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RESEARCH ARTICLE

FORMULATION AND EVALUATION OF ANTIDANDRUFF HAIR GEL.

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Abstract

At present, there are number of antifungal agents use topical applications like clotrimazole, griseofulvin, itraconazole, fluconazole etc. Clotrimazolewas used as a model drug. Clotrimazole is an imidazole derivative with a broad spectrum anti mycotic activity. It acts by inhibiting biosynthesis of ergosterol, an important component of fungal cell membranes. It is widely used for the treatment of local candidacies, vaginal yeast infections; topical applications include fungal infections such as ring worm, athlete's foot and jock itch. Its action leads to increased membrane permeability and apparent disruption of enzyme systems bound to the membrane. The major drawback of this drug is its insolubility in water. The techniques generally employed to enhance the solubility of poorly water soluble drugs are, use of surface active agent, hydrates and solvates ,polymorphism, complexation, solid dispersion. Among this Solid dispersion is a unique technique used to increase solubility, dissolution and bioavailability of poorly water-soluble drugs. Conventional method for preparing solid dispersion includes solvent wetting method, physical mixture, complex formations, and solvent evaporation techniques. Creams, gels, ointments and pastes are some of the topical semisolids in use for many decades**.** The extensive studies on release properties have revealed that the active ingredients in gel based formulations are better percutaneously absorbed than cream or ointment bases

Introduction:-

The Etiology of Seborrheic Dermatitis remains un identified, though many factors, including hormonal have been occupied. This chronic inflammatory disorder is normally limited to area where these bateaus glands are present like head. In this condition of skin, the skin becomes crumbling. This type of dermatitis on scalp is harsh type of dandruff. When this type of dermatitis affect the scalp various people call it as dandruff. Seborrheic dermatitis occurs when in the neonatal period, it generally disappears by six to twelve months suggesting that it possibly are spend to maternal hormone stimulation. (1) Seborrhoea dermatitis often affects people in post puberty. Further facts of hormonal influence is provided by research indicating that the human sebocyte responds to androgen stimulation. Although specific details remaining known Pityrodporium Ovale is mainly found to take part in the demonstrating of the Seborrhoea dermatitis. The migration rate of occupied skin by this organism may be lesser than of normal skin. Classified Common sites of dandruff distribution: The distribution is naturally symmetric and general sites of distribution are Hairy areas of head, Forehead, The external ear canals, Post auricular creases. Its affect not just on

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the scalp but also affect the ears, eyebrows, side of nose, beard, and less commonly the central part of the chest. Dandruff may cause in any hairy area with even very small hair follicles .Dandruff is seen in all ages from baby to the elderly .In efficiency scalp, "Cradle cap" is another term using for dandruff. Dandruff is commonly known as seborrheic dermatitis. Severe dandruff may be very difficult and frustrating condition. Ongoing combination treatment of multiple shampoo, washes, cream and lotion may be required to treat resistance condition. Overall, dandruff treatment is safe and effective The best shampoo choice include zinc pyrithione, selenium sulphide, tar based shampoo. Prescriptions shampoo of dandruff such ask etoconazole have no over over-the-counter brands. Topical drug administration is a localized drug delivery system anywhere in the body through ophthalmic, rectal, vaginal and skin as topical routes. Topical drug delivery can be defined as the application of a drug containing formulation to the skin to directly treat coetaneous disorders(e.g. acne) or the coetaneous manifestations of a general disease (e.g. psoriasis) with the intent of containing the pharmacological or other effect of the drug to the surface of the skin or within the skin. Skin is one of the most readily accessible organs on human body for topical administration and is the main route of topical drug delivery system. It affords to maintain applied preparation intact for a prolonged time and this has resulted in its increasing use as a route of administration whether for local, regional or systemic effects. Topical anti fungal are the agents, meant for topical use for fungal infection. Topical application of drug at the affected site offers potential advantage of delivering drug directly to the site of action. Local infection can be treated by application of products which forms transparent water vapours and air permeable film over the skin surfaces, from which drug releases continuously to the skin site and skin structure infection and the disease of the patient would be treated. At present, there are number of antifungal agents used in topical applications like clotrimazole, griseofulvin, itraconazole, fluconazole etc. Clotrimazole was used as a model drug. Clotrimazole is an imidazole derivative with a broad spectrum anti mitotic activity. it acts by inhibiting bio synthesis of ergo sterol, an important component of fungal cell membranes. It is widely used for the treatment of local candidacies, vaginal yeast infections; topical applications include fungal infections such as ring worm, athlete's foot and jock itch. Its action leads to increased membrane permeability and apparent disruption of enzyme systems bound to the membrane. The major drawback of this drug is its insolubility in water. The techniques generally employed to enhance the solubility of poorly water soluble drugs are, use of surface-active agent, hydrates and solvates, polymorphism, complication, solid dispersion. Among this Solid dispersion is a unique technique used to increase solubility, dissolution and bioavailability of poorly water-soluble drugs.(2)

