 21-26


of Penicillium glabrum Causing Fruit Rot of Pomegranate (Punica granatum) in Greece, APS Journal, 93(12), pp. 1347

**BIO-MEDICAL**


8. Yuhao Li, Yanfei Qi, Tom H. W. Huang, Johji Yamahara and Basil D. Roufogalis, 2008, Pomegranate flower: a unique traditional antidiabetic medicine with dual PPAR-δ/γ activator properties, Diabetes, Obesity and Metabolism, 10(1), pp. 10-17


1. Khadher Ahmad et al., Bibliometric analysis on research study of pomegranate: a review towards new findings

2. hyperlipidemia, pancreatic cells lipid peroxidation and antioxidant enzymes in experimental diabetes, Food and Chemical Toxicology, 47(1), pp. 50–54


22. A Robert Neurath, Nathan Strick, Yun-Yao Li and Asim K Debnath, 2004, Punica granatum (Pomegranate) juice provides an HIV-1 entry inhibitor and candidate topical microbicidal, BMC Infectious Diseases, 4(41)


24. Mehran Haidari, Muzammil Ali, Samuel Ward Cassells III, Mohammad Madjid, 2009, Pomegranate (Punica granatum) purified polyphenol extract inhibits influenza virus and has a synergistic effect with oseltamivir, Phytomedicine, 16(12), pp. 1127–1136


31. C P Forestl, H Padma-NathanI and H R Liker, 2007, Efficacy and safety of pomegranate juice on improvement of erectile dysfunction in male patients with mild to moderate erectile dysfunction: a randomized, placebo-controlled, double-blind, cross over study, International Journal of Impotence Research, 19, pp. 564-567


34. R. Valsecchi, 1998, Immediate contact hypersensitivity to pomegranate, Contact Dermatitis, 38(1), pp. 44-45

35. Zuarida Mohyin, Buah Delima Kurangkan Risiko Sakit Jantung, majalah Al-Islam, Februari 2001

36. Arshi Malik, Farrukh Afaq, Sami Sarfaraz, Vaqar M. Adhami, Deeba N. Syed, and Hasan Mukhtar, Pomegranate fruit juice for chemoprevention and chemotherapy of prostate cancer, Proceedings of the National Academy of Sciences of the United States of America, October 11, 2005, vol. 102, no. 41


40. Bayizit, 2010, 

41. van Elswijk, 2004,

BIO-CHEMICAL


7. Navindra P. Seeram, et.al. 2005, In vitro antiproliferative, apoptotic and antioxidant activities of punicalagin, ellagic acid and a total pomegranate tannin extract are enhanced in combination with other polyphenols as found in pomegranate juice, The Journal of Nutritional Biochemistry, 16(6), pp. 360-367


14. Ismail Celik, Atilla Temur, Ismail Isik, 2009. Hepatoprotective role and antioxidant capacity of pomegranate (Punica granatum) flowers infusion against trichloroacetic acid-exposed in rats, Food and Chemical Toxicology, 47(1), (pp. 145-149


16. Meenakshi Shukla, et.al. 2008, Bioavailable constituents/metabolites of pomegranate (Punica granatum L) preferentially inhibit COX2 activity ex vivo and IL-1beta-induced


32. Qingquan Liu, et.al. 2011, A simple route to prepare pomegranate-like polystyrene-based microspheres with high porosity, Polymer International, 60(9), pp. 1287-1290.


34. "تتبنى الحسن عليه". 2009. استخلاص الليبرال والليبراليين من الرومان. تحت مسؤولية د. رضوان م. شلتوت، كلية الاقتصاد الوطني، جامعة القاهرة، مصر.

