



# “A review on Hair Conditioner Containing Curry Leaves, Amla, Aloe vera, Neem & Flaxseed”

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## ABSTRACT

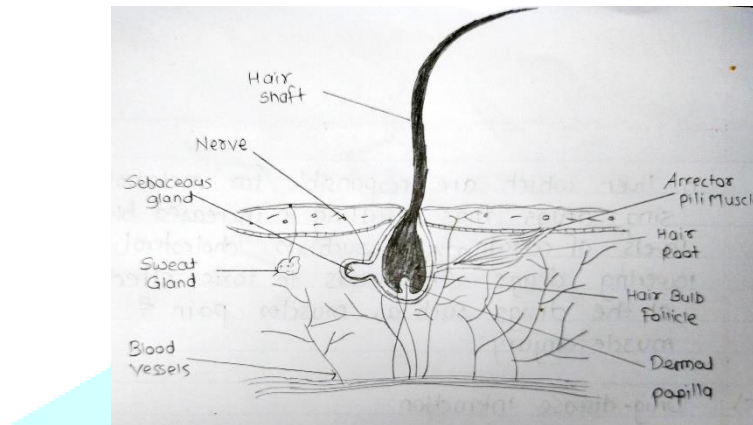
Nowadays, people are interested in hair preparations and conditioner materials, such as shampoos. Hair tonic and conditioner formulations containing herbal extracts, such as Curry Leaves, Amla, Aloe Vera, Neem, Flaxseeds, can prevent hair loss and retain hair conditioning. Curry leaf (*Murraya koenigii*) are abundant in carbazole alkaloids,  $\beta$ -Carotene. Curry leaf has strong hepato-protective properties of tannins, carbohydrates & cartonoids. Leaves are separated from the stalk and then the extraction is done. Flaxseeds are nutrition powerhouse and may help repair hairs as well. Flaxseed is rich in vitamin E & omega-3-fatty acid. Mucilage if they are used in smoothing and strengthening of hair. Aloe Vera are succulent plant have active ingredient and minerals that in strengthen hair. Amla benefit includes antibacterial & astringent properties which help to improve body immunity Vitamin C from Amla help in promoting hair growth. Neem is effective herb to treat hair loss; it is excellent way to cure dandruff. Nimbin extraction is done through supercritical CO<sub>2</sub> where nimbin shows anti-pyretic, anti-inflammatory, anti-fungal, antihistamines, anti-septic activity.

**Keywords:** Herbal conditioner, Nutrition

## 1. INTRODUCTION

Hair's is one amongst the vital a part of the body derived from ectoderm of the skin & its protection appendages on the body & considered accessory addition on the skin together with oil gland, sweat glands & mails. Hair is a vital a part of the general attraction of the figure. Conditioners that add shine to the hair and make it straight. After shampooing it is important to use hair conditioners to offer increased agreement to our hair, leaving it soft and glossy. Conditioner is the second step to hair washing. Formulation of herbal cosmetics like Conditioner, using totally raw material is a thought-provoking idea. The complications occurs in selection of materials that can be reasonably vindicated as natural and converting them into

cosmetics which functionally comparable with their synthetic counterparts. The current study focused on formulation of completely natural conditioner and its assessment with the commercial products. Herbal products have gained increasing popularity within the last decade, now it's utilized by 20-30% of the population herbal products are complex mixtures of organic chemicals that will come from any raw processed a part of the plant, including leaves, flowers, stems, bark and seeds, etc. Herbal preparations are finished herbal products that contain parts of the plants or other stuff as active ingredient.[11][4]



**Fig.1: Diagram of Hair Scalp**

## 1.1 ANATOMY OF SKIN

The skin (interface between human and their environment) is the largest organ in the body. It weighs as average of 4 kg and covers an area of 2 m<sup>2</sup>.

The skin has two layers:

**1) Epidermis, outer epithelial layer. 2) The dermis, inner connective tissue.**

Beneath the dermis is the sub cutis/hypodermis which usually contain abundant fat. The epidermis adhere the dermis partly by the interlocking of its downward project. (epidermal Ridges or pegs) with upward projection of the (dermis papapillae)

### 1)Epidermis:

The epidermis is formed from many layers of closely packed cell called keratinocytes.

**1.layer ( stratum germinativum)**

**2.Prickel cell (stratum spinosum)**

**3.Granular layer(stratum ranulosum)**

**4.Horney layer( Stratum Corneum)**

On the palms & sloes a pale or pink layer. The Stratum lucium, is noted just above the granular layer. The epidermis varies in thickness from less than 0.1 mm on the eyelids to nearly 1 mm on the palms & soles.

### 1) The basal layer:

Is the deepest layer, rests on basement membrane, which attaches it to the dermis. This layes generate cells of the epidermis. It is a single layer of columnar cells , whose basal surface sprout many fine processes &hemidesmosomes , anchoring them membrane.

## 2) The spinous or prickle cell layer:

Composed of differentiating cells, contain some tonifibrils & keratohyalin granules, which synthesize keratins. They are larger than basal cells. Keratinocytes are firmly attached to each other by small interlocking cytoplasmic processes, and by abundant desmosomes. Under the light microscope, the desmosomes look like 'prickles' they are a specialized attachment plaques.

