JCARR
JOURNAL OF CLINICAL ADVANCES AND RESEARCH REVIEWS

Available online on http://www.jcarr.in/
Journal of Clinical Advances and Research Reviews 2024; 02(01); 16-22
ISSN: 3048-6556

Review

A Review on Wound Healing Activity of *Daucus Carrota* and General Method of Herbal Topical Formulation

Shreyasi*[1], Anil Sharma[2], Shailesh Sharma[3], Hansraj Bishnoi[4], Amit Kumar Sharma[5]
[1]*PhD Research Scholar, Dr. K.N. Modi University, Newai, Rajasthan*
[2]*Professor, Dr. K.N. Modi University, Newai, Rajasthan*
[3]*Principal, Shyam University, Dausa, Rajasthan*
[4]*Principal, Vivekanand college of pharmacy, Bikaner*
[5]*Associate professor, Dr. K.N. Modi University, Newai, Rajasthan*

Received: 10-12-2024 / **Revised:** 23-12-2024 / **Accepted:** 05-01-2025
Corresponding Author: Shreyasi
Email: shreyashithakur31@gmail.com
Conflict of interest: Nil

Abstract:
Throughout much of human history, plants have served as the basis for medical treatments; this type of traditional medicine is still commonly used today. Herbal products that were once used in traditional medicine have gained popularity. Herbal medications play a significant role in both treating and preventing human illness all over the world. Herbal remedies often have the following benefits: efficacy, safety, acceptance, and affordability. Phytochemicals, sometimes referred to as bioactive substances, are abundant in fruits and vegetables and have become recognised for their nutraceutical and health beneficial properties. *Daucus carota L.* is used in the traditional medicine for the treatment of variety of ailments such as anti-oxidant, anti-inflammatory, anti-microbial, anti-cancer etc. Now a days herbal medicines are mostly administered from topical rout for various treatment purpose so aim of current review is described about wound healing activity of *daucus carrota* and general method of herbal topical formulation.
Keywords: Herbal plant, Herbal medicine, wound healing, Herbal formulation, Daucus carrota.

INTRODUCTION

The intricate, tightly controlled process of wound healing is essential to preserving the skin's barrier function. The delicate interplay between several highly controlled variables is necessary for the extraordinarily complex process of cutaneous wound healing, which aims to repair damaged skin and restore its barrier function. The great majority of superficial wounds follow this series of events normally, but there are several places along the pathway where it can go wrong, particularly when there are underlying disease conditions like diabetes. A chronic wound may develop as a result of irregular wound healing, which places a heavy strain on the patient and the healthcare system. An individual with a diabetic ulcer is thought to cost around US$50,000 and chronic wounds as a whole cost the medical system over US$25 billion per year, with the number of patients affected growing yearly from 6.5 million, given the increasing prevalence of diabetes and other chronic diseases that may affect wound healing [1, 2]. Potential infection is the most frequent avoidable obstacle to wound healing mechanism (**Fig-1)**, and topical antimicrobials have long been used in an empirical manner to try to prevent wound infection. A crucial threshold of 105 bacteria has been identified as the boundary between colonisation and a clinically meaningful infection

that may hamper wound healing, despite the fact that bacteria are an ordinary part of the skin flora and hence wounds [3]. The herbal plant is those that were utilised when consumers' demand for herbal products and their products' medicinal value in product preparation led to a demand for natural products and natural extracts in cosmetics preparations. One of the earliest traditional medical systems, Ayurveda uses plant extracts from various parts of the plant to treat and manage a wide range of illnesses and infections [4]. The oldest holistic, sacred, and traditional medicinal plant in history is Nyctanthes arbor-tristis, a member of the Oleaceae family. The Vishnu Purana mentions this plant and its great importance in treating a variety of diseases, including rheumatoid arthritis, as it reduces pain and inflammation [5]. The strength, texture, and other properties are supported by the secondary metabolites found in plants that have a variety of medicinal uses. which all plant parts have some medicinal value and can be used for profit; more research is needed to determine whether these phytochemicals could be used as pharmacological agents to treat a variety of diseases, including those with hepatoprotective, antileishmaniasis, antiviral, antifungal, antipyretic, antihistaminic, antimalerial, antibacterial, anti-inflammatory, and antioxidant properties [5,6,7]. Daucus carota **(Fig-2)** is a scientific name of carrot belongs to family Apiaceae and it contains array of chemical constituent. Advance to topical treatment for a variety of chronic skin conditions, such as psoriasis, acne, and atopic dermatitis, is known to be very poor. A number of factors contribute to this phenomenon, including lack of treatment efficacy and patient concerns regarding side effects, among others. Wound healing is a biological dynamic process that involves the interaction of matrix and cellular level components to restore the integrity of damaged tissue and replace missing tissue of damage part [8,9,10].

