1. Introduction & Review of Literature

Demand for hair care products for cleaning, coloring, changing the texture and providing nourishment and many more to the hair are increasing. With the excessive use of chemicals in various grooming aids side by side, the hair alignment is also increasing. Although commercially many herbal hair care preparations are available, somehow they involve these of chemicals in the form of a synthetic base, which themselves are associated with several side effects. Use of chemicals for the long term may cause hairfall, gray hair, split end, scalp infections such as dandruff, etc. Hair follicle many times coat with the surface grease and dirt. Therefore the nutrients essential for the hair growth are unable to reach the hair root, which leads to dead cell generation from the scalp. These dead cells are known as Dandruff. It is seen in the scalp region as a silvery powder & whitish scales, in the hair, or on the clothes. It may cause moderate to severe itching. Hair falling is also very common in most of the dandruff sufferers. There are mainly two types of dandruff. The scales may chronic or acute, non-inflammatory scaling disorder. Scales may be dried or trapped in oil or sebum. Scaling of the scalp is sometimes confused with seborrhea dermatitis and psoriasis. The exact cause of dandruff is still not known, but the main fungus responsible for the condition is Pityriasis capitis (referring to Malassezia furfur). There are many ways to improve the dandruff condition other than superficial treatment like good sleep, proper diet, personal hygiene. Nasal therapy and head massage therapy with ayurvedic oils is also best for dandruff control.

1.1 Alignment of Hair

There are so many common problems which affect the hair and scalp such as hairfall, dandruff, bacterial or fungal infections in hair scalp (folliculitis), also other disorders infestation of head lice (pediculosis capitis), and fungal infection of scalp ringworm (tinea capitis). Sometimes flakes or scalp ears, redness around the nose, acne or pimples. Excessive flaking may be due both dandruff (seborrheic dermatitis) and psoriasis.
1.2 What is Dandruff?
Dandruff characterizes excessive scaling of the scalp, patches of loosely adherent flakes; it is a universal scalp disorder usually accompanied by itching. Exact etiology of dandruff is still controversial. Malassezia furfur is main dandruff pathogen\(^4\); it is lipophilic dimorphic yeast, which is the normal fungal flora of the human skin. It requires lipids for its growth and feeds which facilitates lipase activity. It also causes dermal inflammation and tissue damage\(^5\). Bacteria also have stronger followed by severity of fungi responsible for dandruff. Severity depends on interaction between host i.e., Malassezia and microorganism. By maintaining the balance of bacteria on the scalp like Staphylococcus and other dermatophytes might helps to resolve the dandruff\(^6\).

Seborrheic dermatitis is characterized by the greasy or yellow color, flakes with is frequent flaking and inflammation. Seborrheic dermatitis differs from normal dandruff as it not only appears on the scalp but also, particularly on nasolabial folds, ears, eyebrows and chest. Furthermore, the concept of dandruff and seborrheic dermatitis are controversial, because both of them share a similar mechanism and similar treatment in both man and women\(^7\).

Malassezia furfur + Lipids ——— Hyperproliferation ——— Flakes →
Figure 1.1: Normal dandruff (*Flaking*)

Figure 1.2: Severe dandruff (*Flaking and itching*)
1.3 Types of Dandruff \cite{8, 9}
Two types of dandruff are found. One is the dry type which contains grayish white flakes. These flakes shed when the scalp is scratched. Another one is the oily type in which flakes stick to the nails when the scalp is scratched.

A) Dry and flaky type (Pityriasis scale)
During winters when the air is dry, and there is little or no sebum, then Pityriasis scale will appear due to drying of the outer layer of the skin i.e., (the stratum corneum).

B) Oily-type (Seborrhoeic scale)
Seborrhoeic scales appear due to excessive sebaceous secretion, generally during the time of summers and rainy season when the climate is humid. Sebaceous secretion is also excessive due to excess androgenic hormone and Keratinization. Keratinization phenomenon was accelerated by physical irritation or chemical irritation. Physical irritation includes scratching with the nails, excessive combing or use of hair dryers; Chemical irritation may occur from drugs.

