



The Comparative Study of Catharanthus Roses, Calendula Officinalis and Senna on Wound Healing.

¹Pawar Sneha Arjun, ²Jadhav Dnyandev Gorakh, ³Kasar Rushikesh Bhaskar

¹At Post Loni Vyankanath Tal – Shrigonda, Dist – Ahmednagar 414006 India. Email id – Snehapawar3501@gmail.com

²At Post Ahmednagar 414006, Email id - dnyandevjadhav536@gmail.com

³At Post walki Tal / Dist – Ahmednagar 414006, Email id – rushikeshk933@gmail.com

ABSTRACT

The hunt for further effective and lower cost remedial approaches for crack mending remains a challenge for ultramodern drug. In the hunt for new remedial options, shops and their metabolites are a great source of new biomolecules. Among their ingredients, the catharanthus roseus represent 90 of essential canvases, and have a variety of structures with several conditioning similar as antimicrobial, anti-inflammatory, antioxidant and crack mending. Grounded on that, and also due to the lack of reviews concerning the crack- mending exertion of catharanthus roseus, we performed this methodical review which provides an overview of their characteristics and mechanisms of action.. Ayurveda is the Indian traditional system of medicine which focuses on the medical eventuality of shops. Catharanthus roseus is one plant recognized well in Ayurveda. It's known for its--- oxidant and anti- mutagenic goods Woundhealing. Catharanthus roseus, which is a potent medicinal plant multitudinous of the pharmacological conduct analogous as antimicrobial, antioxidant, anthelmintic, antifeedant, antisterility, antidiarrheal, antidiabetic effect etc. That is used to treat multitudinous of the fatal conditions. Alkaloids were the major phytochemical element of the below medicinal plant and have different types enjoying various medicinal uses. The need for the new pharmaceutical products out from the plant has attained a great interest in the present disquisition world due to the cost and the advanced side goods that are associated with the chemically drugs. Catharanthus roseus, which is a potent medicinal plant multitudinous of the pharmacological conduct. That is used to treat multitudinous of the fatal conditions also used in crackhealing. Calendula officinalis, the pot marigold, normal marigold or Scotch marigold, is a factory of the family Asteraceae. The abecedarian synthetic parts set up in the flowers are saponins, triterpenes, liquor triterpenes, unsaturated fat esters, carotenoids, flavonoids, coumarines, introductory canvases, hydrocarbons, and unsaturated fats. Calendula officinalis is a factory that has multitudinous pharmacological conditioning like injury healing, aggravation, eye complaint, menstrual period issues, ulcer, stomach worried etc. In this disquisition, the ethanolic excerpt methodology is done to acquire the concentrate of calendula officinalis condiment just as the tender Thin Subcaste Chromatography profile of calendula officinalis splint, blossom and prints of the factory. the factory Cassia auriculata col is a weidly used medicinal factory in india, and popular in indigenouse system of drugs like Ayurveda and siddha, flower of this shops used in skin diseases, rheumatism, dinghy and leaves as tangy and anthelmintic, powered corridor are used for ophthalmia, crack mending, conjunctivitis, diabetes etc. The present review is an effect to give a detailed check on pharmacological conditioning of factory.

Crucial words- periwinkle, vinca, alkaloids, catharanthus, Madagascar, cassia angustifolli, Tagetes.

INTRODUCTION:

Injuries are physical, chemical or thermal injuries that affect in an opening or breaking in the integrity of the skin. The durability of the skin should be restored, and applicable styles for crack mending are essential for the restoration of disintegrated anatomical durability and disturbed function status of the skin(1) Crack mending is a complex, dynamic process supported by a myriad of Cellular events that must be tightly coordinated to efficiently repair damaged Tissue. Derangement in crack- linked cellular behaviours, as occurs with Diabetes and ageing, can lead to mending impairment and the conformation of Chronic, non-healing injuries. These injuries are a significant socioeconomic Burden due to their high frequency and rush. therefore, there's an Urgent demand for the bettered natural and clinical understanding of The mechanisms that bolster crack form.

