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FORMULATION AND EVALUATION OF HERBAL LOTION OF ALOEVERA

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1. INTRODUCTION[1,5,6]

Aloe is also common in both traditional Chinese and ayurvedic medicine. The aloevera is derivied from Arabic word "Alloeh" meaning "shining bitter substance" while "vera" in latine means "true". The plant aloevera has a history dating back to biblical time. There are over 250 species of aloe grown around the world. Only two species are grown commercially. Aloe barbadensis miller and aloe arborescens. This plant has been known by number of names such as "the wand of heaven". "heaven blessing" "the scilent healer" aloe was previously considered in family liliaceae but now it has been placed in its own family Aloeace. aloevera has a beneficial effects on human health and cure many disease. Active ingredient of plant- leaves has three layers the outermost layers consist of 15-20 cells thick protective layer synthesizing carbohydrate and protein. the active component of aloe include anthraquinone, chromones, polysaccarid and enzymes. Al, B, Ba, Ca, Fe, Mg, Na, P, Si, etc has also been reported to be present in aloe vera plant has triangular, fleshy leaves with serrated edges, yellow tubular flowers andfruits[11,12] Contain numerous seed. aloevera is a natural product that is now a day frequently used in The field of cosmetology. Though there are various indication for its use controlled trials Are needed to determine its real efficacy.

1.1 History[8,9]

plant aloevera has a history dating back to biblical times. There are over 250 species of aloe grown around the world. Only 2 species are grown commercially, Aloevera Barbadensis Miller and Aloe arborescens. Aloe was considered in family Liliaceace but now it has been placed in it's own family Aloaceae.[4,5] It has a fibrous root system. It Does not have stem it has thick freshly leaves with sharp points, which are Up to 18 inches long and 2 inches wide

at the base. Aloe is known as Ghrita Kumari in Sanskrit name of Aloe, where Kumar means child, and it was thought that this plant gave women the energy of youth and rejuvenated their nature. The Aloe Vera plant is revered in Hindu culture as one of the plants of Atharva Veda, where it is known as "the silent healer. "Aloe was considered a rejuvenator of the body by Ayurveda (the ancient Indian science of health and life). Aloe Vera has four flavours, according to Ayurveda: sweet, sour, bitter, and astringent. In Indian ayurvedic medicine, it is used for a variety of purposes, including rejuvenating treatments, menorrhoea disorders, and cardiovascular system stabilisation. Aloe is known as the plant of pitta, kapha, and vata balance, and it is one of the few plants that possesses these qualities. (mehta, 2017) view plants that possesses these qualities. (mehta, 2017) For centuries, aloe vera has been used for medicinal purposes in Greece, Egypt, India, Mexico, Japan, and China. It was used by Egyptian queens Nefertiti and Cleopatra as part of their daily beauty routines.

2. Plant profile[14,15]

Taxonomy

- Kingdom- Plantae
- Order- Asparagales
- Division- Spermatophyte
- Subdivision- Angiospermae
- Class- Monocotyledoneae
- Genus- Aloe
- Species- Barbadensis Mill

- **Biological source**
- Aloe is the dried latex of leaves of various species of Aloes,
- namely:
- *Aloe barbadensis Miller* (or Curacao Aloe);
- *Aloe ferox Miller* (or Cape Aloe);
- *Aloe perryi Baker* (or Socotrine Aloe);
- *Aloe Africana Miller* and *Aloe spicata Baker* (or Cape Aloe).
- **Family** - It belongs to the *Liliaceae family.*

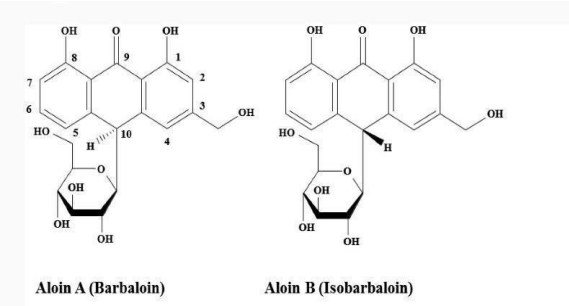
- **Morphology**

- Taste : - Bitter
- Odour : - characteristic nauseous.
- Size & Shape : - Plant growing to 60-100cm in
- shaped with elongation.
- Strands Colour : - Leaves are green