1.4 Dandruff Composition
Dandruff is composed of a cluster of corneocytes, dirt, dust, sebum, grease. Scales vary in size and found in abundance from one site to other. Parakeratotic cells are also present, and their number is related to this variety of clinical manifestation. The heterogeneity occurs in the size and abundance of scales from one site to another and over time. Parakerototic cells are often part of dandruff their numbers and severity may also influence by Seborrheic dermatitis \cite{10}. Dandruff always occurs in areas with high levels of sebum on the skin. Sebum helps in epidermal development, transporting antioxidants, barrier maintenance, protection, regulating the body temperature odor, and generation of pheromones \cite{11}.

1.5 Microbial Etiology of Dandruff
The etiology of dandruff appears to be based upon the evidence, dependent upon three factors that are sebaceous gland secretions, microfloral
metabolism, and Individual susceptibility. Malassezia furfur the Lipophilic yeast is widely accepted to play a keen role in dandruff. The level of Malassezia increases by 1.5 to 2 times at the time of dandruff. Candida albicans is one of the leading causes of dandruff together with the fungus; there may be some bacterial infestation on scalp wound by nail scratching \[12, 13\].

1.6 Non-Microbial Etiopathology of Dandruff
Exposure to sun cause desquamation of the scalp with minimal or severe irritation is the non-microbial cause for dandruff other reasons are over shampooing, frequent combing, use of excessive cosmetics products for hair grooming, dust and dirt also to some extent cause dandruff \[14\].

1.7 Pathophysiology
The real reason for dandruff formation is not yet known. This was well documented.
that.lipases.containing.organisms.;hydrolyze.triglycerides.Malassezia a yeast which resides on the surface of the scalp requires saturated fatty acids to proliferate. These cells secrete hydrolytic enzymes, including lipase. Free fatty acids and glycerol are formed by the lipase enzymes cleave of sebaceous triglycerides. The Malasseziais are dependent on the saturated fatty acids for their proliferation. These irritating unsaturated fatty acids are leave behind an increased penetrate into the epidermis of susceptible individuals \[15\].
Dandruff is always being confused with SD ,signs and symptoms of scalp may well explain the.cutaneous.disorder..Malassezia.metabolism.initiates.the.inflammatory.responses and causes the scalp skin cells proliferation \[16\].
1.8 Composition of Sebum

Various skin types secrete varying amount of sebum at different sites of the skin. Sebumeter is used to measure sebum excretion. The role of sebum in dandruff is implied by the strong temporal correlation with sebaceous gland activity. Sebaceous glands in the human secrete a lipid mixture, wax, cholesterol and triglycerides. Composition of the sebum is associated with the activity of sebaceous gland, age and effect of androgens and origin of sebaceous gland. Sebum contains wax esters, a mixture of triglycerides, fatty acids, sterol esters, cholesterol and cholesterol esters, and squalene.
Secreted sebum contains triglycerides and esters which are broken down by microbes into diglycerides, monoglycerides, and free fatty acids. The free fatty acids play a key role as it involved in the initiation of the irritant response and hyper proliferation of scalp. The dandruff incidence and severity is affected by stress and hormones [17, 18].

1.9 Flaking and Dandruff
Flaking is normal process. Normal flakes are too small to be visible. Epidermal cells are continuously replaced dead cells are pushed outward and flakes off. In dandruff condition flaking or keratinization occurs earlier (between 2 to 7 days), although normally it takes around a month. Common older literature cites the Pityrosporum ovale or Malassezia furfur as the causative agent, which is smallest sequenced free living fungus on human skin. Malassezia species is responsible for lot many human health issues. This fungus plays role in threatening to individual like respiratory allergies, autoimmune diseases, etc. In the physiological spectrum of scaling about 48,000 cells cm\(^2\) get released normally after detergent treatment and this number goes up to 800,00 cm\(^2\) during dandruff and seborrheic dermatitis. However dandruff is noninflammatory in nature [19].