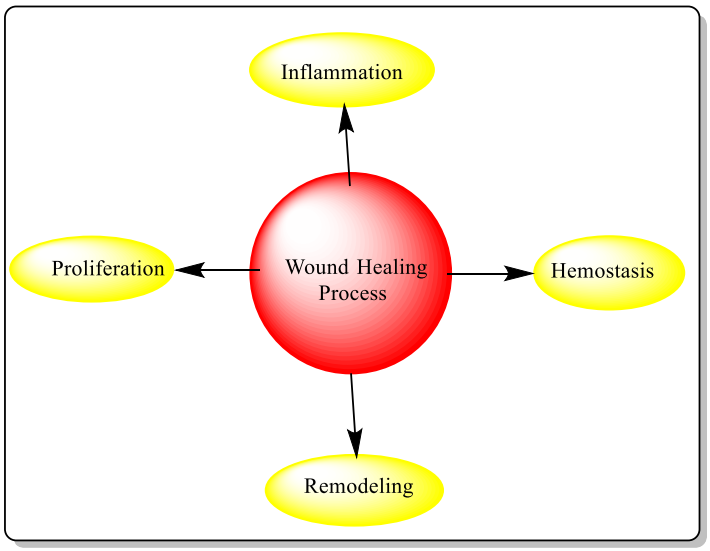

Fig.1- Mechanism of wound healing.

Factor Affecting of Wound Healing Process

1. Infection at the wound site
2. Insufficient oxygen supply and tissue
3. Diabetes and other diseases condition
4. Age
5. Diet
6. Medication

Herbal products are formulated, using various permissible pharmaceutical ingredients to form the base in which one or more herbal ingredients are used to provide defined advantages only, shall be called as Herbal formulation [11,12]. The current review aims to introduce the main and most effective phytochemical and herbal formulation and general method for herbal topical formulation.

PHYTO-CONSTITUENTS OF *DAUCUS CARROTA*

Botanical name: *Daucus carrota*
Kingdom: Plantae
Class: Magnoliopsida
Order: Apiales
Family: Apiaceae

Fig.2- Image of *Daucus carrota.*

It contains many phytochemical constituents such as Carbohydrates are sugars and dietary fibres. Fats, proteins, vitamins like vitamin A, beta-carotene, lutein zeaxanthin, riboflavin, niacin, pathetic acid, vitamin B6, foliate, vitamin C, vitamin K. Minerals like calcium, iron, magnesium, phosphorous, potassium, sodium and zinc some other important constituents with essential are mention in **(Table-1**) [13-15].

Table-1: Chemical composition of carrot seeds essential and edible oil

S/No.	Chemicals	Essential oil (%)
1	α-pinene	0.67
2	Camphene	0.04
3	Sabinene	0.10
4	α-pinene	0.52
5	Myrcene	0.17
6	Limonene	0.53
7	Linaloo	0.08
8	p-cymene-8-ol	0.07
9	β-caryophyllene	0.13
10	Ar-curcumene	0.23
11	β-sesquiphellandrene	0.46
12	Carotol	66.78
13	Daucol	0.48
14	α-eudesmol+alfa-cadinol	0.21
15	α-eudesmol+alfa-cadinol	-

The Ayurvedic system of medicine was one of the most important system that uses herbal plants and extracts for the treatment of management of various diseases and diseased states [2]