## 3) Granular layer:

Consists of two or three layers of cells that are flatter than those in the spinous layer and have more tonifibrils. As the name of the layer implies these cells contain large irregular basophilic granules of keratohyalin, which merge with tonifibrils. As keratinocytes migrate out through the outermost layer, their keratohyalin granules break up and their content are dispersed throughout the cytoplasm, leading to keratinization and the formation of a thick and the horny envelope

## 4) The horny layer (stratum Corneum):

It's made of piled-up layers of flattened dead cells (coenocytes). The corneocyte cytoplasm is packed with keratin filaments, embedded in a Matrix and enclosed by an envelope derived from the keratohyalin granules. Horny cells normally have no nuclei or intra-cytoplasmic organelles these having been destroyed by hydrolytic and degrading enzyme found in lamellar granules and the lysozymes of granule cells.[7]

**Table No 1: Taxonomical Description Of Plant:**

| Sr.No | Common Name  | Taxonomical classification  | Botanical Name             | Part used |
|-------|--------------|---|----------------------------|-----------|
| 1.    | Curry leaves | Kingdom : <i>Plantae</i><br>Subkingdom : <i>Tracheobionta</i><br>Division : <i>Magnoliophyta</i><br>Class : <i>Magnoliopsida</i><br>Order : <i>Sapindales</i><br>Family : <i>Rutaceae</i><br>Genus : <i>Murraya</i><br>Species : <i>koenigii</i>          | <i>Murraya koenigii</i>    | Leaf      |
| 2.    | Amla         | Kingdom : <i>Plantae</i><br>Subkingdom : <i>Viridiplantae</i><br>Division : <i>Flowering Plant</i><br>Class : <i>Magnoliopsida</i><br>Order: <i>Malpighiales</i><br>Family: <i>Phyllanthaceae</i><br>Genus: <i>Phyllanthus</i><br>Species: <i>emblica</i> | <i>Phyllanthus emblica</i> | Fruit     |

|    |           |  |                            |      |
|----|-----------|--|----------------------------|------|
| 3. | Flaxseed  | Kingdom : <i>Plantae</i><br>Subkingdom: <i>Viridiplantae</i><br>Division : <i>Magnoliophyta</i><br>Class : <i>Magnoliopsida</i><br>Order: <i>Malpighiales</i><br>Family: <i>Linaceae</i><br>Genus: <i>Linum</i><br>Species : <i>L. usitatissimum</i>               | <i>Linum usitatissimum</i> | Seed |
| 4. | Aloe Vera | Kingdom : <i>Plantae</i><br>Subkingdom : <i>Tracheobionta</i><br>Division : <i>Tracheophyta</i><br>Class : <i>Magnoliopsida</i><br>Order: <i>Asparagales</i><br>Family: <i>Asphodelaceae</i><br>Genus: <i>Aloe L.</i><br>Species: <i>Aloe vera (L.)</i>            | <i>Aloe barbadensis</i>    | Leaf |
| 5. | Neem      | Kingdom : <i>Plantae</i><br>Subkingdom: <i>Tracheobionta</i><br>Division : <i>Magnoliophyta</i><br>Class : <i>Magnoliopsida</i><br>Order: <i>Sapindales</i><br>Family: <i>Meliaceae</i><br>Genus: <i>AzadirachtaA. Juss.</i><br>Species: <i>Azadirachta indica</i> | <i>Azadirachta indica</i>  | Leaf |

## 2. OBJECTIVE

The present study includes individual formulation of an herbal conditioner for extra smoothing of hair by using **CURRY LEAVES, AMLA, ALOE VERA & FLAXSEED** and to evaluate their physicochemical, phytochemical screening properties.

Main purpose is to reduce friction between strands of hair to allow easier brushing or combing and supply nutrition.

It is also evaluated for cleansing action, stability studies, and dirt dispersion test.

A reduction in the static electricity caused combing and brushing dry hair, resulting in hair flyaway hair.

The enhancement of the gloss or as a luster of hair.

### 3. ABOUT PLANTS:

#### 3.1 CURRY LEAVES (*Murraya koenigii*):



**Fig: 1 Curry Leaves (Leaf)**

##### 3.1.1 HISTORY:

Most of the population relies upon herbal medicines because they have been considered as safe, effective and economical. *Murraya koenigii* (Curry Leaves /KadhiPatta /MithaNimba /Giri Nimba) is one such medicinally important herb which is widely used as spice, condiments and also used to treat various diseases in India. It is a staple in Indian dishes and is well known for its subtle flavor and used confidently in daily cooking. Curry leaves contain many important ingredients like carbohydrates, proteins, fibers, calcium, phosphorus, iron, magnesium, copper, minerals and vitamins like nicotinic acid, vitamin B, C, A and E, antioxidants, plant sterols, glycosides and flavonoids. The oil is used externally for bruises, eruption, in soap and perfume industry.