1.10 Head – Scratcher
Atopic Dermatitis (AD) is inflammatory skin disorder associated with hay fever and asthma. It is also known as eczema. Malassezia plays an important role in atopic dermatitis. Seborrheic dermatitis is also skin disease; the basic difference between these is types of flakes and their existence. The standard treatments are topical, corticosteroids topical immunomodulating agents, and emollients. Causes for AD is unknown, but it is assumed to that It may be due to irritant chemicals, temperature, personal hygiene, food allergies, emotional stress, infections etc. There are around 10 % cases of atopic dermatitis in childhood, which may be. cause by egg, wheat, milk, peanut, and many more.
Response of AD flares due to sweating and emotion stress [20].
1.11 Malassezia and Its Mechanism of Action [21, 22,23]

The Malassezia most commonly found on sebum rich areas of the body and degrade sebum. Malassezia organism can be found on the skin in 75-90% healthy people and most common in the age of 12-45 years. Malassezia furfur is a lipophilic, unipolar, dimorphic, gram positive double walled, saprophytic budding oval to round yeast. Colonization by M. furfur begins after birth, peak presence of yeast occurs in adolescence and early stage. Malassezia yeast requires free fatty acid for survival found in stratum corneum and inpilarfollicle. The yeast hydrolyzes triglycerides into free fatty acids, further creates along chain and medium chain fatty acids. This causes inflammation due to activation of the alternative complement pathway. This result is a cell-mediated response. More than seven species of Malassezia has been reported i.e. M. sympodialis, M. globa, M. sympodialis, M.furfur, M. obtuse, M. sloofiae, M. restricta, M. pachydermatis. Multiple lipid-dependent species are (including M. globosa, M. Restricta, M.furfur, M. obtusa, M. japonica, M. nana, M. dermatitis, and M. yamatoensis), & non-lipid-dependent, primarily zoophilic, species, M. pachydermatis.

Figure 1.4: The role of Malassezia in dandruff [16]
1.12 Dandruff and Treatments
Dandruff can be treated depending upon the severity, causes and conditions. Use of hair care preparations, keeping head clean, oil free, by keeping scalp infection free. In the market several antidandruff treatments are available both herbal and synthetic. These antidandruff agents control the excessive flaking or formation of dandruff cells from horny layer of the skin. An antidandruff agent also alleviates the itching and scaliness associated with seborrheic dermatitis. Dosage forms for superficial uses like shampoos, tails, creams, gels and packs are available in the market.

1.13 Antidandruff agents and their mechanism of actions
Agents are associated with the treatment of scalp disorder that controls the excessive formation of dandruff cells from the horny layer of skin. It may also alleviate the itching and scaliness associated with seborrheic dermatitis. Antidandruff agents may be natural or synthetic. These agents make the scalp free from natural grease, oil, dirt or fatty lipids which avoid creating a prime environment for Malassezia, Candida and bacteria to thrive. This stops the formation of oleic acid and prevents the increased turnover of skin cells thus getting rid of dandruff.

1.14 Synthetic Antidandruff Agents and their side effects
The chemical agents used in present scenario for controlling dandruff are Ketoconazole an Imidazole derivative; other chemicals include such as Selenium sulfide, Zinc pyrithione, Ethylene glycol, Piroctone, Olamine, Salicylic acid, Guar hydroxy propylammonium chloride, Dimethicone, Glycolic acid, Steroids, Tar derivatives. Most of the products which are designed to fight dandruff contain zinc pyrithione as an antifungal agent.

It can disrupt transport mechanism by blocking the proton pump. A new study proposes that the mode of action of zinc pyrithione arises from iron starvation. Ketoconazole and Zinc pyrithione (ZnPTO) based shampoos (Over the Counter products) are used more by the consumers for common dandruff problems. The desired functional benefit shampoos and low cost with ZnPTO
are preferred by the majority of the consumers, like the shampoos brands with ZnPTO. (Antidandruff. Agent). Earlier in severe cases of dandruff, ketoconazole based shampoos were preferred, but nowadays ketoconazole is commonly found in all synthetic antidandruff shampoos despite its various known side effect and relatively higher costs [27].