2.1 Anatomy[14,15]

The plant has triangular, fleshy leaves with serrated edges, Each leaf is composed of three layers

1) An inner clear gel that contains 99% water and rest is made of glucomannans, amino acids, lipids, sterols and vitamins.
2) The middle layer of latex which is the bitter yellow sap and contains anthraquinones and glycosides.
3) The outer thick layer of 15-20 cells is called a rind which has a protective function and synthesizes carbohydrates and proteins. Inside the rind are vascular bundles responsible for transportation of substances such as water (xylem) and starch (phloem).



The main feature of the Aloe vera plant leaf is its high water content, ranging from 99.0% to 99.5% however, the remaining 0.5%–1.0% of the plant leaf is reported to contain over 75 potentially bioactive compounds, including phenolic compounds, such as aloin. The anthrone C- glycoside, aloin, is a major component of Aloe vera latex, and it exists as a mixture of diastereoisomers, aloin A and aloin B, also referred to as barbaloin and isobarbaloin .Aloe vera latex possesses laxative properties, and aloin A and aloin B are the principal agents responsible for the cathartic activities of Aloe vera latex in humans and animals.

2.2 Active components with its properties[4.12, 15]

- **Vitamins**: It contains vitamins A (beta-carotene), C and E, which are antioxidants. It also contains vitamin B12, folic acid, and choline. Antioxidant neutralizes free radicals.

- **Enzymes**: It contains 8 enzymes: aliiase, alkaline phosphatase, amylase, bradykinase, carboxypeptidase, catalase, cellulase, lipase, and peroxidase. Bradykinase helps to reduce excessive inflammation when applied to the skin topically, while others help in the breakdown of sugars and fats.

- **Minerals**: It provides calcium, chromium, copper, selenium, magnesium, manganese, potassim, sodium and zinc. They are essential for the proper functioning of various enzyme systems in different metabolic pathways and few are antioxidants.

- **Sugars:** It provides monosaccharides (glucose and fructose) and polysaccharides: (glucomannans/polymannose). These are derived from the mucilage layer of the plant and are known as mucopolysaccharides. The most prominent monosaccharide is mannose-6-phosphate, and the most common polysaccharides are called glucomannans [beta-(1,4)-acetylated mannan]. Acemannan, a prominent glucomannan has also been found. Recently, a glycoprotein with antiallergic properties, called alprogen and novel anti-inflammatory compound, C-glucosyl chromone, has been isolated from Aloe vera gel.[7]

- **Anthraquinones**: It provides 12 anthraquinones, which are phenolic compounds traditionally known as laxatives. Aloin and emodin act as analgesics, antibacterials and antivirals.

- **Fatty acids:** It provides 4 plant steroids; cholesterol, campesterol, β-sisosterol and lupeol. All these have anti-inflammatory action and lupeol also possesses antiseptic and analgesic properties.

- **Hormones***:* Auxins and gibberellins that help in wound healing and have anti-inflammatory action.

- **Others:** It provides 20 of the 22 human required *amino acids* and 7 of the 8 essential amino acids. It also contains salicylic acid that possesses anti-inflammatory and antibacterial properties. Lignin, an inert substance, when included in topical preparations, enhances penetrative effect of the other ingredients into the skin. Saponins that are the soapy substances form about 3% of the gel and have cleansing effect.

2.3 Marketed preparation

Fig. No. 1: Aloevera gel.

Fig. No. 2: Aloevera tablet.

Fig. No. 3: Aloevera juice.

Mechanism of action[10,15,16]

- **Healing properties:** Glucomannan, a mannose-rich polysaccharide, and gibberellin, a growth hormone, interacts with growth factor receptors on the fibroblast, thereby stimulating its activity and proliferation, which in turn significantly increases collagen synthesis after topical and oral Aloe vera. Aloe gel not only increased collagen content of the wound but also changed collagen composition (more type III) and increased the degree of collagen cross linking. Due to this, it accelerated wound contraction and increased the breaking strength of resulting scar tissue. An increased synthesis of hyaluronic acid and dermatan sulfate in the granulation tissue of a healing wound following oral or topical treatment has been reported.