35. "زهاء يوسف حسن". 2000. بعض العوامل الفيزيولوجية والكيميائية المستخدمة في دراسة الخلايا النباتية في نمو العظام. من نشر "اللغة العربية"، الشرق الأوسط، القاهرة.
MICROBIOLOGY


4. B. Cerdá, et.al. 2004, Ellagitannins from pomegranate juice are metabolised into bioavailable but poor antioxidant hydroxy-6H-dibenzopyran-6-one derivatives by the colonic microflora of healthy humans, European Journal of Nutrition, 43(4), pp 205-220

5. Veeramuthu Duraiandiyar, Muniappan Ayyanar and Savarimuthu Ignacimuthu, 2006, Antimicrobial activity of some ethnomedical plants used by Paliyar tribe from Tamil Nadu, India, BMC Complementary and Alternative Medicine, 6(35)

6. E.A. Hayounia, et.al. 2011, Hydroalcoholic extract based-ointment from Punica granatum L. peels with enhanced in vivo healing potential on dermal wound, Phytomedicine, 18(15), pp. 976-984

7. Mario Dell Agli, et.al. 2010, Ellagitannins of the fruit rind of pomegranate (Punica granatum) antagonize in vitro the host inflammatory response mechanisms involved in the onset of malaria, Malaria Journal, 9(208)


17. S. Rout, R. Banerjee, 2007, Free radical scavenging, anti-glycation and tyrosinase inhibition properties of a polysaccharide fraction isolated from the rind from Punica granatum, Bioresource Technology, 98(16), pp. 3159-3163


Pertanian Bogor


7. SCOPE OF RESEARCH AND DISCUSSION ON POMEGRANATE

Based on the study of the pomegranate classification, analysis of the results are as follows;

Table 1. Classification of research area on pomegranate

<table>
<thead>
<tr>
<th>Valid</th>
<th>Environmental Education (Flora)</th>
<th>Frequency</th>
<th>Valid Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Islamic Education</td>
<td>10</td>
<td>4.7</td>
</tr>
<tr>
<td></td>
<td>Pharmacology</td>
<td>11</td>
<td>5.2</td>
</tr>
<tr>
<td></td>
<td>Nutritional Science</td>
<td>19</td>
<td>9.0</td>
</tr>
<tr>
<td></td>
<td>Science Botany</td>
<td>52</td>
<td>24.6</td>
</tr>
<tr>
<td></td>
<td>Bio-Medical</td>
<td>23</td>
<td>10.9</td>
</tr>
<tr>
<td></td>
<td>Bio-Chemical</td>
<td>41</td>
<td>19.4</td>
</tr>
<tr>
<td></td>
<td>Microbiology</td>
<td>35</td>
<td>16.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20</td>
<td>9.5</td>
</tr>
<tr>
<td></td>
<td>Jumlah</td>
<td>211</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Research on the method of analysis conducted in the previous studies found that most studies on pomegranate done on a scientific analysis (laboratory studies). Studies on aspects of science has been divided into six areas. Focus areas include scientific discussion of pomegranate covered in the aspect of Pharmacy, Nutritional Science, Science Botany, Bio-Medical, Bio-Chemical and Microbiology. Only one field of study that focuses on the analysis of Islam focusing on Islamic Education.

Additional fields of Environmental Education (Flora) are also included by researchers to collect data and find results on plants that contain pomegranate. Comparative evaluation of research found that a total of 188 kinds of studies involves the study of the scientific aspects compared to only 11 studies based on Islam (Islamic Education) and 10 studies based on environmental education. Thus, this proves the scientific study of pomegranate is well known by researcher.

Pomegranate is a fruit that has attracted researchers from around the world in which all components of the pomegranate has its own significance for the research analysis to identify its benefits and interests. This includes the skin, fruit, juice, and seed to produce extracts of pomegranate.