1.15 Herbs as Antidandruff

Herbs contribute to a great extent to fight against pathogens and microbes. In India and other tropical developing countries, traditional medicines hold a great promise as an effective, easy and economical source for skin diseases. These herbs have been reported for usefulness in the form of infusion, paste, leps, packs and decoctions in traditional system of medicine for treating skin disease. Some of the imported antidandruff herbs are Tea tree oil, Orange peel, Aloe vera, Rosemary, China rose, Egg plant, Chenopodium, Neem, Indrajev, Dadmari, Shikakai, Henna, Bhringraj, Madukparni, Nilpushpa, Nimbuk, Amalaki, yastimadhu, Gulab, Ushir, Meethi, Jatamansi, Ashwagandha, Rosemary oil, Spearmint oil, Menthol, Guar, Karanja, Chanaka, Kusumbha, Reetha, Amla, Bhringraj, Heena, Shikakai, Neem, Giloy, Aloe vera, Jatamasi, Bakuchi, Haldi, Amahaldi, Yastimadhu, Heena, Aleovera, Jasud, Lemon, Amla, Soap berry, Bhringraj, Indian perriwort, Spikenard, Sandalwood, Lemon grass [28].
1.16 Review of Literature

Review of literature is backbone of research, through literature we get many ideas and knowledge of work done and recent researches also Many literature were referred but these are the summary of some important literature.

Screening for antibacterial and antifungal activity of 10 medicinal plants spices of traditional Chinese medicine was conducted. Crude ethanol extracts was tested against five species of microorganisms: Bacillus cereus, Escherichia coli, Staphylococcus aureus, Pseudomonas aeruginosa, and Candida albicans. Out of these ten plants, 5 showed positive antimicrobial activity against one or more species of microorganisms. Chelidonium majus, Sanguisorba Officinalis, and Tussilago farfara were found to be having potent antimicrobial activity [29].

Antibacterial and antifungal activity of Thespesia populnea (L) was conducted. The alcoholic and chloroform extract of leaves, stems, fruit latex and root was studied. The study thus justifies the folk therapy of little plant in a variety of skin infection [30].

Reported the antifungal activity of some the imported drugs and formulated the antidandruff hair oil for prevention of dandruff. Composition of oil contains H.sinensis, C.asiatica, E.alba, E.officinalis and Terminalia .bellirica. Clinical studies were planned for management of dandruff [31].

Dubey R.C. tested the Antibacterial activity of essential oils against certain human pathogens. The antibacterial activities 100 extracts of 50 Indian plant species was tested the most susceptible bacteria was gram positive and gram negative [32].

Mythreyi R. revealed the antimicrobial activity of Bauhinia tomentosa linn. Each 100mg of chloroform and ethanol extract of Bauhinia tomentosa also
showed antimicrobial activity against tested organisms where as no other extracts show such activity [33].

Kar D.M., tested wound healing properties and antimicrobial activity of stem bark of Toddalia Asiatica Linn. Antimicrobial and wound healing properties were evaluated [34].

Laxmi V. found Antifungal activity of Petrosia nigricans. In vivo evaluation of the fraction against Aspergillus fumigatus systemic infection in Swiss albino mice provided protection at 50 mg per kg [35].

Bhattacharjee P.R. screened Antimicrobial and Pharmacological evaluation of stem, seed, and extract of M. paradisiacal linn. Screened the antimicrobial activity of M.paradisiacal.

Latha M. Reported Antimicrobial activity as well as phytochemical screening of Scoparia dulcis linn. The different concentration of chloroform extract was tested. Activity against all bacterial strains whereas a methanolic extract of whole powder demonstrated moderate activity against Bacillus subtilis [37].

Sagar. R worked on formulation and evaluation of herbal antidandruff shampoo. Shampoo was formulated and evaluated and compared against marketed preparation. Prepared formulation showed better activity than the standard [38].

Shyam Sunder D. worked Aqueous extracts of Terminalia catappa linn. Fruits were tested against some fungal strains. Ripe and unripe fruit of Terminalia catappa when investigated separately for their in-vitro antifungal activity [39].

Kole P. Focused on potency of herbal extract and gave an scientific account for use of extracts in cosmetic. In future newer herbs will find the place in world of cosmetics with more sophisticated formulations. So, it will become mandatory authorities for regulatory authorities as well as Government and to make laws regarding safety and efficacy of herbal extracts [40].
Sanjai saxena, Present study highlight vast range of G.glabra . It states the need to modify glycyrrhizin to reduce the side effects as prolong use may cause hyperkalmia , hypertension , cytotoxicity [41].

Gangwar P., The aqueous extract of Mentha spicata tested for antibacterial properties, and Phytochemical analysis of essential oils was done. Essential oils and aqueous extract from the leaves of mentha spicata was tested in vitro for their antibacterial efficacy against common enteric pathogen bacteria [42].