WOUND HEALING ACTIVITY OF *DAUCUS CARROTA*

In an excision wound model, animals treated with a topical cream containing an ethanolic extract of carrot root, produced at several doses, demonstrated a substantial reduction in wound area, epithelization duration, and scar breadth as compared to animals in the control group. The rate of wound contraction dramatically increased in the meanwhile. Significant improvements were also seen in the hydroxyproline content, protein content, and wound tensile strength of the animals administered the topical cream formulation containing the ethanolic extract of carrot seeds. This improved curative property may be due to the antioxidant and antibacterial actions of carrot root ethanolic extract, primarily flavonoids and phenolic derivatives. The inhibition of high levels of lipid peroxides and control of collagen expression may also have a role in the healing effects of wounds [16, 17]. Anthocyanin extract-containing herbal anti-inflammatory gel was developed and assessed by Desai et al in 2020. Daucus carota L. was extracted for its anthocyanin using 1% HCl (v/v) in methanol as the solvent. A variety of polymers, including Xanthan gum, Carbopol 934, HPMC K100 M, and other additives, were used to make anthocyanin gels. The FTIR, pH, viscosity, spreadability, extrudability, drug content, and in-vitro drug release of each anthocyanin

gel formulation were assessed. Additionally, the results indicated that there was no interaction between the medicine and formulation additives according to the FTIR spectral analysis. The compositions' pH ranged from 6.1 to 6.7, which is pretty stable with skin pH. Compared to gels made with carbopol934 and HPMC, those made with xanthan gum were less viscous, more spreadable, had good extrudability, and displayed a higher percentage of medication content [18-25]. The formulation developed by Rajput et al. in 2020 for the excision wound model shown a noteworthy ($p<0.001$) impact on wound healing when compared to the positive control group, and it was almost on par with the standard group. The formulation demonstrated a statistically significant increase in skin breaking strength in incision wounds when compared to control and reference standards. The root extract's phytoconstituents, such as flavonoid and phenolic derivatives, may be responsible for the formulation's ability to heal wounds. The herb-mineral ointment was determined to be stable for 45 days after being assessed for a number of pharmaceutical criteria. Carotenoids, anthocyanins, and vitamins A, B, and C are abundant in carrots. In certain Northern Nigerian regions, the aerial sections are fed to cattle with little or no nutrients [26]. Ayeni et al, 2018 established the phytochemical, nutritional and antioxidant potentials of carrot aerial parts. Methods: The proximate and elemental analyses of the aerial parts were determined using Association of Official Analyst Chemist (AOAC) method and 2,2-diphenyl-1-picrylhydrazyl (DPPH) method for quantification of antioxidant properties in the crude extracts. The ethyl acetate and methanol crude extracts contained steroid/triterpenes, flavonoids, tannins, and saponins, according to the preliminary phytochemical screening. Crude protein (14.59%), fat (10.37%), fibre (9.07%), carbohydrates (51.81%), moisture (10.23%), and ash content (12.99%) were all found in the proximate analysis. P (11.00 mg/L), Na (5.38 mg/L), Fe (3.19 mg/L), K (2.25 mg/L), Ca (2.02 mg/L), Mn (1.15 mg/L), Mg (1.02 mg/L), As (0.83 mg/L), Se (0.40 mg/L), Zn (0.26 mg/L), Cu (0.13 mg/L), Cd (-0.02 mg/L), Cr (0.02 mg/L), Ni (0.17 mg/L), and Pb (0.04 mg/L) were all abundant in the aerial portions. The EC_{50} values for the ethyl acetate and methanol extracts were 86.89 ug/mL and 166.79 ug/mL, respectively, according to the antioxidant activity. In conclusion, the aerial sections of Daucus carota have a high nutritional content and can be fed to livestock [27-35].

GENERAL METHOD FOR PREPARATION OF HERBAL TOPICAL FORMULATION [35-46]

Herbal products are formulated, using various permissible pharmaceutical ingredients to form the base in which one or more herbal ingredients are used to provide defined advantages only, shall be called as Herbal formulation.

Materials & Method (O/W, W/O)

↓

Add the required quantity of ingredient in sufficient amount of Base water and prepare a solution by heating on water bath

↓

In the above solution, add required quantity of Herbal extract

↓

Add Solution dropwise into Solution2. When both the Phases get mixed properly, add methyl paraben as Preservative.

↓

The formulated Polyherbal Cream was kept aside for about an hour in cool and dry place indirect to sunlight till it sets completely and was used after 48 hours after keeping at room temperature for stability and analytical testing

↓

Packed in container and store in cool place.

Advantages of Herbal Topical Formulations:

1. Improve healing
2. Reduce inflammation
3. Antimicrobial action
4. Reduced or no Risk of Side Effects
5. Herbal topical are generally safe for use on all skin types.