- **Effects on skin exposure to UV and gamma radiation**: Aloe Vera gel has been reported to have a protective effect against radiation damage to the skin Exact role is not known, but following the administration of aloe Vera gel, an antioxidant protein,

metallothionein, is generated in the skin, which scavenges hydroxyl radicals and prevents suppression of superoxide dismutase and glutathione peroxidase in the skin. It reduces the production and release of skin keratinocyte-derived immunosuppressive cytokines such as interleukin-10 (IL-10) and hence prevents UV-induced suppression of delayed type hypersensitivity.

- **Anti-inflammatory action***:* Aloe vera inhibits the cyclooxygenase pathway and reduces prostaglandin E2 production from arachidonic acid. Recently, the novel anti-inflammatory compound called C-glucosyl chromone was isolated from gel extracts.

- **Effects on the immune system:** Alprogen inhibit calcium influx into mast cells, thereby inhibiting the antigen-antibody-mediated release of histamine and leukotriene from mast cells In a study on mice that had previously been implanted with murine sarcoma cells, acemannan stimulates the synthesis and release of interleukin-1 (IL-1) and tumor necrosis factor from macrophages in mice, which in turn initiated an immune attack that resulted in necrosis and regression of the cancerous cells Several low-molecular-weight compounds are also capable of inhibiting the release of reactive oxygen free radicals from activated human neutrophils.

- **Laxative effects:** Anthraquinones present in latex are a potent laxative. It increases intestinal water content, stimulates mucus secretion and increases intestinal peristalsis.

- **Antiviral and antitumor activity***:* These actions may be due to indirect or direct effects. Indirect effect is due to stimulation of the immune system and direct effect is due to anthraquinones. The anthraquinone aloin inactivates various enveloped viruses such as herpes simplex, varicella zoster and influenza. In recent studies, a polysaccharide fraction has shown to inhibit the binding of benzopyrene to primary rat hepatocytes, thereby preventing the formation of potentially cancer-initiating benzopyrene-DNA adducts. An induction of glutathione S-tranreported which suggest a possible benefit of using aloe gel in cancer chemoprevention.

- **Antiseptic agent**: Aloe vera contains 6 antiseptic agents: Lupeol, salicylic acid, urea nitrogen, cinnamonic acid, phenols and sulfur. They all have inhibitory action on fungi, bacteria and viruses.
- **Effects on the immune system**: Alprogen inhibit calcium influx into mast cells, thereby

inhibiting the antigen-antibody-mediated release of histamine and leukotriene from mast cells. In a study on mice that had previously been implanted with murine sarcoma cells, acemannan stimulates the synthesis and release of interleukin-1 (IL-1) and tumor necrosis factor from macrophages in mice, which in turn initiated an immune attack that resulted in necrosis and regression of the cancerous cells. Several low-molecular-weight compounds are also capable of inhibiting the release of reactive oxygen free radicals from activated human neutrophils.

- **Moisturizing and anti-aging effect**: Mucopolysaccharides help in binding moisture into the skin. Aloe stimulates fibroblast which produces the collagen and elastin fibers making the skin more elastic and less wrinkled. It also has cohesive effects on the superficial flaking epidermal cells by sticking them together, which softens the skin. The amino acids also soften hardened skin cells and zinc acts as an astringent to tighten pores. Its moisturizing effects has also been studied in treatment of dry skin associated with occupational exposure where aloe vera gel gloves improved the skin integrity, decreases appearance of fine wrinkle and decreases erythema. It also has anti-acne effect.

Fig. No. 4: Aloevera plant.

2.4 Application[1,2,4, 5,8]

Application of body

- Helps digestion- Drinking Aloe vera juice it encourages the bowels to move and helps with elimination if a person is constipated. And if you have diarrhea, it will help slow it down
- Builds immunity- Aloe vera juice stimulate macrophages, the white blood cells that fight viruses.
- Detoxifies- Aloe vera juice is a great natural aid to detox. Drinking Aloe vera juice

provides a fantastically rich cocktail of vitamins, minerals and trace elements to help our bodies deal with these stresses and strains every day.

