

ISSN 2580-4936

Health Notions

Published by: Humanistic Network for Science and Technology



<http://heanoti.com/index.php/hn>

Volume 3 Number 6
June 2019



Health Notions

ISSN: 2580-4936
(online version only)

Published by:
Humanistic Network for Science and Technology

Cemara Street 25, RT.01 RW.02, Ds./Kec. Sukorejo, Ponorogo, East Java, Indonesia
63453

Phone: +6282142259360

Email: hunescite@gmail.com, admin@heanoti.com

<http://heanoti.com/index.php/hn>

"Health Notions" is a media for the publication of articles on research, literature review, book review, commentary, opinion, scientific news and letter to editor in the areas of health science and practice such as public health, medicine, dentistry, pharmaceutical, environmental health, nursing, midwifery, nutrition, health technology, clinical laboratories, health education, health information system, health management, and popular health.

EDITORIAL TEAM

Chief Editor (valid from January 1, 2019)

Dr. Heru Santoso Wahito NUGROHO
Poltekkes Kemenkes Surabaya (Health Polytechnic of Surabaya), Indonesia

Editors (valid from January 1, 2019)

Dr. Joel Rey U. ACOB
Department of Nursing, Visayas State University, Philippines

Dr. Sahrir SILLEHU
Department of Public Health, STIKes (College of Health Science) "Maluku Husada",
Indonesia

Tanko Titus AUTA
Department of Nursing, Niger State Ministry of Health, Minna, Nigeria

Wiwin MARTININGSIH
Poltekkes Kemenkes Malang (Health Polytechnic of Malang), Indonesia

Somsak THOJAMPA
School of Nursing, Naresuan University, Thailand

Dr. Hadi PRAYITNO
Department of Public Health, Universitas Jember, Indonesia

Dr. Mfuh Anita Y. LUKONG
Department of Nursing Science, Faculty of Allied Health Sciences, College of Health
Sciences, Ahmadu Bello University, Nigeria

Victoria KALUSOPA
School of Nursing, University of Zambia, Zambia

Administrator (valid from January 1, 2019)

Suparji, SST, SKM, MPd
Poltekkes Kemenkes Surabaya (Health Polytechnic of Surabaya), Indonesia

FOCUSE AND SCOPE

"Health Notions" is a media for the publication of articles on research, literature review, book review, commentary, opinion, scientific news and letter to editor in the areas of health science and practice such as public health, medicine, dentistry, pharmaceutical, environmental health, nursing, midwifery, nutrition, health technology, clinical laboratories, health education, health information system, health management, and popular health.

REVIEW

Article submitted to this journal going through two types of reviews. The first is review by peer reviewers, who are not involved in "Health Notions" management. These reviewers have expertise relevant to the articles assigned to them. In this case, applied "BLIND PEER REVIEW", meaning that the author does not know the reviewers to review the article. The end result of peer review is "RECOMMENDATION".

The second is review done by the editor of "Health Notions". The end result of this review is "DECISION". After it is decided that the article is "ACCEPTED", then the article goes to the editing stage, and then will be scheduled for publication.

Researchers can register as a reviewer for stints reviewing articles that are relevant to their area of expertise. Guidelines for review activities are as follows:

1. Sign up for get a username and password
2. LOGIN using username and password
3. Receiving requests to review articles
4. Approved the task of reviewing
5. Check the article (metadata and attached file)
6. Write down the "results of the review". Reviewer can do a review directly on the article file, then upload it
7. Provide a "recommendation"

Note: review is a social duty (non profit).

PRIVACY STATEMENT

The names and email addresses entered in this journal site will be used exclusively for the stated purposes of this journal and will not be made available for any other purpose or to any other party.

ARCHIVING

Health Notions utilizes the Lots of Copies Keep Stuff Safe (LOCKSS) system to create a distributed archiving system among participating libraries and permits those libraries to create permanent archives of the journal for purposes of preservation and restoration.

PROCESSING FEE

This journal charges the following author fees.

Article submission: 0.00 USD (free for charge)

Article publication fee: 110.00 USD or 1,600,000.00 IDR (If this article is accepted, you will be asked to pay article publication fee via e-mail).

SUBMISSION PREPARATION CHECKLIST

As part of the submission process, authors are required to check off their submission's compliance with all of the following items, and submissions may be returned to authors that do not adhere to these guidelines.