The phyto-constituents isolated so far from the leaves are alkaloids viz., mahanine, koenine, koenigine, koenidine, girinimbiol, girinimibine, koenimbine, O-methyl murrayamine A, O-methyl mahanine, isomahanine, bismahanine, bispyrayafoline and other phytoconstituents such as coumarin glycoside viz., scopotin, murrayanine, calcium, phosphorus, iron, thiamine, riboflavin, niacin, vitamin C, beta-carotene and oxalic acid. The essential oil from leaves yielded di-  $\alpha$ -phellandrene, D-sabinene, D- $\alpha$ -pinene, dipentene, D- $\alpha$ -terpinol and caryophyllene.

*M. koenigii* is widely used in Indian cookery for centuries and have a versatile role to play in traditional medicine. The plant is credited with tonic and stomachic properties. Bark and roots are used as stimulant and externally to cure eruptions and bites of poisonous animals. Green leaves are eaten raw for cure of dysentery, diarrhea and for checking vomiting.[4]

### 3.1.2 Uses:

- Anti-Dandruff: Curry leaves when used regularly remove dead hair follicles, which is one of the reasons behind dandruff.
- Prevent Premature Greying.
- Stimulates Hair Growth.
- Rejuvenation of Hair Follicles.
- Strengthening of Hair Shafts.
- Prevents Hair Thinning.
- It has a rich source of beta-carotene and proteins. They also contain amino acids and antioxidants which strengthen the hair follicles and moisturize the scalp.[18]
- It also help remove the dead hair follicles, which can be the reason behind dandruff.
- Leaves and roots are also used traditionally as bitter, anthelmintic, analgesic, curing piles, inflammation, itching and are useful in leucoderma and blood disorders. [5]

### 3.1.3 Chemical Constituents:

Curry Leaves contain proteins, carbohydrate, fiber, minerals, carotene, nicotinic acid, Vitamin C, Vitamin A, calcium and oxalic acid. It also contains crystalline glycosides, carbazole alkaloids, koenine, koenidine and koenimbine. Triterpenoid alkaloids cyclomahanimbine, tetrahydromahanimbine are also present in the leaves. Murrayastine, murrayaline, pyraya-foline-carbazole alkaloids and many other chemicals have isolated from *Murryakoenigii* leaves. [5].

## 3.2 ALOE VERA (*Aloe barbadensis*)



**Fig. 2 Aloe Vera (Leaf)**

### 3.2.1 Uses:

- Aloe vera has many active ingredients and minerals that can help strengthen your hair.
- It has enzymes that break down fats and so strips your hair of any extra oil (sebum).
- It has an antidandruff property.
- It can significantly decrease the scariness and itchiness.
- Deep cleans oily hair.
- Strengthens and repairs hair strands.
- It promote hair growth.[16]

**3.2.2 Chemical Constituents:** Aloe Vera contains 75 potentially active constituents: vitamins, enzymes, minerals, sugars, lignin, saponins, salicylic acids and amino acids. It also contains fatty acids and amino acids and is rich in vitamins A, B12, C, and E. These play a part in healthy hair follicles [18]. There are many chemical constituents derived from Aloe vera such as; Acidic galactan, Arabinans, Glucogalactomannan, Glucomannan, Polyuronide, Cellulose, 7-Hydroxyaloin, Aloemodin, Aloesaponarin I&II, Aloin A and B (barbaloin), Anthranol, Beta barbaloin, Chrysophanol, Chrysophanolglycoside, Isobarbaloin, Capric acid, Hexadecadienoic acid, Palmitleic acid, Stearic acid,  $\beta$ -Carotene, Choline, Folic acid, Vitamin K, Vitamin D, Vitamin E, Arginine, Glutamic acid, Magnesium, Calcium, Zinc, Copper, Amylase, Catalase, Echitamine, Picrinine.[16]

### 3.3 AMLA (*Phyllanthus amblica*)



**Fig. 3 Amla (Fruit)**

### 3.3.1 Uses:

- Amla benefits include antibacterial & astringent properties which help improve the body's immunity system.
- Amla purifies the blood and enhances hair natural color by preventing premature greying of hair.
- It contains calcium, which promotes healthier hair.
- It stimulates hair growth and improves the quality of hair.
- It can treat hair loss effectively.
- It has antifungal and antiviral properties, which prevent dandruff and other fungal infections and improve scalp health.
- improve brain health and function.
- improve vision and eye health.[6]

### 3.3.2 Chemical Constituents

Amla contains vitamin C (ascorbic acid) and contains several bioactive phytochemicals, of which majority are of polyphenols (ellagic acid, chebulinic acid, gallic acid, chebulagic acid, aepigenin, quercetin, corilagin, leutolin, etc.).The fruit contains two hydrolysable tannins Emblicanin A and B, which have antioxidant properties.[6]

### 3.4 NEEM (*Azadirachta indica*)



**Fig.4 Neem(Neem)**



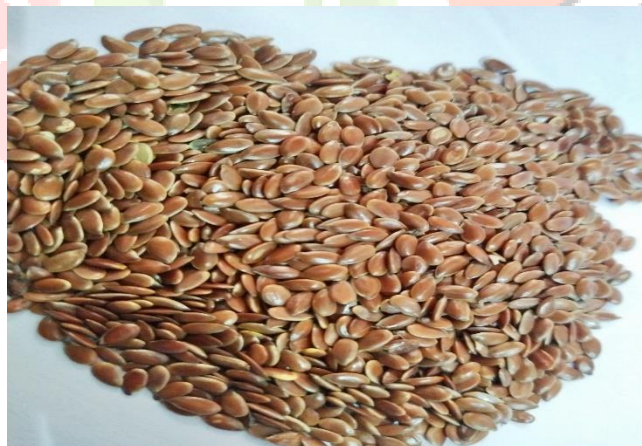
### 3.4.1 Uses:

- Neem has properties is an effective herb to treat hair loss.
- It has antifungal properties that may help within the treatment of dandruff.
- The regenerative properties of neem help in reducing hair fall.
- It helps the hair follicles to become stronger and also encourages hair growth.
- Its medicinal properties is an effective herb to treat hair loss.
- The extracts of the leaves are widely used in skincare and hair care products
- Ayurveda medicine for controlling blood sugar level, cleansing blood and strengthening the immune system.
- Relieves itchy scalp.

### 3.4.2 Chemical Constituent :

Neem leaf and its constituents have been demonstrated to exhibit immunomodulatory, anti-inflammatory, antihyperglycaemic, antiulcer, antimalarial, antifungal, antibacterial, antiviral, antioxidant, antimutagenic and anticarcinogenic properties. This review summarizes the wide range of pharmacological activities of neem leaf.

### 3.5 FLAXSEED (*Linum Usitatissimum*)



**Fig.5 Flaxseed (Seed)**

### 3.5.1 Uses:

- Flaxseed is emerging as an important functional food ingredient because of its rich contents of  $\alpha$ -linolenic acid (ALA, omega-3 fatty acid), lignans, and fiber.

- Flaxseed oil, fibers and flax lignans have potential health benefits such as in reduction of cardiovascular disease, atherosclerosis, diabetes, cancer, arthritis, and osteoporosis, autoimmune and neurological disorders.
- flaxseed is full of fatty-acids and anti-oxidants which help to remove toxins and dead cells from the scalp.
- Flaxseeds are rich in vitamin E, which is great for both skin and hair health.
- It helps improve circulation in the head, thus promoting hair growth and slowing down hair breakage.
- It may also help prevent premature greying of hair.[2]