Clinical application

- Aphthous Ulcer- Researchers evaluated a gel that combined all antoin, Aloe vera, and silicon dioxide and its effects on aphthous ulcers of the oral cavity.
- Oral Lichen Planus- The efficiency of Aloe vera in treatment of oral lichen planus as been measured by many researcherz.
- Gingivitis- Several studies have been conducted to test the efficacy of Aloe vera in treating gingivitis.
- Denture Adhesive- It is a property that led to the production of prototype cemannan denture adhesives. ase.
- Cancer- Glyco proteins and polysaccharides presin Aloe vera make it a potent chemo-preventive agent that is useful against various types of cancers. These agents stimulate the immune system to fight against cancer.
- Skin diseases: Aloevera is most commonly used in various skin problem. like pimples, dark spots, and rashes. and it protect the skin from uv rays.
- Wound healing: aloevera also shows the good healing property. aloevera Scientific studies have shown that the gel can increase the flexibility and reduce the fragility of the skin since 99% of the gel is water.

3. Literature review[1,2,5,7.9]

1. **Dr.S. Valarmathi, Dr.M kumar.s et.al**: aloevera is an important key ingreadent in wide range of buty and skin care product. improve the effectiveness of sunscreen product relives itching and swelling of the irritated skin the main aim of the research work to prepare the herbal lotion by using aloevera.

2. **Verma H, sisodiya.d et.al**: Aloe vera is oldest medicinal plant ever known and the most applied medicinal plant worldwide. Several steps used in formulation of lotion such as cutting of tip and base of the leaf, extract mucilage part in mixing jar grind it well, add vitamin E, pasteurized the mixture and cool it after that gel was prepared further take the measured quantity of the gel for lotion formulation mix the measured quantity of ingredient including gel after some time lotion was prepared. The formulation greenish in color having pH 5.5 easily spreadable and excellent extrudability. The herbal formulation

had no adverse effect. It is showed this herbal preparation is useful in inflammation wound healing, anti-tumor, antiaging and so on.

3. **Grundmann oliver** B pharm: aloe Vera commonly known as barbadose aloe is an herbal medicine with a long tradition of use by variety of culture has formulated and evaluated aloevera gel that is widely use for the treatment of minor burns especially sun burbs and the thick sap of the leaves that turns yellow brown and has a strong laxative effect that caution its use.

4. **Abbas A, h.s Abediankenari et.al**: treatment of wounds is very important and was subject of different investigation.in this regard, natural substance plays crucial role as complementary medicine. various studies reported that aloe vera has useful effects on wounds especially cutaneous wound healing. therefore in the current review, we examined the effect of aloevera on cutaneous wound healing and concluded that although aloevera improves the wound healing.

5. **Surjushe A, Vasani R et.al:** Aloevera is a natural product that is now a day frequently used in the field of cosmetology. indication for its trials are needed to determine its real efficacy. The aloevara plant its properties, mechanism of action and clinical uses are briefly reviewed in this article.

4. AIM AND OBJECTIVES

Aim: Formulation and evaluation of herbal lotion of aloevera.

OBJECTIVE

1. To prepare good quality product.
2. To formulate lotion that is safe for all types of skin.
3. To formulate lotion that locks natural moisture and provides essential hydration to skin that gives healthy and soft skin
4. To evaluate herbal lotion.

5. Plan of work

- Selection of plant.
- Literature survey.
- Collection of plant leaves.

- Extract mucilage part of the leaves.
- Formulation of herbal lotion of aloevera.
- Evaluation of herbal lotion of aloevera.

6. Experimental work

Equipment: Digital balance, pH meter.

Apparatus: beaker, glass rod, measuring cylinder, mortar and pestle.