1. The submission has not been previously published, nor is it before another journal for consideration (or an explanation has been provided in Comments to the Editor).
2. The text typed in article template of this journal.
3. The text adheres to the stylistic and bibliographic requirements outlined in the Author Guidelines.

AUTHOR GUIDELINES

"Health Notions" received the original article in the form of research, literature review, book review, commentary, opinion, scientific news and letter to editor in the field of health, which has never been published, is equipped with:

1. Research license or endorsement page,
2. If the researcher is more than one person, there must be an agreement signed by the researcher sequence all researchers.

Editor has the authority to accept or reject the incoming articles, and the entire article will not be returned to author. Editor is also authorized to change the article, but will not change the meaning contained therein. In student work article (scientific papers, thesis, dissertation, etc.), student is a primary author.

Terms of the article is as follows:

1. Typed in article template of Health Notions (available at website)
2. The maximum number is 10 pages and must be submitted by online registration

Article must be written in English and meet the following systematic:

1. The title is written no more than 14 words at the center position.
2. The author's full name without a title written under the title, in bold at the center. Beneath it is written the institutions of author.
3. The word "ABSTRACT" typed in capital letters, at the center, and the contents of the abstract are typed in one paragraph, without indentation. Under the contents of the abstract should be added to the maximum five key words.
4. Introduction is written with indentation 1 cm.
5. Methods is written with indentation 1 cm. The contents adapted to the materials and research methods applied in the study.
6. Results is written with indentation 1 cm. If necessary, this section is equipped with tables and images (photographs, diagrams, illustrations and other forms). The title of the tables are written above the table, the position in the center, while the title of the picture written below the image, with the position in the center.
7. Discussion is with indentation 1 cm. In this section, the results are discussed by referring to the literature and the results of other studies.
8. Conclusions and suggestions written with indentation 1 cm. They are presented in a narrative.
9. References written with a hanging indentation 1 cm, referring to the Vancouver style.

LIST OF ARTICLES

- 1 [Development of Scientific Activity in Humanistic Network for Science and Technology](#) 247-250
Tanko Titus Auta, Sanglar Polnok, Ilyas Ibrahim
- 2 [Development of Social Capital Based on Health Promotion Model to Improve Behavior for Taking VIA Test](#) 251-258
Tinuk Esti Handayani, Agung Suharto
- 3 [Utilization of The Place of Delivery Based on Childbirth Assurance and Community Habits](#) 259-266
Mareta Bakale Bakoil, Heru Santoso Wahito Nugroho, Veki Edizon Tuhana
- 4 [Arabica Coffee \(Coffea Arabica\) Fruit Skin Potential Towards the Increase of Fibroblast Cells Amount Within Socket Post Tooth Extraction of Male Wistar Mouse](#) 267-272
Ahmad Masruri, Agus Sumono, Tecky Indriana
- 5 [Development of Assessment Instruments for Disaster Resilient Campus Capacity](#) 273-278
Hery Sumasto, Sulikah Sulikah, Nurwening Tyas Wisnu
- 6 [Effects of Giving Iodized Salt, Counseling of Iodine and Goitrogenic Sources of Food in Mothers Who Have Elementary School Children Against Urinary Iodine Excretion](#) 279-284
I Ketut Swiryajaya, Iswari Pauzi

DOI: <http://dx.doi.org/10.33846/hn30604>
<http://heanoti.com/index.php/hn>



RESEARCH ARTICLE

URL of this article: <http://heanoti.com/index.php/hn/article/view/hn30604>

Arabica Coffee (*Coffea Arabica*) Fruit Skin Potential Towards the Increase of Fibroblast Cells Amount Within Socket Post Tooth Extraction of Male Wistar Mouse

Ahmad Masruri¹, Agus Sumono², Tecky Indriana^{3(CA)}

¹Dentistry Faculty, Universitas Jember, Indonesia; amasruri03@gmail.com

²Basic Dentistry Department, Dentistry Faculty, Universitas Jember, Indonesia; agusumono@gmail.com

^{3(CA)}Biomedic Department, Dentistry Faculty, Universitas Jember, Indonesia; tecky@unej.ac.id (Corresponding Author)