Conventional method for preparing solid dispersion includes solvent wetting method, physical mixture, complex formations, and so Creams, gels, ointments and pastes are some of the topical semisolids in use for many decades**.** The extensive studies on release properties have revealed that the active ingredients in gel based formulations are better per cutaneously absorbed than cream or ointment bases Topical drug administration is a localized drug delivery system anywhere in the body through ophthalmic, rectal, vaginal and skin as topical routes. Topical drug delivery can be defined as the application of a drug containing formulation to the skin to directly treat coetaneous disorders(e.g. acne) or the coetaneous manifestations of a general disease (e.g. psoriasis) with the intent of containing the pharmacological or other effect of the drug to the surface of the skin or within the skin. Skin is one of the most readily accessible organs on human body for topical administration and is the main route of topical drug delivery system. It affords to maintain applied preparation intact for a prolonged time and this has resulted in its increasing use as a route of administration whether for local, regional or systemic effects. Topical anti fungal are the agents, meant for topical use for fungal infection. Topical application of drug at the affected site offers potential advantage of delivering drug directly to the site of action. Local infection can be treated by application of products which form transparent water vapours and air permeable film over the skin surfaces, from which drug releases continuously to the skin site and skin structure infection and the disease of the patient would be treated. At present, there are number of antifungal agents use topical applications like clotrimazole, griseofulvin, itraconazole, fluconazole etc. Clotrimazolewas used as a model drug. Clotrimazole is an imidazole derivative with a broad spectrum anti mycotic activity. It acts by inhibiting biosynthesis of ergosterol, an important component of fungal cell membranes. It is widely used for the treatment of local candidacies, vaginal yeast infections; topical applications include fungal infections such as ring worm, athlete's foot and jock itch. Its action leads to increased membrane permeability and apparent disruption of enzyme systems bound to the membrane. The major drawback of this drug is its insolubility in water. The techniques generally employed to enhance the solubility of poorly water soluble drugs are, use of surface active agent, hydrates and solvates ,polymorphism, complexation, solid dispersion. Among this Solid dispersion is a unique technique used to increase solubility, dissolution and bioavailability of poorly water-soluble drugs. Conventional method for preparing solid dispersion includes solvent wetting method, physical mixture, complex formations, and solvent evaporation techniques. Creams, gels, ointments and pastes are some of the topical semisolids in use for many decades**.** The extensive studies on release properties have revealed

that the active ingredients in gel based formulations are better percutaneously absorbed than cream or ointment bases.(3)

Causes Of Dandruff:-

The cause of dandruff is un defined. Now there are so many experts who think that the dandruff is not caused by the poor cleanliness .Persons who are highly sensitive to yeast having high improbability of having dandruff. That's why we can say that the yeast may play an important part in causing dandruff. *Malassezia*is a type of fungi and its sensitive people who get dandruff find that it gets lost during the warmer season and higher in cold. UV light from the sun interacts with the yeast. Several say, that during winter skin becomes dried due to cold air and hot area temperature, that causes dandruff more liable. Fungi Malassezia is generally present on everyone's scalp. Normally, this fungus does not show any problem. Though, it can grow un control. It nourished by the oils and by the hair follicles secretion. When occurs, the scalp can become irritated and produces extra skin cells. After that the extra skin cell side and fall off. Then they mix with the oil of the hair and scalp, and turn into a flaky scale which we can say as dandruff.(4)

Seborrheic dermatitis: Person who suffers from seborrhoea dermatitis are more sensitive to dandruff. Seborrhoea dermatitis affects various areas of the skin include the back of the ears, the breastbone, eyebrows ,and the sides of the nose, not only on the scalp. The patient who suffers with this disease will have red, greasy, itchy, irritates skin covered with flaky white scales.**Disease conditions**: People with psoriasis, eczema and some other skin disorders have a tendency to get dandruff much more often than other people. Adults with Parkinson's disease and some other neurological disease are more prone to having dandruff and seborrhoea dermatitis. Patients who having heart disease and they recover from heart attack having dandruff more than the other persons**.**

Oil-Related Dandruff: This kind of dandruff is commonly found due to the gathering of oils in the skin and scalp. It may result because of irregular cleanliness practices. This type of dandruff is generally occurred by improper washing of hair and not enough shampooing. Sebaceous glands are found in the scalp which secretes oil. This production and release of Sebum oil is a natural incident in human beings and it make an important part of healthy hair. Alternatively, if this sebum is not cleared regularly, it can binned with dead skin and dirt which foremost to the formation of dandruff