6.1 Formulation

7. Table no.1 formulation of herbal lotion.

Chemicals	Quantity	Role
Aloe Vera gel	3ml	Moisturizing the skin
Coconut oil	2.4ml	Antibacterial activity
Rose water	5ml	Hydrate the skin
Vitamin E	2 capsule	antioxidant
Glycerin	3ml	Moisturizing agent
Arrowroot powder	2gm	Thickening agent

7.1 Method of formulation[1,2,6,7]

Formulation method of gel

Collect raw material (aloe leaves) Washing leaf and removed base and tip of the leaf, leaf are is cut into section (Filleting) Extract mucilage part of the leaves into mixing jar and Heat it and add agar agar into the mixing jar. Grinding/Homogenization of Unpasteurized Juice Add Vitamin E and Pasteurize the mixer cool the mixer of aloe leaf Packaged the produced gel and Stored it.

Steps Used In Formulation of Gel

Reception of raw materials- The Aloe vera leaves after harvesting were preferably transported to the processing place. The leaves should be sound, undamaged, mold/rot free and matured (3-4 years) in order to keep all the active ingredients in full concentration.

Grinding- The major steps in this process include crushing or grinding. The aloe gel fillets should be crushed and homogenized using a commercial high speed tissue crusher at room temperature (25°C).And add agar agar into the mixture Addition of vitamin E- The unpasteurized aloe gel juice was fortified with vitamin E to improve the flavor of Aloe vera gel juice and to stabilize the juice. It is used for its antioxidant activity.

Pasteurization- Treatment (at 85-95°C for 1-2 min) is an effective method to avoid the bad

flavor and the loss of biological activity of the Aloe vera gel.

lash cooling- After pasteurization, the juice is flash cooled to 5°C or below within 10- 15 sec. This is a crucial step to preserve biological activity of the Aloe vera gel.

Storage- Relative humidity and temperature are two most important environmental parameters that affect product quality.

7.2 Formulation method of lotion[1,2,3]

Measure the quantity of above formulated gel. Weigh all other ingredient used in formulation. Take a large glass or plastic mixing bowl. Add measured out gel of the aloe vera into the mixing bowl. Then add other ingredients of the formulation one by one like coconut oil, rosewater, vitamin E, glycerin, essential oil & arrowroot powder with measured quantity. Mix all the ingredient of the bowl in vigorously manner. Herbal lotion was prepared.

Fig. No. 5: crushing of aloe Vera pulp.

Fig. No. 6: Alovera lotion.

Fig. No. 7: aloevera herbal lotion.

Evaluation parameter

- **Determination of pH-** pH of 1% aqueous solution of the formulation was measured by using calibrated digital pH meter at constant temperature. pH value of the formulation is 5.
- **Homogeneity**- All developed gels were tested for homogeneity by visual inspection after the gels have been set in the container. They were tested for their appearance and presence of any aggregates.
- **Smoothness**- The smoothness of the lotion formulation was tested by rubbing between the fingers and observes whether the gel is smooth, clumped, homogenous or rough.
- **Appearance**- All the formulations of aloevera lotion were light green.

RESULT AND DISCUSSION

Aloevera plant has potential in pharmaceutical, nutritional and cosmetic industries. The processing of Aloevera requires critical attention in time, temperature and sanitation. The herbal gel and body lotion was prepared and subjected to evaluation of various parameters. The herbal formulation was greenish in color. The pH was constant throughout the study to about 5.5 which lies in the normal pH range of the skin 4.5 to 6. Evaluation is carried on parameters as PH, smoothness, homogeneity, appearance. The prepared herbal lotion was stable as like other marketed lotion.

8. CONCLUSION

Aloevera has many important chemical constituent. alovera having antibacterial, antiviral, anticancer, antifungal activities and it also provide hydration to the skin due to this reason we selected aloevera herb to prepare its herbal lotion as a moisturizer. and prepared lotion is

evaluated which found to be greenish in colour. This preparation increase the importance of aloevera. Futher study will perform to check stability and its effects on human skin.