Background: Tooth extraction can cause wound in hard tissue and soft tissue inside oral cavity. Wound healing process involves cell proliferation especially fibroblast cells. To accelerate fibroblast cell proliferation alternative substance that can accelerates wound healing process is needed which is arabica coffee fruit skin. Arabica coffee fruit skin contains substances such as polyphenols, tannin, chlorogenic acid, and caffeine expected to be able to stimulate fibroblast cells amount. **Objective:** To understand arabica coffee fruit skin potential towards increase in number of fibroblast cells on the socket after tooth extraction. **Method:** The design of this research was post test only control group with sample size of 24 wistar mouse. The samples used were divided into two groups which are control and treatment group. Then treatment was given in 3 days, 5 days, and 7 days. Then they were decapitated to undergo tissue processing with HE coloring and post tooth extraction socket fibroblast cells counting. Acquired data then analyzed used One Way ANOVA and LSD test. **Result:** Fibroblast cell amount increased significantly ($p < 0.05$) in treatment group compared to control group. **Conclusion:** Arabica coffee fruit skin potentially increase fibroblast cells amount in socket post tooth extraction of male wistar mouse.

Keywords: tooth extraction; wound healing; fibroblast cells

INTRODUCTION

Background

Tooth extraction is a process to remove tooth from alveolar, where the said tooth can no longer receive treatment. Tooth extraction can cause a wound to appear at either soft or hard tissue⁽¹⁾. Wound healing process post extraction involves inflammatory phase, proliferation phase, and remodeling phase. Inflammatory phase is a first reaction when body receive lesion. Several minutes after, vasodilation and capillary permeability raise occurred because of release of chemicals at wounded tissue. And then next is proliferation phase which is a phase where new blood vessel and granulation tissue are formed. Fibroblast cells are cells with important role in this phase. In wound healing process, fibroblast cells first appeared on the third day and reach peak on day 7. Fibroblast cells responsible to produce protein structure that will be used during tissue reconstruction process like collagen, elastin, and reticular. Remodeling/maturation phase is the longest phase^(2,3,4).

Technology development of health pharmacy in the world has centered their attention to use material that are produced from nature because it is safer to use compared to medicine that contains chemicals. One of natural material currently developed is arabica coffee (*Coffea arabica*). Arabican coffee is a type of coffee that is the most consumed which is 70%⁽⁵⁾. Coffee production also produced waste as in coffee skins that is not used optimally in health department. Content of coffee fruit skin isn't much of a different compared to coffee fruit itself, which contain polyphenols, tannin, chlorogenic acid, and caffeine. Coffee fruit has been researched with one of the result is for incision wound recovery^(6,7).

Arabica coffee fruit skin contain higher polyphenols than robusta coffee. Coffee fruit skin contain caffeine and polyphenols that can function as natural antioxidant. Polyphenols covers flavonoids, catechins, epicatechins, procyanidin, anthocyanin, complex tannin, and flavonol glycosides. Flavonoids function as anti-inflammatory. Flavonoids inhibit important phase in prostaglandin biosynthesis, in cyclooxygenase pathway so inflammation process is shorter and fibroblast proliferation is faster, so it triggers collagen formation and accelerate wound healing process^(7,8,9,10).

Objective

The objective of this research is to understand potentiation of arabica coffee fruit skin (*Coffea arabica*) towards the increase of fibroblast cells amount in post tooth extraction socket of male wistar mouse.