Parekh J, Some Indian medicinal plants aqueous and alcoholic extracts was screened for antibacterial activity. The antibacterial activities of 100 extracts of 50 Indian plant species were tested against six medically important bacterial strains. The most responsive bacteria were gram positive and gram negative [43].

Patel D, Evaluated antibacterial activity of leaf and bark extract Neolamarckia cadamba (ROXB) bosser. Evaluation of antibacterial activity of Neolamarckia cadamba (ROXB) bosser leaf and a bark extract. Leaves extract showed more activity than bark extract [44].

Bakshi N, Antidermatophytic activity of some alkaloids from Solanum dulcamara. Solanum dulcamara extract was screened for their anti dermitophytic activity. Inhibition zone produced by solasodine proved better efficacy than the standard (Griseofulvin) [45].

Trakranrungsie N, Ethnoveterinary study of the antidermetophytic activity of Piper bettle, Alpinia galangal and Allium ascalonicum extract in vitro. Ethanolic extract of crude extract of Piper bettle and its different crude extract of, petroleum ether, chloroform, water were subjected to preliminary qualitative chemical investigation, ethanolic extract showed significant antifungal activity against candida albicans when compared to Griseofulvin [46].
Kothari A. studied Antimicrobial activity of the Eliptica alba. Aqueous and organic extract of the whole plant of eliptica alba was investigated for the presence of various chemical activity. The methanolic extract exhibit inhibitory activity against all bacterial culture [47].

Nayak S.H, Developed and evaluated Cosmeceutical hair styling gel for dandruff containing Ketoconazole. The formulation containing 1% ketoconazole could be used as effective anti dandruff hair styling gel [48].

Krishnamurthy studied the anti-dandruff activity of Dano polyherbal hair oil was studied using microbial and clinical tests. Results of clinical test proven that there was a clear symptomatic relief from dandruff in all the volunteers after ten days of use. The plant extracts are from Wrightiatinctoria (Indrajev), Cassia alata (dadmari) and abitter fraction of Azadirachta indica (Neem or Nimba). Methylene blue reductase test was done to study the anti-dandruff efficacy of the oil [49].

Shrivastava S, Novel preparation and evaluation of lotion containing Aloe gel beads. A new gelation method was used to prepare aloe gel beads using sodium alginate as a polymer. The novel lotion showed good compatibility, photo protective activity and stability as compared to regular aloe gel calamine lotion [50].

Chaple D.R, Henna extract for formulation and evaluation of topical antifungal drug delivery system. The tropical drug delivery system in the form of a gel having laws one as herbal antifungal drug extracted from leaves of henna plant laswsonia inermis was formulated and characterized using the following parameters – appearance, PH, rheological properties and stability studies. The antifungal activity study was performed on all four formulations. Griseofulvin and Clotrimazole in the same gel base activity [51].

Braca.A, Momordica charantia seed essential oil tested for chemical composition and antimicrobial activity. The essential oil obtained from the
seeds of Momordica charantia was analyzed by GC/MS the main constituent where trans-nerodol, apiole, cis-dihydrocarveol, the oil were tested for its antibacterial and antifungal activity [52].

Semalty M, explained herbal hair growth promotion strategies for alopecia. The herbal drugs are also investigated for potential and safer alternatives. The article focuses on causes and factors affecting the hair losses. The developments in appropriate rejuvenation strategies discussed along with the potency of herbal drugs for hair growth activities [53].

Ashok K, Evaluation of antibacterial activity and phytochemical constants of Singhad guggul. The methanolic extracts of Singhad guggul were tested for antibacterial activity by cup-plate method was studied against Bacillus subtilis, E.coli, S.aureus, and Staphylococcus. Erythromycin used as standard antibacterial. The result of the study revealed that the Tindukadi Vati exhibited antibacterial activity against E.coli and B.Subtilis [54].

Elayaraja A, explained the anti-bacterial activity of Bryonia seabra crude extract was done. All four extracts obtained from leaves of Bryonia seabra i.e., extracts of petroleum ether, benzene, ethanol and hydro-alcohol (50:50) were evaluated by in different concentrations for in vitro antibacterial activity against different microbial strains of E.coli, S.aureus, B.Subtilis, K. pneumonia and M. luteus. Both the ethanol and hydroalcoholic extracts had significant broad spectrum anti-bacterial activity [55].