9. REFERENCES

1. Atlaw T K. Preparation and Utilization of Natural Aloe Vera to Enhance Quality of Mango Fruit, 2018; 6(3): 76-81.
2. Maana A A, Nazir A, Khan M K I, Ahmad T, Zia R, Murid M, Abrar M. The Therapeutic Properties And Applications of Aloe Vera: A Review, 2018; 1-10.
3. Yohannes G. Review On Medicinal Value Of Aloe Vera In Veterinary Practice. 2018; 01-06.
4. Mendhekar S Y, Thorat P B, Bodke N N, Jadhav SL, Gaikwadd D. Formulation And Evaluation Of Gel Containing Neem, Turmeric, Aloe Vera, Green Tea And Lemon Extract With Activated Charcoal And Honey, 2017; 12(4): 439-443.ISSN 394-3211.
5. Pardeshi M D.Formulation And Evaluation Of Aloe-Vera Gel With Active Salt And Alum: As A New Dentifrice, 2016; 6(5): 297-310.
6. Pandey A, Singh S. Aloe Vera: A Systematic Review Of Its Industrial And Ethno-Medicinal Efficacy, 2016; 5(1): 21-33.
7. Nia A F, Farhangsardrodi A. Morphological & Physiologocal Changes of Aloe (Aloe Barbadensis Miller) In Response to Culture Media, 2015; 6(6): 100-105.
8. Chithra R Sajithlal GB, Chandrakasan G. Influence of aloe vera on collagen characteristics in healing dermal wounds in rats. *Mol Cell Biochem,* 1998; 181.
9. Heggers J, Kucukcelebi A, Listengarten D, Stabenau J, Ko F, Broemeling LD, et al. Beneficial effect of aloe on wound healing in an excisional wound model. J Altern Complement Med, 1996; 2: 271–7.
10. Chithra P, Sajithlal G, Chandrakasan G. Influence of aloe vera on the glycosaminoglycans in the matrix of healing dermal wounds in rats. J Ethnopharmacol, 1998; 59: 179–86.
11. Roberts DB, Travis EL. Acemannan-containing wound dressing gel reduces radiation-induced skin reactions in C3H mice. Int J Radiat Oncol Biol Phys, 1995; 32: 1047–52.
12. Sato Y, Ohta S, Shinoda M. Studies on chemical protectors against radiation XXXI: Protective effects of Aloe arborescens on skin injury induced by x-irradiation. *Yakugaku Zasshi*, 1990; 110: 876–84.
13. Byeon S, Pelley R, Ullrich SE, Waller TA, Bucana CD, Strickland FM. Aloe barbadensis

extracts reduce the production of interleukin-10 after exposure to ultraviolet radiation. *J Invest Dermtol.,* 1988; 110: 811–7.

14. S. E. Dal'Belo, L. R. Gaspar, and P. M. Maia Campos, "Moisturizing effect of cosmetic formulations containing *Aloe vera* extract in different concentrations assessed by skin bioengineering techniques," *Skin Research and Technology*, 2006; 12(4): 241–246.
15. R. H. Davis, "Biological activity of *Aloe vera*," *SOFW Journal*, 1993; 119: 646–649.
16. J. A. Hutter, M. Salman, W. B. Stavinoha et al., "Anti-inflammatory C-glucosyl chromone from Aloe barbadensis," Journal of Natural Products, 1996; 59(5): 541–543.
17. SA. Ito, R. Teradaira, H. Beppu, M. Obata, T. Nagatsu, and K. Fujita, "Properties and pharmacological activity of carboxypeptidase in Aloe arborescens Mill var. natalensis Berger," Phytotherapy Research, 1993; 7: S26–S29.
18. A. Mansourian, F. Momen-Heravi, M. Saheb-Jamee, M. Esfehani, O. Khalilzadeh, and J. Momen-Beitollahi, "Comparison of *Aloe vera* mouthwash with triamcinolone acetonide 0.1% on oral lichen planus: a randomized double-blinded clinical trial," *The American Journal of the Medical Sciences*, 2011; 342(6): 447–451. View at: Publisher Site.
19. N. Salazar-Sánchez, P. López-Jornet, F. Camacho-Alonso, and M. Sánchez-Siles, "Efficacy of topical *Aloe vera* in patients with oral lichen planus: a randomized double-blind study," *Journal of Oral Pathology and Medicine*, 2010; 39(10): 735–740.
20. B. Chandrahas, A. Jayakumar, A. Naveen, K. Butchibabu, and P. K. Reddy, "A randomized, doubleblind clinical study to assess the antiplaque and antigingivitis efficacy of *Aloe vera* mouth rinse," *Journal of Indian Society of Periodontology*, 2012; 16: 543–548.