Catharanthus roseus :

Catharanthus roseus(L.) which is an important medicinal factory of the family Apocynaceae is used to treat numerous of the fatal conditions contains a virtual cornucopia of useful alkaloids, used in diabetes, blood pressure, asthma, constipation, and cancer and menstrual problem. There are about two common cultivars of C. roseus which is named on the base of their flower colour that's the pink unfolded " Rosea " and the white flowers " Alba ". Catharanthus roseus which is proudly known as the Madagascar periwinkle is set up to be a species of Catharanthus native and also aboriginal to Madagascar. The antonyms of the factory name include Vinca rosea, Ammocallis rosea and Lochnera rosea, other English names sometimes used for the factory include Cape Periwinkle, Rose Periwinkle, Rosy Periwinkle and " Old Maid ".(2). Medicinal shops have a long history of operation in traditional drug. Ethno- botanical information on medicinal shops and their operation by indigenouse societies is useful in the conservation of traditional

societies, biodiversity, community health care and medicine development. *Catharanthus roseus* L.(G.) Don, is an important medicinal factory belonging to the Apocynaceae family; this factory is a dicotyledonous angiosperm and synthesizes two terpene indole alkaloids vinblastine and vincristine that are used to fight cancer(3).

Peckolt, in 1910, described the use in Brazil of an infusion of the leaves to control hemorrhage and scurvy, as a mouthwash for toothache, and for the mending and cleaning of habitual injuries. In Europe affiliated species have been used for the personal repression of the inflow of milk. In the British West Indies it has been used to treat diabetic ulcer and in the Philippines has been reported as being an effective oral hypoglycemic agent. More lately, Chopra et al. have reported that the total alkaloids retain a limited antibacterial exertion as well as a significant and sustained hypotensive action. The hypoglycemic and antibacterial conditioning haven't been verified, although one of the alkaloids insulated from this factory, ajmalicine, has been reported to retain flash depressor action on arterial blood pressure Periwinkle ” or *Catharanthus roseus*(Family Apocynaceae), generally known as “Nayantara ” or “Sadabahar ”, the word *Catharanthus* derives from the Greek language meaning “pure flower.

Scientific classification (4) :

Botanical Name(s) : Vinca Rose(*Catharanthus roseus*)

Family Name : Apocynaceae

Kingdom : Plantae

Division : Magnoliophyta (Flowering plants)

Class : Magnoliopsida (Dicotyledons)

Order : Gentianales

Family : Apocynaceae

Genus : *Catharanthus*

Species : *C. roseus* means red, rose or rosy .



Fig 1: *Catharanthus roseus* (copied from google.com)

Table 1: Different Alkaloids Produced By *Catharanthus roseus*.

Produceby	Alkaloids	Properties
1) Roots	Ajmalicine	CardioVascular Diseases And High Blood Pressure.
	Catharathine	Anti-Diabetic Properties.
	Raubasin	Pain Relieving Properties.
	Reserpine	Tranquilizers.
	Serpentine	CardioVascular Diseases And High Blood Pressure.
2) Aerial parts like leaves.	Vinblastine	Anti-Tumour Propertie.
	Vincristine	Anti-Tumour Properties.
	Vindoline	Anti-Diabetic Properties.