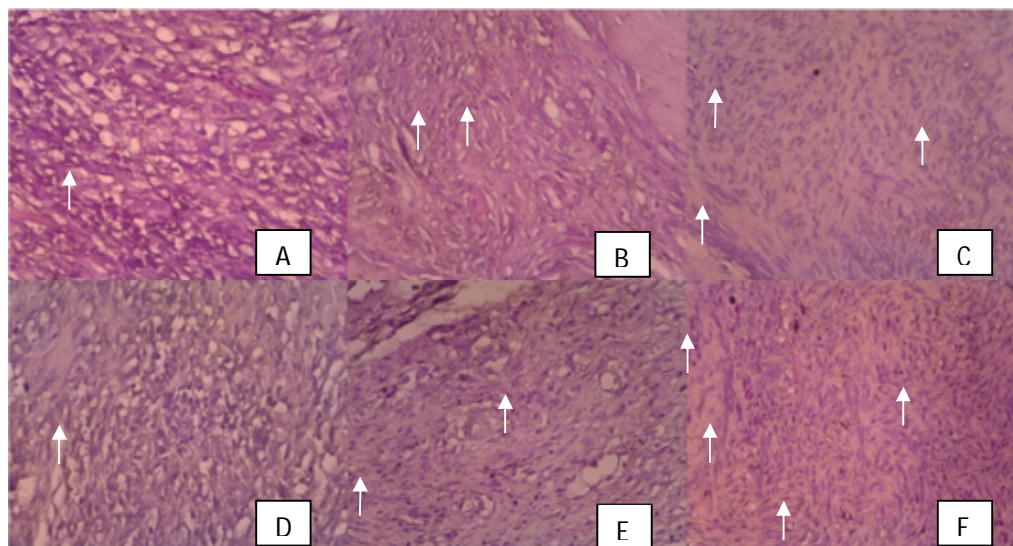
METHOD

The research type was laboratory experimental with post test only control group design⁽¹¹⁾. This research was conducted in the biomedical laboratory of the faculty of dentistry, Universitas Jember in August until November 2018. Sample size were 24 male Wistar mouse with age 2-3 month old and body weight 200-225 gram separated into 2 groups named control and treatment group. Treatment group given arabica coffee fruit skin powder with intragastric method and dose of 0.117 gr/day for 3 days, 5 days, and 7 days. Control group given akuades 2 ml intragastrik for 3 days, 5 days, and 7 days. Male Wistar mouse decapitated at day 4, 6, and day 8 to execute tissue processing with HE coloring, next fibroblast cells in tooth socket post extraction observed using optilab that was connected with binocular microscope with 400X magnifier. Data then tested using One Way ANOVA test with 95% confidence level. And next tested with post hoc Least Significant Difference test to see differences between each groups.

RESULT

Fibroblast Cells Amount

According to Figure 1, tooth extraction socket was seen with granulation tissue inside that was made of fibroblast cells. Fibroblast cells were cells with flat shape with oval cores. Fibroblast cells observed using *optilab* that was connected to binocular microscope with 400X magnifier. Fibroblast cells picture as follows (Figure 1).



Explanation: (A) Histology picture of fibroblast cells in tooth socket post extraction from Control group day 3 with 400X magnifier, (B) Control group day 5, (C) Control group day 7, (D) Treatment group day 3, (E) Treatment group day 5, (F) Treatment group day 7, and (G) White arrow marks shows fibroblast cells inside socket.

Figure 1. Figure fibroblast cells in socket post tooth extraction

Based on observation at preparation socket post male wistar mouse tooth extraction, we obtained average and standard deviation of fibroblast cells amount at research group (Tabel 1).

Tabel 1. Mean and standard deviation of fibroblast cells amount

Group	3 days		5 days		7 days	
	Mean	SD	Mean	SD	Mean	SD
Control	10.22	2.63	17.13	0.97	29.91	4.77
Treatment	18.91	1.62	24.22	2.33	43.58	5.91

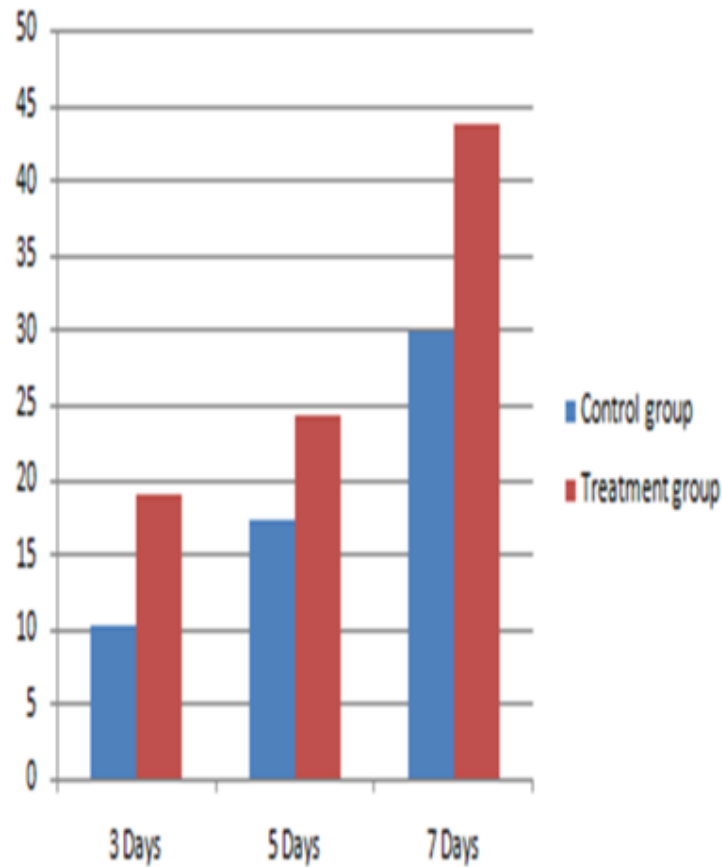


Figure 2. The mean of fibroblast cells amount of control group and treatment group in socket post tooth extraction

According to Tabel 1 and Figure 2, showed a raise of fibroblast cells amount in control group and treatment group. However, fibroblast cells amount in treatment group were higher compared to control group.