6. Herbal topical product contains ingredients that help keep the wound area moisturized, creating an optimal environment for healing.

CONCLUSION

Carrot has remarkable nutritional and health benefits. There are good reasons to include carrots in human diet, since they are enriched with carotenoids, phenolic compounds, polyacetylenes, and vitamins and by this reason they may help reduce the risk of some diseases. Experimental evidence has reported that these carrot compounds exert antioxidative, hepatoprotective, reno-protective, which help wound healing benefits of carrot based on various research articles regarding to herbal formulation of daucus carrota wound healing activity. This review will provide knowledge to clinicians about phytoconstituents of Carrot with wound healing properties choice of herbal formulation via topical rout.

REFERENCES

1. Paquette D, Falanga V. Leg ulcers. *Clin Geriatr Med*. 2002;18(1):77–88. doi: 10.1016/S0749-0690(03)00035-1. [PubMed] [CrossRef] [Google Scholar]
2. Brem H, Stojadinovic O, Diegelmann RF, et al. Molecular markers in patients with chronic wounds to guide surgical debridement. *Mol Med*. 2007;13(1–2):30–39. [PMC free article] [PubMed] [Google Scholar]
3. Trengove NJ, Stacey MC, McGechie DF, Mata S. Qualitative bacteriology and leg ulcer healing. *J Wound Care.* 1996;5(6):277–280. doi: 10.12968/jowc.1996.5.6.277.
4. Khan IA, Abourashed EA. Leung's encyclopedia of common natural ingredients: used in food, drugs and cosmetics. John Wiley & Sons; 2011 Sep 21.
5. Singh IP, Ahmad F, Chatterjee D, Bajpai R, Sengar N. Natural products: drug discovery and development. Drug Discovery and Development: From Targets and Molecules to Medicines. 2021:11-65.
6. Sharma L, Dhiman M, Singh A, Sharma MM. Nyctanthes arbor-tristis L.:"An Unexplored Plant of Enormous Possibilities for Economic Revenue". Proceedings of the National Academy of Sciences, India Section B: Biological Sciences. 2021 Jun;91:241-55.
7. Chakraborty R, De SD. A Brief Overview on the Health Benefits of Nyctanthes arbor-tristis Linn.-A Wonder of Mother Nature. Indo Global Journal of Pharmaceutical Sciences. 2022 Jun 30;12:197-204.
8. Mittal I, Naim MJ, Singh A, Mandal S. International Journal of Modern Pharmaceutical Research.
9. Prafulla Sabale, Bhargav Bhimani, Chirag Prajapati and Vidya Sabale anOverview of medicinal plants as wound healers. Journal of Applied Pharmaceutical Science Vol. 2 (1), pp. 143-150, November, 2012.
10. Nilani P.*, Pranavi A., Duraisamy B., Damodaran P., Subhashini V. and Elango K. Formulation and evaluation of wound healing dermal patch. African Journal of Pharmacy and Pharmacology Vol. 5(9), pp. 1252-1257, 8 September, 2011.
11. P. F. BUILDERS*, B. KABELE-TOGE1, M. BUILDERS2, B. A. CHINDO3, Wound Healing Potential of Formulated Extract from Hibiscus Sabdariffa Calyx. Indian Journal of Pharmaceutical Sciences January – February 2013
12. Sumit K, Vivek S, Sujata S, Ashish B. Herbal cosmetics: used for skin and hair. Inven. J. 2012 Oct 10;2012:1-7.
13. Ahmad T, Cawood M, Iqbal Q, Ariño A, Batool A, Tariq RM, Azam M, Akhtar S. Phytochemicals in Daucus carota and their health benefits. Foods. 2019 Sep 19;8(9):424.
14. John S, Priyadarshini S, Monica SJ, Arumugam P. Phytochemical profile and thin layer chromatographic studies of Daucus carota peel extracts. International Journal of Food Science and Nutrition. 2017;2(1):23-6.
15. Ayeni EA, Abubakar A, Ibrahim G, Atinga V, Muhammad Z. Phytochemical, nutraceutical and antioxidant studies of the aerial parts of Daucus carota L.(Apiaceae). Journal of Herbmed Pharmacology. 2018 Mar 20;7(2):68-73.