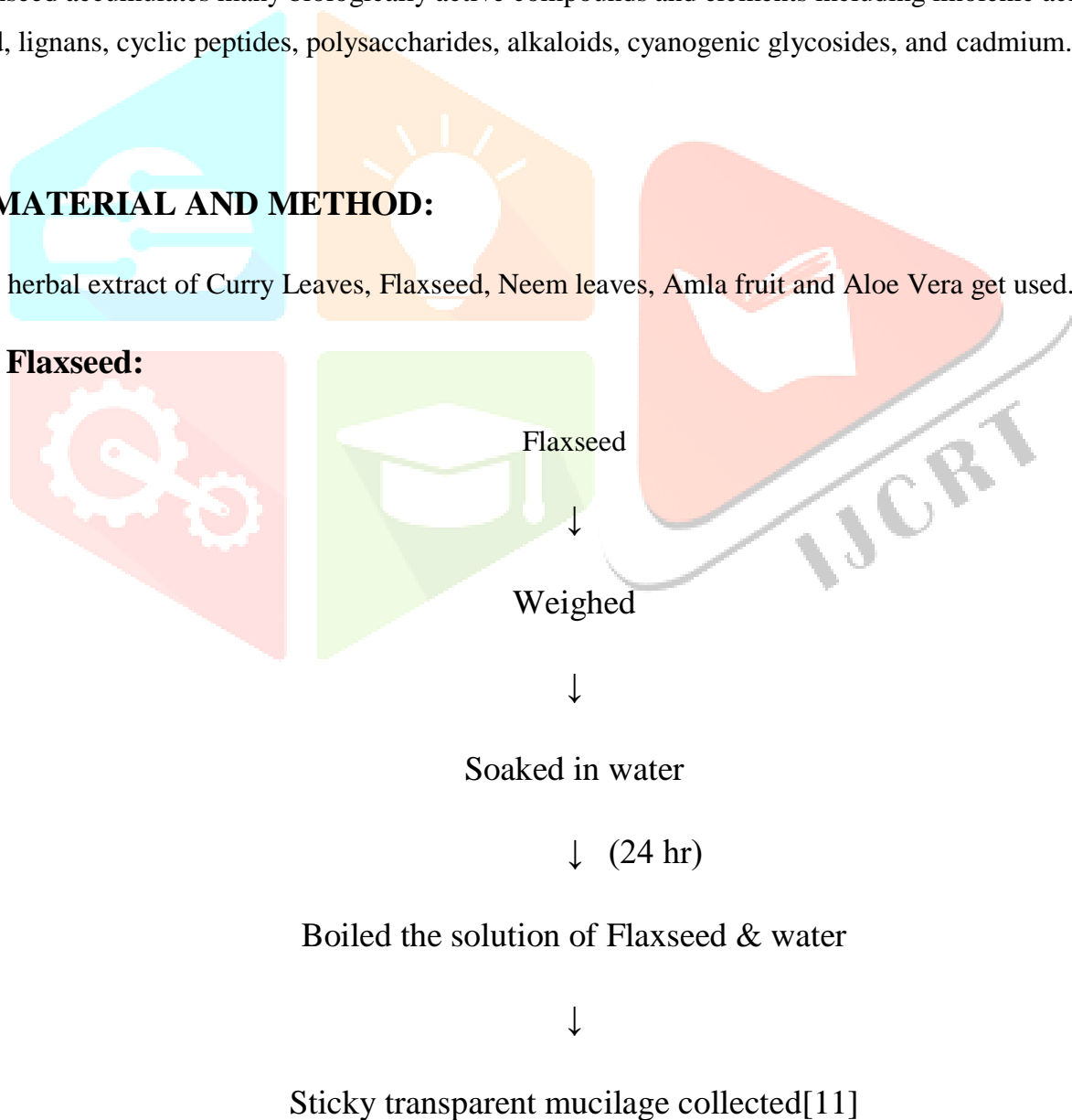
### 3.5.2 Chemical constituents

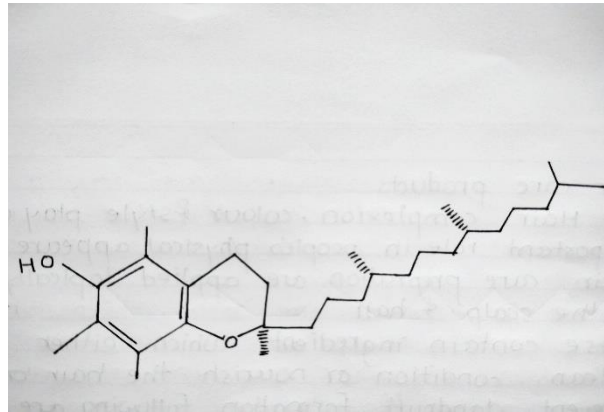
Flaxseed accumulates many biologically active compounds and elements including linolenic acid, linoleic acid, lignans, cyclic peptides, polysaccharides, alkaloids, cyanogenic glycosides, and cadmium. [17]

## 4. MATERIAL AND METHOD:

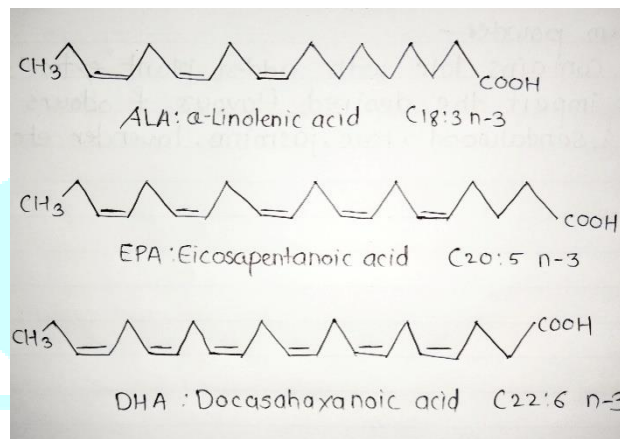
The herbal extract of Curry Leaves, Flaxseed, Neem leaves, Amla fruit and Aloe Vera get used.

### 4.1 Flaxseed:





**Vitamin-E**



**omega-3-fatty**

## 4.2 Extraction Method:

### 4.2.1 Curry leaves Extraction:

Collect the curry leaves



Wash it under running water



Blanched in boiling water



Dipped in chilled water immediately after blanched



Pour it in Petri dish



Keep it in lyophilizer

↓ At – 65°C, 75hr.

Take it out and grind it

↓

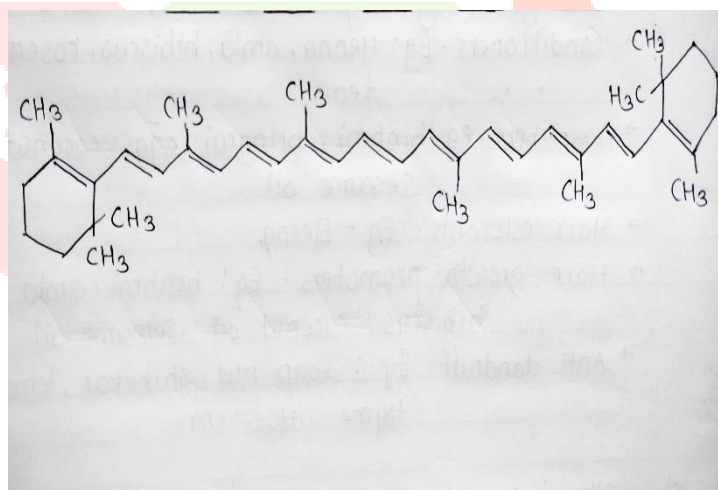
Powder sieved through mesh No. 30

↓

Powder is formed[18]