Rath C. worked on antibacterial potential assessment of Jasmine essential oil against E.coli. The anti-bacterial activity of Jasmine flower hydro steam distilled essential oils, synthetic blends and six major individual component assessed against E.coli (MTCC-443) strain. The activity was bactericidal. The activity of the chemicals was possibly due to the inhibition of cell membrane synthesis [56].

Saeedi M. worked on extracts of Four species of Stachys studied for antimicrobial activity. The dried flowering aerial parts, methanolic extracts was
used to test the anti-microbial activity of Stachys byzantia, S.inflata, S.lavandulifolia, and S. laxa was studied by disc diffusion method and determination of minimum inhibitory concentration (MIC) values against E.coli, S.aureus, B.Subtilis, K. pneumonia,M.luteus, A.niger and Candida albicans. The extracts of plants exhibited concentration depended anti-bacterial activity against the bacteria tested. The extracts did not show any antifungal activity. The extracts were more active against Gram-positive microorganisms. The extracts, however, did not show any antifungal activity [57].

Nair R, conducted antimicrobial activity of Terminalia catappa, Manikara and Piper betel leaf aqueous and methanol extract were studied against 12 gram-positive and fungal strain of Candida Tropicalis. The methanolic extract was considerably more efficient than aqueous extract in inhibiting the investigated microbial strains. The most powerful anti microbial plant was Piper betel [58].

Nanda U, conducted antimicrobial activity of Ludwgia Octovals (Jacq) Raven against selected human dermatological pathogens. The extract was tested against dermatological pathogens such as bacteria including S.aureus, E.coli, C.krusei, M.gyseum, C.albicans, C.tropicalis, E.faecalis, A.niger for determination of MIC by microdilution method. The extract was compared with the activity of standard regarding zone of inhibition (ZOI) by disc diffusion method [59].

Mohanty J concluded antibacterial spectrum of Kaempferia RotaundsLinn and Eupatorium Cannabinum Linn. The present study was done to investigate antibacterial activity and synergism effect of methanol extracts of Kaempferia Rotaunds Linn and Eupatorium Cannabinum Linn. with antibiotic Ciprofloxacin. The antibacterial effect determined by agar dilution and disc diffusion method. Only three out of following selected bacterial strains exhibited significant synergism effect in combination with plant extracts with a standard antibiotic [60].

Muthuswamy P.concluded antibacterial and antifungal activity of Trianthema Decandra extracts. The plant Trianthema Decandra, Linn. was successively extracted with petroleum ether, chloroform, and ethanol by soxhlet extraction. The extracts wasvacuumed dried and subjected to antimicrobial screening by
the agar disc diffusion method. It was observed that ethanol extract was most potent and the petroleum extract was least potent of the extract screened. Phytochemical tests were performed to identify the phytoconstituents present in the extracts [61].

Burli D. Concluded antibacterial activity of Butea monosperma (LAM) Taub flower extracts. Butea monosperma (Lam). Flowers were dried, powdered and extracted with various solvents and evaluated for antibacterial activity against microorganism (Gram positive and Gram negative). Chloroform extract showed moderate activity. Benzene extract was found to be much effective at different concentration [62].

Shameem A. did Clinical study on the management of dandruff with a pharmacopeial preparation of Unani medicine and its cosmetic evaluation. Comparison of efficacy of Unani medicine and ketoconazole regarding dandruff. Assessment of parameters like Itching, scalp shedding, erythema, Hairfrizz, etc. All parameters were analyzed and compared using appropriate statistical test [63].

Shivanand P. reviewed Herb’s big hand in the field of cosmetics in India and abroad. Explained about the importance of knowledge of nature, compiled in Ayurveda, with the science of Ayurveda several herbs are use to prepare the cosmetic as well as medicated product [64].

Berenji H did in vitro activity on Malassezia species of Lawsonia inermis extract. The present study demonstrate that aqueous, chloroform and methanolic extracts of henna inhibits the growth of fungus. Study also revealed the aqueous extract was more potent than methanolic and chloroform extract [65].