16. Bijauliya RK, Alok S, Kumar M, Chanchal DK, Yadav S. A comprehensive review on herbal cosmetics. International Journal of Pharmaceutical Sciences and Research. 2017 Dec 1;8(12):4930-49.
17. Saudagar RB, Sisodiya MH. Review on herbal cosmetics. World Journal of Pharmaceutical Research. 2018 Feb 9;7(7):573-91.
18. Preethi PJ, Padmini K, Srikanth J, Lohita M, Swetha KP, Rao PV. A review on herbal shampoo and its evaluation. Asian Journal of Pharmaceutical Analysis. 2013;3(4):153-6.
19. A review on herbal cosmetics Lovepreet Kaur, Ajeet Pal Singh, Amar Pal Singh, Taranjit Kaur St. Soldier Institute of Pharmacy, Lidhran Campus, Behind NIT (R.E.C), Jalandhar-Amritsar by pass NH-1 Jalandhar 144011,Punjab , India. Volume 9, issue 3 ,2021
20. Dhase AS, Khadbadi SS, Saboo SS. Formulation and evaluation of vanishing herbal cream of crude drugs. Am J Ethnomed. 2014;1:313-8.
21. Sahu T, Patel T, Sahu S, Gidwani B. Skin cream as topical drug delivery system: a review. Journal of Pharmaceutical and Biological Sciences. 2016 Sep 1;4(5):149.
22. Abubakar AR, Haque M. Preparation of medicinal plants: Basic extraction and fractionation procedures for experimental purposes. Journal of pharmacy & bioallied sciences. 2020 Jan;12(1):1.
23. Chauhan NN, Vasava MP, Patel MS. comparision of formulated and marketed herbal creak cream by evalution parameters.
24. krishnan n, afsal vi, jamal f, rasheed r, pp ss. formulation and evalution of herbal vanishing cream.
25. Karaman S, Toker ÖS, Yüksel F, Çam M, Kayacier A, Dogan M. Physicochemical, bioactive, and sensory properties of persimmon-based ice cream: Technique for order preference by similarity to ideal solution to determine optimum concentration. Journal of dairy Science. 2014 Jan 1;97(1):97-110.
26. Kumar SW, Rai DC, Singh DI. Role of herbal ice cream in human health: a review. Trends Biosci. 2013 Apr;6(2):130-2.
27. de Koos PT, McComas B. Shaving versus skin depilatory cream for preoperative skin preparation: A prospective study of wound infection rates. The American Journal of Surgery. 1983 Mar 1;145(3):377-8.
28. Samim M, Twigt B, Stoker L, Pronk A. Topical diltiazem cream versus botulinum toxin a for the treatment of chronic anal fissure: a double-blind randomized clinical trial. Annals of surgery. 2012 Jan 1;255(1):18-22.
29. Mosavianasl Z, Pouya AB, Borun R. Evaluation of Human Reliability in Steel Industry Using SPAR-H and CREAM Techniques. PJMHS. 2018 Apr 1;12(2):901-5.
30. Zhou T, Wu C, Zhang J, Zhang D. Incorporating CREAM and MCS into fault tree analysis of LNG carrier spill accidents. Safety science. 2017 Jul 1;96:183-91.
31. Heinrich M, Barnes J, Prieto-Garcia J, Gibbons S, Williamson EM. Fundamentals of pharmacognosy and phytotherapy E-BOOK. Elsevier Health Sciences; 2017 Nov 24.
32. Wathoni NA, Haerani A, Yuniarsih N, Haryanti RE. A review on herbal cosmetics in Indonesia. International Journal of Applied Pharmaceutics. 2018;10(5):13-6.
33. Rajput, R. T., Gohil, K. J., & Kumara, S. (2021). DEVELOPMENT OF HERBOMINERAL FORMULATION FROM DAUCUS CAROTA (LINN) FOR WOUND HEALING EFFECTS. *Indian Drugs*, *58*(7).
34. Ayeni, E. A., Abubakar, A., Ibrahim, G., Atinga, V., & Muhammad, Z. (2018). Phytochemical, nutraceutical and antioxidant studies of the aerial parts of Daucus carota L.(Apiaceae). *Journal of Herbmed Pharmacology*, *7*(2), 68-73.
35. Schaller RG, Schnitzler WH. 2000. Nitrogen nutrition and flavour compounds of carrots (Daucus carota L.) cultivated in Mitscherlich pots. J.Sci. Food Agric. 80, 49-56.
36. Hansraj Bishnoi, Shailesh Sharma, Garvendra Singh Rathore, Omveer Singh "Wound recuperation and Approaches of Aloe Barbadensis for Traumatize Mending" Journal of Survey in Fisheries Sciences 10(4S)128-134 march 2023 https://sifisheriessciences.com/journal/index.php/journal/article/view/661