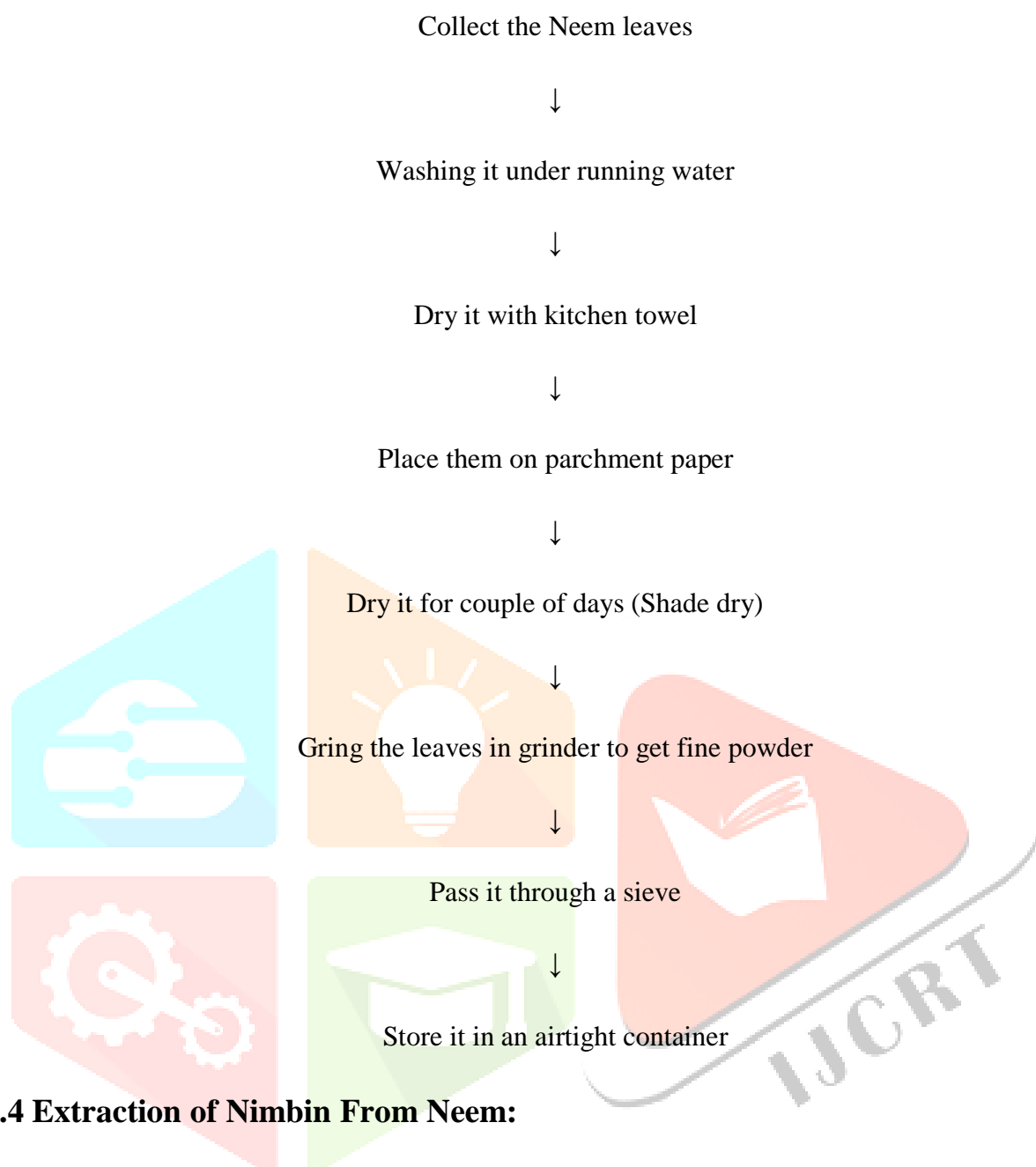
#### 4.2.2 Extraction Of $\beta$ -Carotene From Curry Leaves:

Carotenoids were expected to the procedure. The dried leaves were coarse ground in a mixture. The carotenoids were extracted with ice-cold acetone until sample becomes colorless. the concentrated crude extract was take in a separating funnel and petroleum ether. and aqueous sodium chloride were added and shaken well. the upper layer (petroleum ether) was separated. and the combined extract was dried over anhydrous sodium sulfate and filtered through what whatmann No.1 filter paper the filtrate was evaporated to dryness and in a evaporator. Under vacuum and redissolved in a Known Volume of hexane. Carotene was confirmed by the retention times of respective standard.[20]