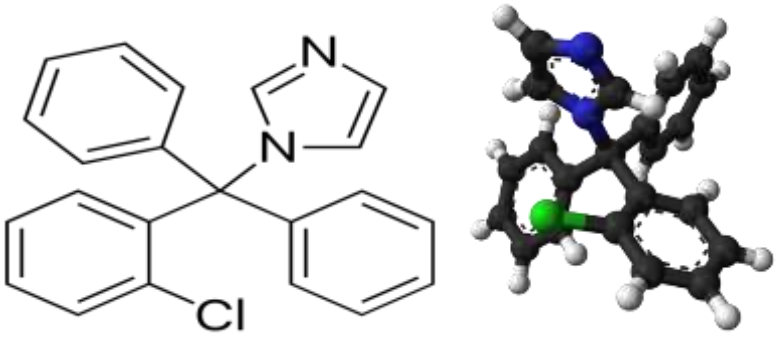
Plan Of Work:-

The present research study is planed with the following objectives.

1. To prepare anti dandruff hair gel.
2. To perform solid dispersion study of Clotrimazle.
3. To formulate the hair gel of Clotrimazole.
4. To complete the Clotrimazole compatibility study.
5. To evaluate the formulations with respect to various physical parameters.
6. To evaluate the formulations with respect to anti-microbial properties.

Drug profile:-

Clotrrimazole:



Trade Names – Desenex, Canesten

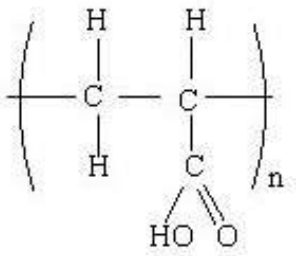
Route of Administration – Topical ,Throat ,Lozange

Bioavailabilty- Poor absorption by mouth

Protein Binding – 90%
Metabolism – Liver

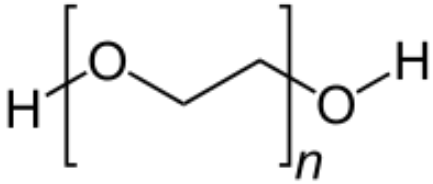
Clotrimazole, sold under the brand name Canesten among others, is an antifungal medication. It is used to treat vaginal yeast infections, oral thrush , diaper rash , pityriasis versicolor , and types of ringworm including athlete's foot and jock itch. It can be taken by mouth or applied as a cream to the skin or in the vagina. Common side effects when taken by mouth include nausea and itchiness. When applied to the skin common side effects include redness and burning. In pregnancy, use on the skin or in the vagina is believed to be safe. There is no evidence of harm when used by mouth during pregnancy but this has been less well studied. When used by mouth, greater care should be taken in those with liver problems. It is in the azole class of medications and works by disrupting the cell membrane. Clotrimazole was discovered in 1969. It is on the World Health Organization's List of Essential Medicines, the most important medications needed in a basic health system. It is available as a generic medication. The wholesale cost in the developing world as of 2014 is 0.20–0.86 USD per 20gm tube of cream. In the United States a course of treatment typically costs less than 25 USD.(17)

Carbopol 940-



Carbopol polymers are extremely efficient thickening polymers that are most often used to thicken cleaning formulas for many different applications. Carbopol yields crystal-clear water-based gels that are freeze-thaw stable and will not vary in viscosity with temperature. They will work in nearly any system where these conditions are met.

Polyethylene glycol (PEG)-



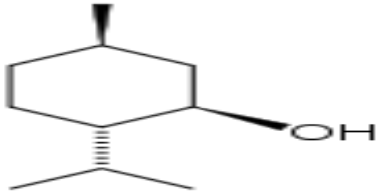
is a polyether compound with many applications from industrial manufacturing to medicine. PEG is also known as polyethylene oxide (PEO) or poly oxy ethylene (POE), depending on its molecular weight. The structure of PEG is commonly expressed as H−(O−CH2−CH2)n−OH.PEG is generally considered biologically inert and safe. However, a minority of people are allergic to it. Allergy to PEG is usually discovered after a person has been diagnosed with an allergy to an increasing number of seemingly unrelated products, including processed foods, cosmetics, drugs, and other substances that contain PEG or were manufactured with PEG.(21).

Methyl paraben- also methyl paraben, one of the parabens, is a preservative with the chemical formula CH3 (C6H4(OH)COO). It is the methyl ester of p-hydroxybenzoic acid. Methyl paraben is an anti-fungal agent often used in a variety of cosmetics and personal-care products. It is also used as a food preservative and has the E number E218. Methylparaben is commonly used as a fungicide in Drosophila food media. To Drosophila, methyl paraben is toxic at higher concentrations, has an estrogenic effect, and slows the growth rate in the larval and pupal stages at lower concentrations(30).