37. Hansraj Bishnoi, Shailesh Sharma, Gajendra Singh Thakur, Shreyasi "A review on Moringa Olifera based On Chemical composed and Wound Healing Activities" International Journal of Education, Modern Management, Applied Science & Social Science (IJEMMASSS) 26 ISSN : 2581-9925, Impact Factor: 6.882, Volume 04, No. 03(II), July - September, 2022, pp. 26-32. https://inspirajournals.com/uploads/Issues/1403743568.pdf
38. Hansraj Bishnoi*, Shailesh Sharma, Omveer Singh and Gajendra Singh Thakur "A Pharmacovigilance Study of Anti Hypertensive Medicines at a Jaipur Nims Hospital" World Journal of Pharmacy and Pharmaceutical Sciences**,** Volume 10, Issue 3, 1081-1089. DOI: https://doi.org/10.17605/OSF.IO/825F3
39. Hansraj Bishnoi, Shailesh Sharma, Omveer Singh, and Suneha Rani "Work study of Antihypertensive Drugs" Indian J.Sci.Res. 18 (2): 321-326, 2019
40. Shreyasi*, Mukut Raj, Shailesh Sharma, Hansraj Bishnoi and Gajendra Singh"A review article on Anti Viral Herbal Plant" World Journal of Pharmacy and Pharmaceutical Sciences, Volume 11, Issue 1, 637-660. DOI: 10.20959/wjpps20221-20907 https://www.wjpps.com/Wjpps_controller/abstract_id/15758
41. Shailesh S*, Mahatama OP, Upadhyat N, Bishnoi H, Savita S "A Review on "Formulation, Development and Evaluation of Amisulpride Once Daily Tablet" Recent Research in Science and Technology 2011, 3(11) https://updatepublishing.com/journal/index.php/rrst/article/download/738/723
42. Shreyasi, Hansraj Bishnoi, Shailesh Sharma, Aman Raj, Keshav Kumar Jha "A Review on Disease and Treatment of Ebola Virus "2023 IJCRT | Volume 11, Issue 2 February 2023 : http://www.ijcrt.org/viewfull.php?&p_id=IJCRT2302396
43. Shreyasi*, Shailesh Sharma, Hansraj Bishnoi and Manmohan Sharma "Formulation and Evaluation of Herbal Lotion for Antimicrobial Activity" World Journal of Pharmacy and Pharmaceutical Sciences, Volume 11, Issue 5, 1907-1913 DOI: 10.20959/wjpps20225-22044 https://storage.googleapis.com/journal-uploads/wjpps/article_issue/1651320091.pdf
44. Hansraj Bishnoi, Dr. Shailesh Sharma, Saloni Sharma, Nabil Sami Pathan" Pharmacogenomics of Matamorphine in type -2 Diabetes" AIJRPLS Volume 8, Issue1 (2023, JAN/FEB/MAR) http://publications.anveshanaindia.com/aijrpls/aijrpls-vol-8-issue-1/
45. Hansraj Bishnoi1*, Dr. Hariom Sharma2, Dr. Shailesh Sharma3, Shailendra Sharma4, Shreyasi5 "Pharmacological Properties of Lagenaria Siceraria" Journal of Community Pharmacy Practice, Vol: 03, No. 04, June-July 2023, page no 1-11 https://doi.org/10.55529/jcpp.34.1.11
46. Hansraj Bishnoi1*, Dr. Hariom Sharma2, Dr. Shailesh Sharma3, "Evaluation of the Phytochemicals, in Vitro Antioxidant Activity, and Toxicity of Lagenaria Siceraria Seeds", Eur. Chem. Bull. 2023, 12 (S3), 5068 –5079, DOI:10.31838/ecb/2023.12.s3.565 https://www.eurchembull.com/issue-content/evaluation-of-the-phytochemicals-in-vitro-antioxidant-activity-and-toxicity-of-lagenaria-siceraria-seeds-8207

*****