Active Chemical Constitue

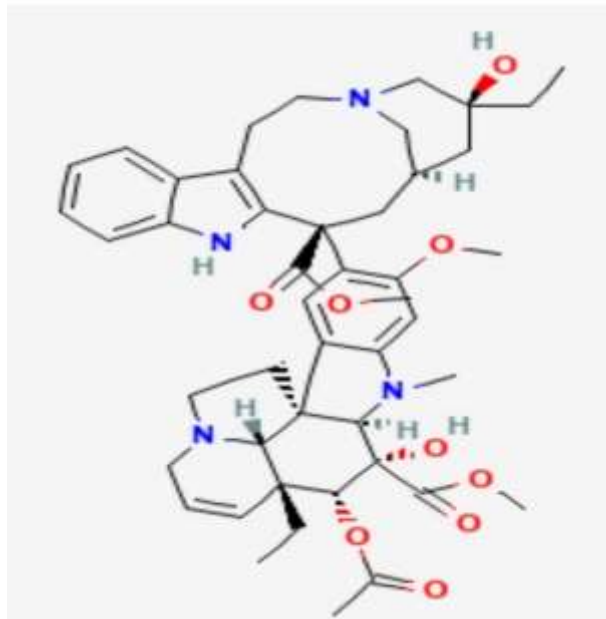


Fig 2: Vinblastin

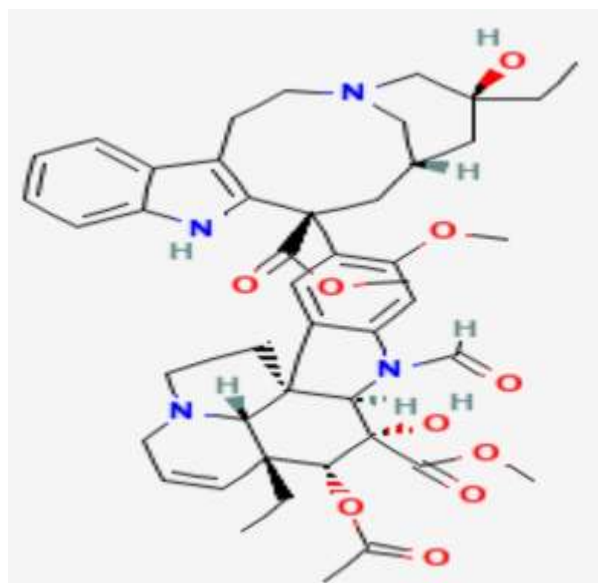


Fig 3: Vincristine

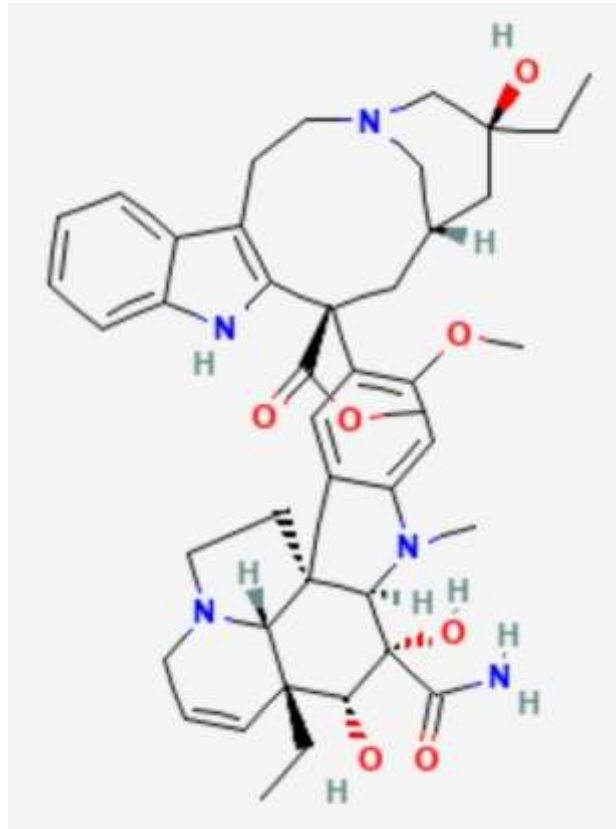


Fig :4 Vindensine



Fig :5 Tabersonine

Pharmacological Activities :

Anti-cancer exertion :

The anticancer alkaloids Vinblastine and Vincristine are deduced from stem and splint of *Catharanthus roseus*. These alkaloids have growth inhibition effect to some mortal excrescences. Vinblastine is used experimentally for treatment of neoplasmas and is recommended for Hodgkins complaint, chorio melanoma. Vincristine another alkaloids is used for leukemia in children.(6, 7)

ANTIOXIDANT ENZYME :

Conditioning An trial was carried out in order to determine the changes in the antioxidant enzyme conditioning with respect to different attention of sodium chloride(NaCl) in alba and rosea kinds of *Catharanthus roseus*(L.)G. Don. in pot culture at colorful stages of growth. Especially, Superoxide dismutase(SOD), peroxidase(Spell), catalase(CAT) enzymes antioxidant capabilities were analysed. The result revealed the fact that the SOD exertion was set up to be increased at the position of 50 mM NaCl, but was reduced at further advanced treatment situations. There were no significant changes attained on the Spell exertion at the range of 25 mM NaCl position but showed significant increases of this exertion at the coming, advanced situations of NaCl.(8)

Crack mending property :

Rats treated with 100 mg/ kg/ day of the *Catharanthus roseus* ethanol excerpt had high rate of crack compression significantly dropped epithelization period, significant increase in dry weight and hydroxyproline content of the granulation towel when compared with the controls. Crack compression together with increased tensile strength and hydroxyproline content support the use of *C. Roseus* in the operation of crack mending.(9)