Upadhyay S, Evaluated the antibacterial and antioxidant activities of Ajuga bracteosa herb by in vitro methods. In the present work in vitro
pharmacological evaluation of Ajuga bracteosa herb extract for antibacterial activity by a zone of inhibition method, while that of antioxidant activity by DDPH radical scavenging and H$_2$O$_2$ scavenging method \[66\].

Chandrani D, concluded the antifungal reviews by combining the literatures on dandruff and its al of herbs from the causes also summarized the antidandruff potential of the drug and herbal extracts already reported in the literatures and lastly advantage of usage of herbs as economic and have no side effect \[67\].

Badi Al, formulated the herbal shampoo was formulated with 10% gelatin aqueous gelatin solution A.conicna, S.mukorossi, P.emblica, C.aurantifolia.Citric acid was used to adjust pH.Several other test such as detergency, dirt dispersion, foam stability were tested \[68\].

Dikshita A, reviewed about etio-pathology of dandruff, Botanicals for the management of dandruff and review elaborates the beneficial effects with lesser or no side effects. Varieties of antifungal agents are available in market for dandruff treatment yet unable to prevent recurrence and negative effect \[69\].

Biswas U, Comparative evaluations of extracts of aqueous Glycyrhiza The study represents the comparison of the ethanolic and aqueous root extracts of G.glabra .The major constituents present in the extracts of Glycrrhiza glabra was triterpenoids saponins and minor was glabarannin, glabrone, stigma sterols, onocerins, isoflavone, umbelliferone, hamyrin, sigmasterol \[70\].

Yusuf M, antibacterial and antifungal activities of henna leaves. The antimicrobial efficacy of leaves against common human pathogen was tested. Extract 10% and 20% were prepared, strains were incubate in the liquid and antibacterial activity was tested \[71\].

Sarath C, Developed and evaluated the antidandruff efficacy of shampoo based on natural sources. The main object of the study was to eliminate
harmful synthetic ingredients from antidandruff shampoo formulation and substitute them with the safe, natural ingredients [72].

Reddy P, reviewed the importance of cosmetics and herbs in cosmetics. Since long herbs and herbal extracts are having several associated properties. The chemical constituent present in the formulation is having ultimate therapeutic value and also they may give good elegance to the formulation [73].

Chandra S. (2013), objective of study was eliminating harmful synthetic ingredient and substitute them with safe base. The antidandruff shampoo was formulated using all natural ingredients. Future studies needed for safety and efficacy of the drug [74].

Wani S, Prepared and evaluated the antidandruff efficacy of polyherbal shampoo. Herbal powder shampoo was formulated. The composition of powder shampoo includes a natural ingredient like Fenugreek, Azadirachta indica, Acacia, Sapindus murossi, Ocimum sanctum which are having the proven efficacy in hair care preparation. The formulation was evaluated for a number of parameters evaluated [75].

Edwin E, have done Pharmacognostic Preliminary Photochemical Studies on Hibiscus rosa-sinensis. They studied various pharmacognostic parameters like morphological studies, microscopical studies, powder microscopy, toal ash, water soluble ash, acid insoluble ash, sulphated ash, extractive values, swelling index, rualitative chemical tests [76].

Aruna M, Concluded his study by development and evaluation of herbal gel by using traditional knowledge and the study also presents herbs already been used for herbal hair care [77].
Sibi G, promoted the use of aqueous solvents there by promoting green pharmacy. Antidandruff activity of H. sinensis, P. emblica and A. concinna was evaluated and characterization of active constituent was done to identify the active principle [78].

Agrahari P, reviewed the T. chebula and concluded immense potential of the T. chebula. She also explained the combination of triphala and the advantages and medicinal uses theof triphala together with the Rasayana for physical and mental health which helps to tolerate any kind of stress [79].

Hemachandran H, evaluated the skin whitening property of Pterocarpus santalinus of methanolic extract as a natural melanogenesis inhibitors: In vitro study in B 16F0 melanoma cells lines, reveals skin whitening property of the Pterocarpus santalinus of methanolic extract of drug and helps to reduce hyper pigmentation [80].

Bulle S, study revealed the therapeutic potential of heart wood (P. santalinus), author reviewed the pharmacological effect of the with the disease. He explains the bioactive compounds in terms of diseases and modifying the risk of disease [81].