Referring to the study of pomegranate from the perspective of Islamic studies, it clearly shows the lack of specific research material concerning this fruit. The best study discusses in detail about the pomegranate from the point of view of religion and science is an article in journal entitled “Punica Granatum Bicara Al-Quran Al-Hadith Dan Sains Perubatan Modern” (Punica Granatum From Al-Quran, Al-Hadith and Modern Medical Science’s Point of View) by Dr. Munirah Abd
Razzak and book written by Dr. Zaid bin Muhammad al-Rummani entitled “Penawar Dalam Buah Delima, Makanan Syurga dan Ubat (Antidote In Pomegranate, Food and Medication of Heaven).

More than that, studies of a pomegranate are only discussed in general view with a summary of the usefulness or efficacy of pomegranate in books or medical research focuses on Tibb al-Nabawi. Among the examples is book Tibb al-Nabawi written by Ibn Qayyim al-Jawziyyah and Pemakanan di dalam Al-Quran dan Al-Hadis written by Siti Rudainah Saleh. The study of pomegranate in magazines were too few in number with a brief discussion.

8. CONTRIBUTION OF THE PREVIOUS RESEARCH

Pomegranate contains 78% water, 1.6% protein, 0.1% fat, 5.1% fiber, carbohydrates 14.5%, 0.7 % minerals and 14mg / 100g ascorbic acid (vitamin C). The fruit is also rich in sodium, riboflavin, thiamin, niacin, vitamin C, calcium and phosphorus. All parts of this plant contain tannins, especially on the skin of 26%, 10-25% stem bark and root bark of 28%. Tannins are used to color the material from skin. Pomegranate bark and roots also contain alkaloids.

Pomegranate flowers can also be used mainly in the treatment of disease. In addition, the bright red flowers are also a source of natural dyes. A study conducted at the Universiy of California at Los Angeles have analyzed 10 types of drinks that have high power to fight disease. Results of the study found that pomegranate juice is best followed by red wine, grape juice, blueberry juice, black cherry juice, cranberry juice, orange juice, tea and apple juice.

In addition, the pomegranate is very significant for the health of the body with high antioxidant content with its main bioactive polyphenols elements. It has a capability of lowering blood pressure in patients with hypertension. Punicalagin is the main polyphenol antioxidants in pomegranate juice. A compound found only in pomegranates called punicalagin is shown to benefit the heart and blood vessels. It not only lowers cholesterol, but also lowers blood pressure and increases the speed at which heart blockages (atherosclerosis) melt away. Antioxidant activity was tested in vitro with pomegranate juice, punicalagin, pomegranate ellagic acid and tannins (polyphenols extracted from pomegranate juice). The experimental results revealed that whole pomegranate juice has more antioxidant activity of the substances.

Furthermore, pomegranate juice or extract found helpful for atherosclerosis. Intake of pomegranate juice a day is good for coronary heart patients. In one study, researchers have provided pomegranate juice for 45 patients suffering from coronary heart disease and myocardial ischemia every day for 3 months. Based on the data, the researchers concluded that pomegranate juice are able to reduce stress stimuli.

The clinical fantastic result about pomegranate juice has also been shown to reduce total cholesterol, low-density lipoprotein (LDL), the ratio of LDL / high density lipoprotein (HDL) and the ratio of total cholesterol HDL. These findings suggest that consumption of pomegranate juice can alter heart disease risk factors in patients with hyperlipidemia (lack of blood lipids).

Pomegranate also has anti-bacterial and anti-microbial. The results showed that the extract of pomegranate are able to fight against methicillin-sensitive-resistant (MRSA), Staphylococcus aureus Salmonella typhi and Escherichia coli O157: H7. Studies in vitro showed anti-HIV-1 microbicide could potentially result from pomegranate. In the field of dentistry, hydroalcoholic extract (HAE) of pomegranate is very effective against dental plaque microorganisms.

In vivo studies performed on pomegranate oil, seed oil, fermented juice polyphenols and pericarp polyphenols on
growth of human prostate cancer cells found to inhibit the growth of breast cancer cells dramatically, aggression and increased apoptosis (programmed cell death) in breast cancer cells. Pomegranate extract effectively repair the damage with UVA-mediated cell lines soften and prevent potential skin cancer. It can act as a barrier against enzymes that can damage the cartilage. Pomegranate juice is a remedy for skin damaged by sun and aging. It repairing damage to the skin smooth and youthful again. For people with Alzheimer’s, pomegranate juice may help prevent and slow development.