Calendula officinalis :

Calendula, else called *Calendula officinalis*, is a veritably notable restorative condiment. It's original to Northern Mediterranean nations. *Calendula* is a monthly blossom, which allude to the inclination it needs to sow in like manner with the schedule. *Calendula* is an advanced Latin nanosecond of the word *calendae*, which signifies " little timepiece" or " little schedule". It's generally blossoms alongside the full moon or conceivably formerly every month. The further regularly known name, pot marigold or the moniker " Mary's Gold" alludes to the Virgin Mary. *Calendula* likewise was employed in eighteenth and nineteenth hundreds of times as to add shadowing to cheddar. *Calendula* is a bloom that can grow up to 31 elevation altitudinous. Its leaves, which are manipulated spirally, can develop from 2 to 7 elevation long, and are shaggy on the two sides. The blossom itself is regularly brilliant orange, unheroic, or gold.(10).



Fig :6 calendula officinalis.

Scientific classification(24) :

Kingdom : Plantae

Order : Asterales

Family :Asteraceae

Genus : Calendula

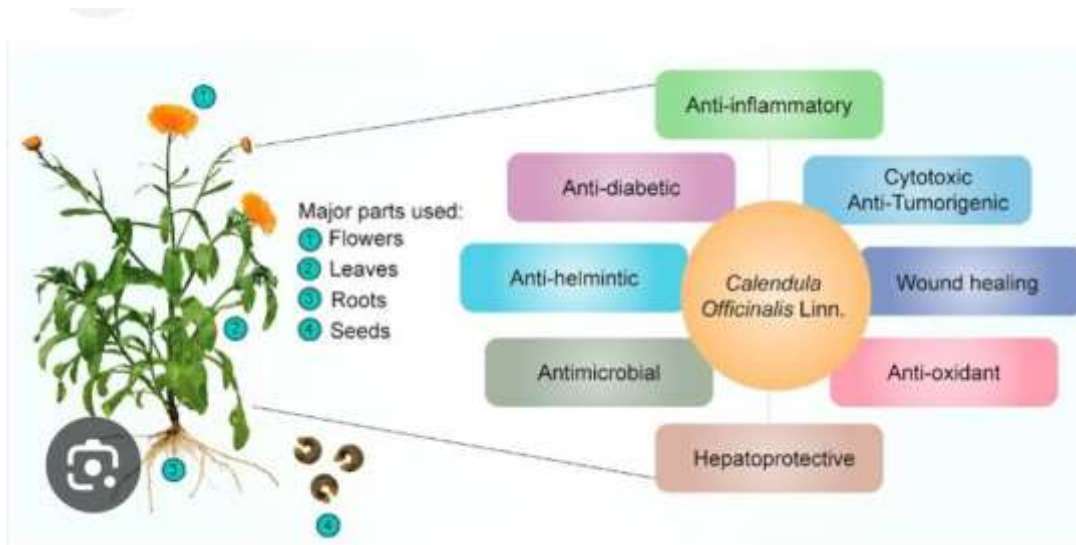
Species : C. Officinalis

Biological name: Calendula officinalis L.

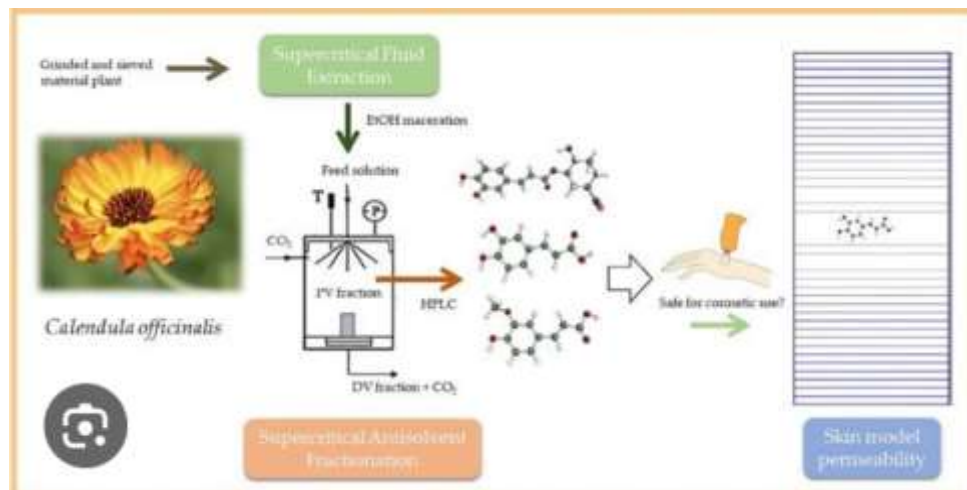
Synonym: Calendula prolifera.