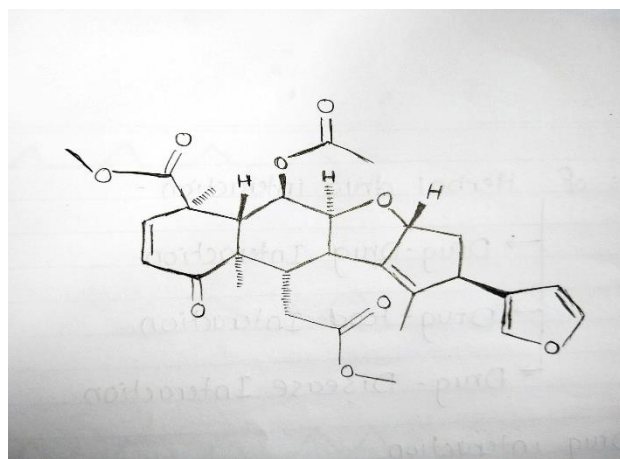
**$\beta$ -Carotene**

### 4.2.3 Neem Extraction:



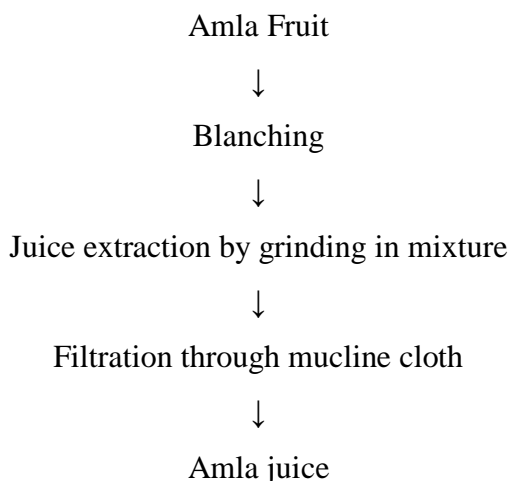
### 4.2.4 Extraction of Nimbin From Neem:

Nimbin extraction is done using super critical CO2 and CO2 with methanol Modified Nimbin.[10]



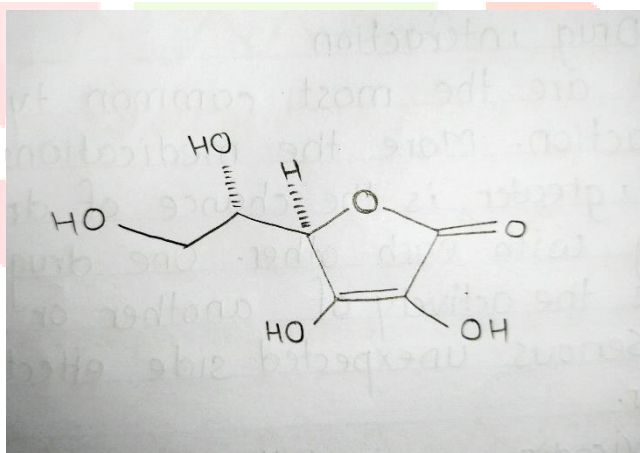
Nimbin

### 4.2.5 Amla Extraction:



### 4.2.6 Extraction of Vitamin C from Amla:

Vitamin C is water soluble. Collect the Amla fruit . Wash under the running water. Scalding the Amla fruit in boiling water or steam for a short time. Crush or grind the fruit and then shake it up with water. A common method is to grind the material with some clean sand in a mortar with a pestle. The pulp can filter through mucline cloth. The vitamin C will be in the water. Vitamin C content in fresh amla was 430.1 mg/100 g.[13]



Vitamin C (Ascorbic acid)

#### 4.2.7 Aloe Vera Extract:

Fresh Aloe Vera Leaf



Washing



Stand it upright in cup

↓ (This allow the yellow resin to drain out)

Peel out the thick skin using knife



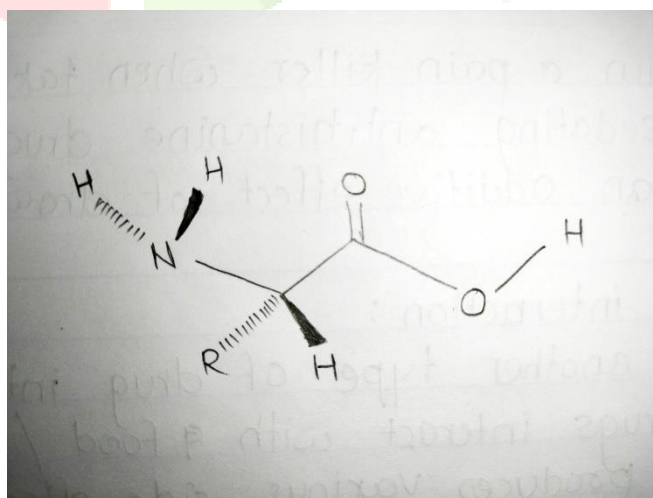
Scoop the gel into a blender



After Few second aloe vera gel is formed

#### 4.2.8 Extraction of Amino Acid from Aloe Vera:

Amino acid extracted from this plant tissue 30 ML 70% ethanol at 80°C. After evaporating the ethanol. The residual water phase was separation, the water phase was freeze dried the extract was resuspended in HCL & using a 0.45 µm syringe filter. The amino acid in the extract was identified using an amino acid analyzer equipped with as HITACHI HPLC column packed with the ion exchange.[21]