From Islamic point of view, Ibn Sina (1037M), Ibn Qayyim (1292M) and al-Dhahabi (1348M) believes eating pomegranates can strengthen the heart, eliminate tapeworms, cure dysentery, nervous weakness, sore-throat inflammation. Pomegranate skin if boiled and when the water is drunk will stop diarrhea disease. Eat fresh pomegranate can reduce cholesterol levels and help digestion.

In addition, drinking pomegranate juice with honey will launch bowel function, eliminate constipation, eases breathing, blood cleansing and treating the wound injury. Muhammad al-Sayyid al-Arna’ut also said that pomegranate juice can soothe pain, fever and thirst. Dried pomegranate skin is good for cough, chest pain, lungs, heart, stomach, liver, digestion and treat diarrhea and infections of tapeworms.

After analyzing the findings of medical studies about pomegranate, it proved to be the fruit of paradise. This is because it has many benefits available with antioxidant benefits, anti-bacterial, anti-cancer, and also good for the heart, liver, sperm production, stomach, skin, brain, teeth, cartilage and wound injury.

9. ADVANCED RESEARCH ON POMEGRANATE

Health field that applies the herb is a broad field of study. There are many aspects that can be carried out a detailed study on the future whether in religion or science aspect. Here are a few suggestions fields and aspects related to these research;

a. Specific studies about pomegranate from a religious perspective is very little. Most studies of a general nature can be devoted to other aspects of the law and emphasize the usefulness of henna available from authentic traditions. This is due to the existence of hadith dhaif (a hadith which fails to reach the status of Hasan) quoted as evidence the efficacy of herbs and fruits in Islam.

b. The combination of discussion and analysis about pomegranate from the viewpoint of religion and science should be done. Until now, the search results data showed that only two publications that discuss the pomegranate with a combination of a religious viewpoint and perspective of science. It is at once can prove the truth of the teachings of Islam with proofs results of scientific analysis.

c. The existence of pomegranate products available in the market or used as a capable new products can be examined from the perspective of halal (lawful) and haram (unlawful). The results of the study can be used as a high-value products that can be sell in the market. Thus, the content of pomegranate should be studied from the aspect of its effectiveness to meet the needs of the community.

d. Henna species vary according to country. The study of pomegranate in Malaysia also not yet widespread. Research on pomegranate species found in Malaysia can be applied to produce health products Malaysia.

10. CONCLUSION

Pomegranate is a prophetic food that is valuable. It is not just a fruit that can be eaten but every aspect in pomegranate trees
can provide health benefits and disease prevention. All aspects related studies to pomegranate should be examined in depth by academics to produce a product that is useful to all classes of society. Thus, the efforts of researchers from Universiti Malaya through grants TRGS (TR001A-2014) entitled 'Safe and Health Uses of Fruits and Herbs Mentioned in Al-Quran and Ahadith: An Analysis of ethnomedicinal Importance in Islamic Products in Malaysia' very significant in the development of science. Advanced new study of pomegranate is expected to produce a new findings for the benefit of Malaysia.

11. REFERENCES

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D. N. Syed et.al. 2006. ‘Photochemopreventive Effect of Pomegranate Fruit Extract on UVA-Mediated Activation of Cellular Pathways In Normal Human Epidermal Keratinocytes’, Photochem Photobiology, 82(2)


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Shams al-Din Muhammad bin Abu Bakr
Khadher Ahmad et al.: Bibliometric analysis on research study of pomegranate: a review towards new findings


Tanner, Cory, 2009, "Pomegranate". Horticulture Extension Department, Clemson University, 21 June 2014.

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