In calendula officinalis there are many chemical components are present:Carotenoids, Terpenoids, Flavonoids, Coumarins, Phenolic Acids, Quinones, Amino Acids etc...

Therapeutic application of Calendula officinalis :



Mechanism of calendula officinalis on wound healing:



Pharmacological activities:

Anti-obesity:

biosynthesis inhibitory, hyaluronic acid product conditioning, anti-obesity using lipase inhibition and adipocyte isolation as well as evaluation of the defensive effect against hydrogen peroxide convinced neurotoxicity in neuro- 2A cells was carried out. The results showed that, compound CS2 has a melanin biosynthesis stimulatory exertion; still, emulsion CS1 has a potent stimulatory effect for the product of hyaluronic acid on normal mortal dermal fibroblast from grown-up(NHDF- announcement). Both composites didn't show any inhibitory effect on both lipase and adipocyte isolation. emulsion CS2 could cover neuro- 2A cells and increased cell viability against H202(27).

Anti-fungal :

The effect of mycorrhizal fungi and heavy essence stress and Cd pot marigold(*Calendula officinalis*L.), was examined. Results indicated that with adding soil Pb and Cd attention, growth and yield of pot marigold was reduced significantly; Cd had lesser negative impacts than Pb. still, mycorrhizal fungi soothed these impacts by perfecting factory growth and yield(29).

Senna :

Senna — a rubric belonging to family Fabaceae, subfamily Caesalpinioideae, lineage Cassieae ser. Aphyllae has roughly 350 species of tree shrubs and subshrubs(11,12) It was set piecemeal from Cassias.l. with the identification of three definite rubrics,viz., *Senna*, *Cassia*L.(s.s), and *Chamaecrista* Moench(13, 14) This rubric can be set up in wide- ranging territories, in distinct climatic conditions, authorizations, and mainlands similar as America, Africa, and Oceania and to a minor extent in Asia and Pacific islets(15). *Senna* shops settled timbers(both sticky and dry), comeuppance(both cold and dry), and gemstone outcrops(16). Some cosmetic species are extensively used for geography gardening due to the seductive unheroic inflorescences and the high rigidity in terms of soil and environmental conditions(17). lately, some species from desert climates were proposed to help or block desertification in thirsty zones. The use of *Cassia* species is reported in the ancient Ayurvedic literature as a laxative, antimalarial, relaxant, and anti-inflammatory(18). To date, the rubric is also generally honored for its biologically active composites and medicinal parcels(19, 20).

Scientific classification (25) :