Data Analysis

Normality test result used Shapiro-Wilk test showed significance value ($p > 0.05$) and for homogeneity test used Levene achieved significance value $p < 0.05$. Based on test result, distributed data were normal but inhomogeneous. Next, One Way ANOVA test was done to see if there was a difference between average of fibroblast cells amount between control and treatment group. Based on One-way ANOVA test we achieved significance value of ($p < 0.05$). This showed that there was a significant difference between control and treatment group. Next, post hoc LSD (Least Significant Difference) done to see if there was a difference between each research group with significance ($p < 0.05$). Summary of One Way ANOVA and LSD as follows in Tabel 2.

Tabel 2. Summary of data analysis result of fibroblast cells amount between each group

Group	n	3 days	5 days	7 days	P
Control	4	10.22±2.63 ^{aA}	17.13±0.97 ^{aB}	29.91±4.77 ^{aC}	0.000*
Treatment	4	18.91±1.62 ^{bA}	24.22±2.33 ^{bB}	43.58±5.91 ^{bC}	0.000*
P		0.003*	0.010*	0.000*	

Explanation :

(*) : There was a significant difference ($p < 0,05$);

(ab) : Superscript in a column shows significant difference;

(ABC) : Superscript in a row shows significant difference between each group.

DISCUSSION

Wound recovery process starts with inflammatory phase, inflammatory phase is the first reaction after wounded. Blood vessels and lymph vessels undergo vasoconstriction several minutes after trauma. Platelets aggregates around wounded endothelium to form blood clot. Then, blood vessels vasodilation occur because of inflammatory mediator release such as prostaglandin in wounded tissue. Next, proliferation phase is an important phase in wound recovery. In this phase, fibroblast cells is the cell with important role. Fibroblast cells is the main component for connective tissue. Fibroblast cells first appear on the 3rd day and reached peak on 7th day^(3,12).

Based on research result, the average of fibroblast cells amount in socket post tooth extraction of male wistar mouse in control group during 3 days until 7 days keeps raising. And also the same for treatment group. Fibroblast cells amount in treatment group are higher compared to control group. Average of fibroblast cells amount in treatment group has a significant raise during 3 days compared to control group during 3 days. Treatment group has a significant raise during 5 days compared to control group during 5 days. While, during 7 days treatment group also has a significant raise in average amount of fibroblast cells compared to 7 days on control group.

Arabica coffee fruit skin contains many compound with some of them being caffeine, chlorogenic acid, tannin, and polyphenols. Those compounds synergize with each other to accelerate fibroblast cells proliferation that helps healing process in extraction tooth socket. Contents of arabica coffee fruit skin which are caffeine and chlorogenic acid plays a role in wound healing process. Caffeine and chlorogenic acid are an antioxidant. Having antioxidant helps body to prevent damage by radical compounds, such as decreased immune system. Caffeine also function as antibacterial by inhibiting bacterial activity by enhancing lysozyme activity. Chlorogenic acid belongs to ester family which is formed from the bond of quinine acid, and few transaminic acid, usually caffeic, pcoumaric, and ferulic acid. Chlorogenic acid om arabica coffee fruit skin is able to

stimulate macrophages to release *growth factor* (TGF- α , TGF- β , PDGF, VEGF, and IL-1) to help accelerating healing process. TGF- β plays a role in angiogenesis, reepithelialization, and tissue bond regeneration^(13,14,15).

Flavonoids are the biggest group in polyphenols. Flavonoids in arabica coffee fruit skin powder plays important role to accelerate wound healing process. Flavonoids able to inhibit arachidonic acid by blocking lipooxygenase and cyclooxygenase path. Arachidonic acid then will synthesize prostaglandin and thromboxane through siklooksigenase path, while leukotriene will be produced through lipooxygenase path. If arachidonic acid is inhibited, then the production of prostaglandin, thromboxane, and leukotriene as inflammatory mediator will decrease. That will cause the decrease of sore pain, edema, and blood vessel vasodilation. Then, inflammatory cell migration to wounded area will decrease and inflammation process will shorten and immediately enter proliferation phase^(10,16).