**Amino Acid**

**Table No 2: Role of Chemical Constituents:**

| <b>Sr.No</b> | <b>Plants(Ingredients)</b>         | <b>Chemical Constituents</b>   | <b>Role</b>  |
|--------------|------------------------------------|--|--|
| 1.           | Curry leaves<br>(Murraya koenigii) | <b>Beta-ceratene, Vitamin A,</b> proteins, carbohydrate, fiber, minerals, carotene, nicotinic acid, Vitamin C, calcium, oxalic acid.crystalline glycosides, carbazole alkaloids, koenine, koenidine, koenimbine. Triterpenoid alkaloids cyclomahanimbine, tetrahydromahanimbine. | <b>Conditioning Agent</b>  |
| 2.           | Amla<br>(Phyllanthus amblica)      | <b>vitamin C (ascorbic acid)</b> and contains several bioactive phytochemicals,ellagic acid, chebulinic acid, gallic acid, chebulagic acid, apeigenin, quercetin, corilagin, leutolin,   | <b>Promote hair growth</b>   |
| 3.           | Flexseed<br>(Linum usitatissimum)  | <b>Vitamin-E, omega-3-fatty Acid,</b> $\alpha$ -linolenic acid (ALA), oleic acid, linoleic acid, stearic acid, palmitic acid, protein [17][2].   | <b>Help in nourish the hair follicles and scalp</b>                                |
| 4.           | Aloevera<br>(Aloe barbadensis)     | <b>Amino Acid,</b> Vitamins, enzymes, minerals, sugars, lignin, saponins, salicylic acids, fatty acids, amino, vitamins A, B12, C, and E [19]  | <b>Promote moisture, retention and keep hair from bracking</b>                     |
| 5.           | Neem<br>(Azadirachta indica)       | <b>Nimbin,</b> Azadirachtin, nimbanene, 6-desacetylnimbinene, nimbandiol, nimbolide, ascorbic acid, n-hexacosanol and amino acid, 7-desacetyl-7-benzoylazadiradione, 7-desacetyl-7-benzoylgedunin, 17-hydroxyazadiradione and nimbiol  | <b>Show anti-fungal, anti-inflammatory, Antiseptic, antihistamine, antipyretic</b> |



## 5. EVALUATION PARAMETERS:

- Physical appearance/visual inspection
- pH determination
- Determination of solid content %
- Surface tension
- Conditioning performance
- Wetting time
- Skin irritation
- Moisturising time determination.

## 8. REFERENCE:

1. (<http://www.phytojournal.com>)
2. Ankit Goyal, Vivek Sharma, NeelamUpadhyay and Sandeep Gill. Flax and flaxseed oil an ancient medicine and modern functional food. J Food Sci Technol. 2014; 59(9):1633-1653.
3. Arora P.,Dr.Nanda A., Dr.Manindar K., Shampoo based on synthetic ingredients VIA-A-VIS shampoo based on herbal ingredients,2011.vol 7, issue 41-46
4. Ashok Kumar, Rakesh Roshan Mali2. Evaluation of prepared shampoo formulations and to compare formulated shampoo with marketed shampoos, International Journal of Pharmaceutical Sciences Review and Research, 2010; 1(3): Article 025.
5. Bhusal D., Thakur D.P., curry leaves: A Review Review in food & agriculture;2021,2(1)36-38
6. Current Trend in the research on emblica officinalis (Amla) : A pharmacology preservative,Int. J. Pharm. Sci. Rev. Res., 24(2), Jan – Feb 2014; n° 25, 150-1591.
7. Dr.S. B. Bhise, Dr.A. V. Yadav, Human Anatomy and Physiology, pune , NiraliPrakashan, 2018, 3.1-3.6
8. Gholamreza DN, Fariba S *et al.* Formulation of herbal conditioner shampoo by using extracts of fenugreek seeds and evaluation its physiochemical parameter. African journal of pharmacy and pharmacology. 2011; 5(22); 2420-2427.
9. Krunali et al., 2013, Fazlolahzadeh and Masoudi, 2015.
10. P. Tonthubthinmthong et al./ Journal of food engineering 47(2001) 289-293

11. Patil.A , phytochemical & in-vitro evaluation of formulated Polyherbal hair conditioner journal of pharmacognosy& phytochemistry,2019;8(6):35-39
12. Perera PPD, Dahanyoke N. 205 Current status & further prospects of Curry (*Murraya koenigii*) leaves in South Asia, journal of agrisearch 2(3) 212-217
13. Premi BR, Sethi V, Maini SB. Effects of steeping preservation on the quality of anola fruit during storage. J Food Sci Technol. 1999; 36:244–247.
14. Redd et al, international journal of Advance in Pharmacy medicine & bioallied science,2018;6(1)31-41
15. Sharma et al., 2011, NirmalaHalligudi, 2013a, NirmalaHalligudi, 2013b, Fazlolahzadeh and Masoudi, 2015.
16. Sharma N., Minocha N., Kushwaha N., A review on the article of aloe vera & curry leaves, international journal of recent scientific research,2020; vol.11, issue.11
17. Singh KK, Mridula D, Jagbir Rehal and Barnwal P. Flaxseed. A Potential Source of Food, Feed and Fiber, Critical Reviews in Food Science and Nutrition. 2011; 51(3):210-222.
18. Sonia et al., Curry Leaves: A Promising Ingredient for the Development of  $\beta$ -Carotene Rich Upma, Int.J.Curr.Microbiol.App.Sci (2020) 9(9): 1326-1332
19. Surjushe A.,vasani R., Sample D.G., Aloe Vera: A short Review , India journal of Dermatol. 2008;53(4);163-166
20. Varnashree B. S., Nagrajan S., Carotenoids retention in processing Curry leaves, international journal of food science and Nutrition,2013;64(1) :58-62
21. Yong K. K. et. Al., Variation in Amino Acid Content Among three aloe species; Asian journal of chemistry,2013, vol.25.No.11, 6346-6348.