Kingdom : Plantae

Order : Fabales

Family : Fabaceae

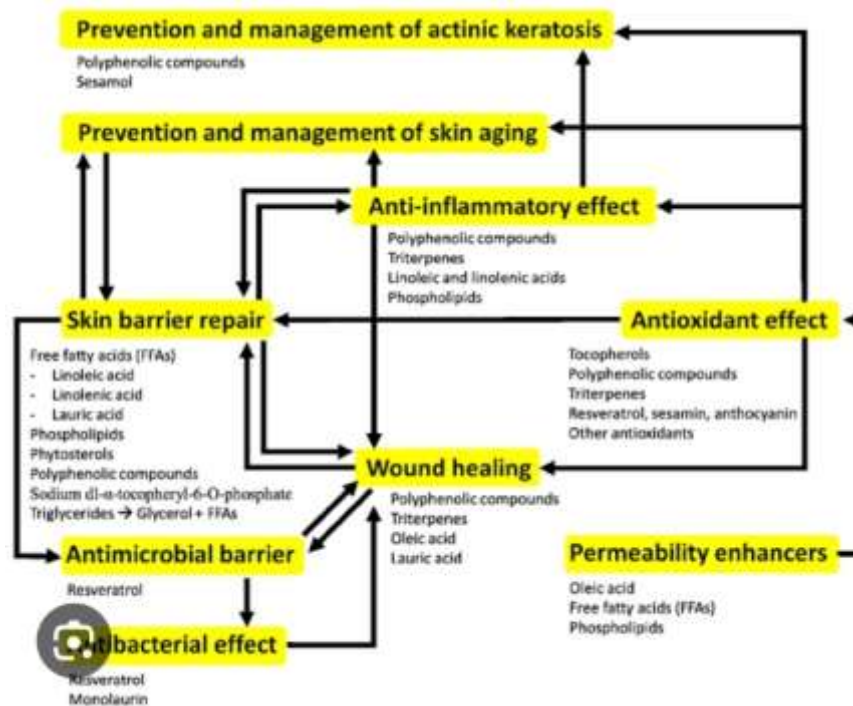
Subfamily : Caesalpinioideae

Genus : *Senna* MillSpecies type : *Senna alexandrina* mill.Synonym : *Cassia* (Mill) benth

Fig :7 sennn flower and leaves.

Studies suggest *Senna occidentalis* possesses crack mending, anti-inflammatory, and antimicrobial exertion. Due to its capability to stimulate collagen conflation, enhance fibroblast proliferation, modulate the seditious response, and inhibit the exertion of essential proteins similar as GSK- 3B for crack mending.(21, 22)

Mechanism of action of senna on wound healing:



Stimulate collagen synthesis, enhance fibroblast proliferation, modulate the inflammatory response, and inhibit the activity of essential proteins such as GSK-3B for wound healing.

Pharmacology activities :

The anti-inflammatory exertion :

The anti-inflammatory exertion of colorful excerpts of leaves was carried out using carrageenan convulsed rat paw edema. Carrageenan convulsed inflammation represents a classical model of edema conformation and hyperalgesia, which has been considerably used for evaluation of anti-edema effect of medicines. The sub-plantar administration of carrageenan in rat is responsible for the typical biphasic edema in which the first phase observed around 0- 2 hours is attributed to the release of histamine and serotonin. The alternate phase of swelling which last for 2- 6 hours is due to release of prostaglandin-like substances. Methanolic excerpt of *C. auriculata* leaves showed potent anti-inflammatory exertion compared to waterless, hydroalcoholic and ethyl acetate excerpts. (26).

Antimicrobial exertion:

The methanolic excerpt of *C. auriculata* leaves parade strong antimicrobial exertion against all the tested organisms. *B. cereus* (18 mm), *S. aureus* (14 mm), *E. coli* (16 mm), *K. pneumoniae* (14 mm), *P. aeruginosa* (10 mm) and *P. mirabilis* (16 mm). The chloroform excerpt showed good exertion.

Formulation of cream:

- Humectants
- Solvents
- Emollient agents
- Spreading agents
- Gelling agents (Thickening agents)
- Nourishing agent
- Preservatives
- Film formers
- Healing agents
- Antioxidants

Material used for cream:

Sr. No	Material used
1)	Catharanthus roseus
2)	Calendula officinalis
3)	Senna
4)	Steric acid
5)	Liquid paraffin
6)	Bees wax
7)	Stearyl alcohol
8)	Methyl paraffin
9)	Potassium hydroxide
10)	Sorbitol solution

Formulation of cream :

- 1) Take the liquid paraffin and bees wax in a borosilicate glass breaker at 75°C.
- 2) maintain that heating temperatures (oil phase)
- 3) In other beaker, dissolve borax and methyl paraben in distilled water by maintaining temperatures 75°C with water bath. In other beaker, dissolve borax and methyl paraben in distilled water by maintaining temperatures 75°C with water bath.
- 4) Stir the solution with glass rod until all solid particles get dissolved (Aqueous phase). Then gently add heated aqueous phase in heated oily phase with continuous stirring. (23).
- 5) After mixing both phases, immediately add catharanthus roseus flowers extract, calendula officinalis flower extract, senna leaves extract. It continues mixing by glass rod until it forms a smooth cream.
- 6) When cream is formed, then add rose oil as fragrance. Put this cream on the slab and add few drops of distilled water if necessary.
- 7) mix the cream in a geometric manner on the slab to give a smooth texture to the cream and to mix all the ingredients properly.
- 8) Pour the cream in container and label it.