Flavonoids and tannin able to raise TGF- β so TGF- β can induce fibroblast cells migration into fibrin matrix⁽¹⁷⁾. Macrophages will keep producing growth factor such as PDGF and TGF- β that induce fibroblast to proliferate, migrate, storing extracellular matrix, and stimulate endothelium cells to form new blood vessel. With so many activated TGF- β , the amount of fibroblast cells that migrate to wounded part will increase. The more fibroblast cells formed, collagen fibers will also increase so that healing process will accelerate. Not only collagen fiber, said fibroblast cells will then form connective tissue by forming reticular fiber, elastic, glycosamine, and glycoprotein which is the base components of connective tissue⁽¹⁸⁾.

CONCLUSION

Based on research result, it can be concluded that compound content of arabica coffee fruit skin (*Coffea arabica*) which are polyphenols, tannin, chlorogenic acid, and caffeine synergize with each other to potentially increase fibroblast cells amount within socket post tooth extraction of male wistar mouse.

REFERENCES

- Gordon PW. Practical Textbook for Oral Surgery (Buku Ajar Praktis Bedah Mulut). Jakarta: EGC, 2013; p. 36-44, 93-100.
- Miloro M. Peterson's Principles of Oral and Maxillofacial Surgery 2-nd. Ed. 2004.
- Sjamsuhidajat R, Jong WD. Surgical Textbook (Buku Ajar Ilmu Bedah). Jakarta: EGC; 2005.
- Khullar, Shilpa, Mittal A, Pankaj D. Healing of Tooth Extraction Socket. Ghaziabad UP: Heal Talk. 2012;4(5):37-39.
- Rahardjo P. Coffee Gardening (Berkebun Kopi). Jakarta: Penebar Swadaya; 2017.
- Artho LN, Wuisan J, Najooan JA. The Effect of Robusta Coffee Powder on Incision Wound Healing In Rabbits (Efek Serbuk Kopi Robusta Terhadap Penyembuhan Luka Insisi Pada Kelinci). Jurnal e-Biomedik. 2015.
- Mullen W, Nemzer B, Stalmach A, Ali S, Combet E. Polyphenolic and Hydroxycinnamate Contents of Whole Coffee Fruits from China, India, and Mexico. J. Agric. Food Chem. 2013;61:5298-5309.
- Esquivel P, Jimenez VM. Functional Properties of Coffee and Coffee by Products. Food Res. Int. 2012;46: 488-495.
- Murthy PS, Naidu MM. Recovery of Phenolic Antioxidants and Functional Compounds from Coffee Industry By-Products. Food Bioprocess Technol. 2012;5:897-903.
- Barbul A. Wound Healing. In: F. Charles Brunnicardi, Dana K, Andersen, Timothy R, Billiar, David L, et al., eds. Schwartz's principles of surgery. 8th ed. New York: McGraw-Hill Companies BC Decker Inc. London; 2005. pp.3-5.
- Notoatmodjo S. Health Research Methodology (Metodologi Penelitian Kesehatan). Jakarta : Rineka Cipta; 2010.
- Baratawidjaja, Karnen G. Basic Immunology (Imunologi Dasar). Jakarta: Medical Faculty, Universitas Indonesia; 2014.
- Ramanaviciene, Almira, Mostovoju, Voktoras, Bachmatova, Iriana, Ramanavicius. Anti-bacterial Effect on Caffeine on Eschericia coli and Pseudomonas florescens. Journal Acta Medica Lituania. 2003;10(4):185-188.
- Morishita H, Ohnishi M. Absorption, metabolism, and biological activities of chlorogenic acids and related compounds. Studies in natural products chemistry. 2001;25:932.
- Barrientos S, Olivera S, Golinko MS, Brem H, Tomic-Canic M. Growth factors and Cytokines in Wound Healing. J Wound Repair and Regeneration. 2008;16:585-601.
- Robbin, Kumar. Basic Pathology. 8th Ed. Philadelphia: Saunders; 2006. pp. 17-21.
- Khan I, Kumar N, Pant I, Narra S, Kondaiah P. Activation of TGF-b Pathway by Areca Nut Constituents A

- Possible Cause of Oral Submucous Fibrosis. PLoS ONE. 2012;7(12):1-12.
18. Gurtner GC. Wound Healing: Normal and Abnormal, Grabb dan Smith's Plastic Surgery. Sixth Edition. Philadelphia. 2007:15-22.