Table :2 Formulation table

Sr. No	Ingredients	Formulation code (F)
1	Catharanthus roseus flowers extract	1gm
2	Calendula officinalis flower extract	1gm
3	Senna leaves extract	1gm
4	Bees-wax	5gm
5	Liquid paraffin	18ml
6	Borax	0.36gm
7	Methyl paraffin	0.03gm



Fig :8 wound healing herbal cream

Evaluation of cream

- Physical properties
- Rheology test
- Determination of pH
- Spreadability Test
- Peroxide Stability test
- Test for stability
- Skin Irritation test

Conclusion:

Formulation of cream was done. The cream was evaluated on several parameters. They have good results on its safety and efficacy. In the coming days due to the progress in the pharmaceutical industry more advance technique are being developed for formulation and evaluation of cream. There is huge demand for herbal based creams. And this demand can increasing in up coming years as herbal constituents base cream are safer and proven to be efficient when compared to synthetic based cream.

REFERENCES:

- 1) Meenakshi, S.; Raghavan, G.; Nath, V.; Ajay Kumar, S.R.; Shanta, M. Antimicrobial, wound healing and antioxidant activity of *Plagiochasma appendiculatum* Lenm et Lind. *J. Ethnopharmacol.* 2006, 107, 67–72.
 - 2) Monika Sain, Vandana Sharma. *Catharanthus roseus* (An anti-cancerous drug yielding plant).A Review of Potential Therapeutic Properties. *Int. J. Pure App. Biosci.* 2013, 1(6)139-142.
 - 3) Ajaib M, Khan ZUD, Khan N, Wahab M. Ethnobotanical studies on useful shrubs of District Kotli, Azad Jammu & Kashmir, Pakistan. *Pak J Bot.* 2010; 42:1407-1415.
 - 4) . Dr. Hemamalini Balaji, Versatile. Therapeutic effects of *Vinca rosea* Linn. *International Journal of Pharmaceutical Science and Health Car.* 2014; 1(4):59-76.k
 - 5) Erdogru. Antibacterial activities of some plant extract used in folk medicine. *Pharm. Biol.* 200 ; 40:269-273.
 - 6) Banskota AH. Antiproliferative activity of Vietnamese Medicinal plants. *Biological Pharmaceutical Bulletin.* 2002; 25(6):753-60.
 - 7) Wang S, Zheng Z, Weng Y. Angiogenesis and antiAngiogenesis activity of Chinese medicinal herbal Extracts. *Life Science.* 2004; 74(20):2467-78.
 - 8) Cheruth Abdul Jaleel, Soil Salinity Regimes Alters Antioxidant Enzyme Activities in Two Varieties of *Catharanthusroseus*. *Botany Research International*, 2009; 2 (2): 64-68, 009.
 - 9) Nayak BS, Anderson M and Pereira LMP. Evaluation of wound-healing potential of *Catharanthus roseus* leaf extract inrats. *Fitoterapia*, 2007, 78:540-544.
 - 10) Debjit B., Harish G., B. Pragati K, S. Duraivel, K.P.Sampath Kumar "THE PHARMA INNOVATION Recent Advances In Novel Topical Drug Delivery System" Vol. 1 No. 9 2012 ,Page | 12, ISSN: 2277- 7695.
 - 11) Ana Cristina de Oliveira Gonzalez,Tila Fortuna Costa, Zilton de Araújo Andrade, and Alena Ribeiro Alves Peixoto Medrado, "Wound healing – A literature review", *An Bras Dermatol.* 2016 Sep-Oct; 91(5): 614–620.doi: 10.1590/abd1806-4841.20164741, PMID: PMC5087220,PMID: 27828635.
 - 12) N. Azani, M. Babineau, C. D. Bailey et al., "A new subfamily classificationof the Leguminosae based on a taxonomically comprehensive phylogeny: the legume phylogeny working group (LPWG)," *Taxon*, vol. 66, no. 1, pp. 44–77, 2017.
- View at: [Publisher Site](#) | [Google Scholar](#).
- 13) F. O. Robbiati, A. Anton, B. Marazzi, M. Vásquez-Cruz, and R. H. Fortunato, "The evolutionary history of *Senna* ser. *Aphyllae* (Leguminosae Caesalpinioideae), an endemic clade of southern South America," *Plant Systematics and Evolution*, vol. 303, no. 10, pp. 1351–1366, 2017.View at: [Publisher Site](#) | [Google Scholar](#).
 - 14) J. Bradley Morris, B. D. Tonnis, and M. L. Wang, "Variability for Senoside a and B concentrations in eight *Senna* species," *Industrial Crops and Products*, vol. 139, article 111489, 2019.View at: [Publisher Site](#) | [Google Scholar](#)
 - 15) H. S. Irwin and R. C. Barneby, *The American cassiinaea synoptical revision of leguminosae tribe cassiiae subtribe cassiinae in the New World*, New York Botanical Garden Bronx, New York USA, 1982.

- 16) B. Marazzi, P. K. Endress, L. P. Queiroz, and E. Conti, "Phylogenetic relationships within *Senna* (Leguminosae, Cassiinae) based on three chloroplast DNA regions: patterns in the evolution of floral symmetry and extrafloral nectaries," *American Journal of Botany*, vol. 93, no. 2, pp. 288–303, 2006. View at: [Publisher Site](#) | [Google Scholar](#).
- 17) L. Acharya, A. K. Mukherjee, and P. C. Panda, "Separation of the genera in the subtribe Cassiinae (Leguminosae: Caesalpinioideae) using molecular markers," *Acta Botânica Brasileira*, vol. 25, no. 1, pp. 223–233, 2011. View at: [Publisher Site](#) | [Google Scholar](#).
- 18) B. Marazzi and M. J. Sanderson, "Large-scale patterns of diversification in the widespread legume genus *Senna* and the evolutionary role of extrafloral nectaries," *Evolution: International Journal of Organic Evolution*, vol. 64, no. 12, pp. 3570–3592, 2010. View at: [Publisher Site](#) | [Google Scholar](#).
- 19) M. O. Rahman, M. Z. Rahman, and A. Begum, "Numerical taxonomy of the genus *Senna* mill. From Bangladesh," *Bangladesh Journal of Plant Taxonomy*, vol. 20, no. 1, pp. 77–83, 2013. View at: [Publisher Site](#) | [Google Scholar](#).
- 20) H. A. Spiller, M. L. Winter, J. A. Weber, E. P. Krenzelok, D. L. Anderson, and M. L. Ryan, "Skin breakdown and blisters from *Senna*-containing laxatives in young children," *Annals of Pharmacotherapy*, vol. 37, no. 5, pp. 636–639, 2003.
View at: [Publisher Site](#) | [Google Scholar](#).
- 21) M. A. Nassar, H. R. Ramadan, and H. M. Ibrahim, "Morphological characteristics of vegetative and reproductive growth of *Senna occidentalis* (L.) link (Caesalpinaceae)," *Research Journal of Agriculture and Biological Sciences*, vol. 7, no. 2, pp. 260–270, 2011. View at: [Google Scholar](#).
- 22) S.S.U. Hassan, W.D. Zhang, H.Z. Jin, S.H. Basha, S.S. Priya In-silico anti-inflammatory potential of guaiane dimers from *Xylopi* *vielana* targeting COX-2.
- 23) Ashara K, Soniwala MM, Paun J, Chawda J. Importance of triturat-ion technique on preparation and evaluation of cold cream. *Inventi Rapid Pharm Tech*. 2013: 1-2.
- 24) https://en.m.wikipedia.org/wiki/Calendula_officinalis
- 25) [https://en.m.wikipedia.org/wiki/Senna_\(plant\)](https://en.m.wikipedia.org/wiki/Senna_(plant))
- 26) Mali A. A., Hivrale M. G., Bandawane D. D., Chaudhari P. D., Study of Anti-Inflammatory Activity of *Cassia Auriculata* Linn. Leaves in Wistar Rats, *INDIAN DRUGS*, Vol. 49; XI;
- 27) T. Murugan, J. Albino Wins, M. Murugan, Antimicrobial activity and Phytochemical Constituents of Leaf extracts of *Cassia Auriculata*, *Indian Journal of Pharmaceutical Sciences*, Vol. 75; I; 2013. p. 122-125.
- 28) Zaki A, Ashour A, Mira A, Kishikawa A, Nakagawa T, Zhu Q, et al. *Phytother Res*. 2016;30(5):835-41.
- 29) Tabrizi L, Mohammadi S, Delshad M, Moteshare Zadeh B. *Int J Phytoremediation*. 2015;17(12):1244-52.