Poly vinyl pyrrolidone (PVP) also commonly called polyvidone or povidone, is a water-soluble polymer made from the monomer N-vinyl pyrrolidone. PVP was used as a plasma volume expander for trauma victims after the 1950s. It is used as a binder in many pharmaceutical tablets; it simply passes through the body when taken orally. However, autopsies have found that crospovidone (PVPP) contributes to pulmonary vascular injury in substance abusers who have injected pharmaceutical tablets intended for oral consumption. The long-term effects of

crospovidone or povidone within the lung are unknown. PVP added to iodine forms a complex called povidone-iodine that possesses disinfectant properties. This complex is used in various products like solutions, ointment, pessaries, liquid soaps and surgical scrubs. It is known under the trade names Pyodine and Betadine among a plethora of others. It is used in pleurodesis (fusion of the pleura because of incessant pleural effusions). For this purpose, povidone iodine is equally effective and safe as talc, and may be preferred because of easy availability and low cost. Povidone is used as a lubricant in some eye drops, e.g. Bausch & Lomb's Soothe.(40)

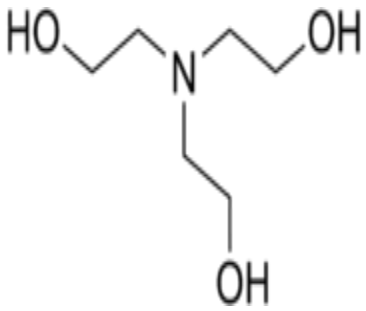
Menthol –



is an organic compound made synthetically or obtained from corn mint, peppermint, or other mint oils. It is a waxy, crystalline substance, clear or white in color, which is solid at room temperature and melts slightly above. The main form of menthol occurring in nature is (−)-menthol, which is assigned the (1R, 2S 5R) configuration. Menthol has local anesthetic and counterirritant qualities, and it is widely used to relieve minor throat irritation. Menthol also acts as a weak kappa opioid receptor agonist. Menthol's ability to chemically trigger the cold-sensitive TRPM8 receptors in the skin is responsible for the well-known cooling sensation it provokes when inhaled, eaten, or applied to the skin. In this sense, it is similar to capsaicin, the chemical responsible for the spiciness of hot chilis (which stimulates heat sensors, also without causing an actual change in temperature). Menthol's analgesic properties are mediated through a selective activation of κ-opioid receptors. Menthol also blocks voltage-sensitive sodium channels, reducing neural activity that may stimulate muscles. A study showed that topical absorption of ibuprofen is not increased by menthol, but does note the complementary effect of the menthol as a pain reliever itself.

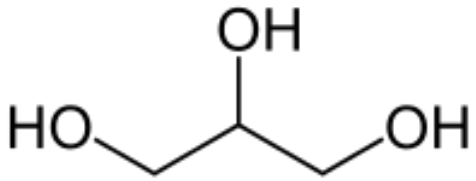
Some studies show that menthol acts as GABAA receptor positive all osteric modulator and increases GABA ergic transmission in PAG neurons. Menthol also shares anaesthetic properties similar to propofol, by modulating same sites of GABAA receptor. Menthol is widely used in dental care as a topical antibacterial agent, effective against several types of streptococci and lactobacilli.(40)

Triethanolamine



often abbreviated as TEA, is a viscous organic compound that is both a tertiary amine and a triol. A triol is a molecule with three alcohol groups. Triethanolamine is a strong base. Triethanolamine can also be abbreviated as TEOA, which can help to distinguish it from triethylamine. Approximately 150,000 tonnes were produced in 1999. It is a colourless compound although samples may appear yellow because of impurities. Triethanolamine is used primarily as an emulsifier and surfactant. It is a common ingredient in formulations used for both industrial and consumer products. The triethanolamine neutralizes fatty acids, adjusts and buffers the pH, and solubilises oils and other ingredients that are not completely soluble in water. Some common products in which triethanolamine is found are liquid laundry detergents, dishwashing liquids, general cleaners, hand sanitizers, polishes, metalworking fluids, paints, shaving cream and printing inks.(44)

Glycerol



(also called glycerine or glycerin; see spelling differences) is a simple polyol compound. It is a colorless, odorless, viscous liquid that is sweet-tasting and non-toxic. The glycerol backbone is found in all lipids known as triglycerides. It is widely used in the food industry as a sweetener and humectants and in pharmaceutical formulations. Glycerol has three hydroxyl groups that are responsible for its solubility in water and its hygroscopic nature. In food and beverages, glycerol serves as a humectants, solvent, and sweetener, and may help preserve foods. It is also used as filler in commercially prepared low-fat foods (e.g., cookies), and as a thickening agent in liqueurs. Glycerol and water are used to preserve certain types of plant leaves.[As a sugar substitute, it has approximately 27 kilocalories per teaspoon (sugar has 20) and is 60% as sweet as sucrose.(43)

Materials & Methods:-

Clotrimazole was procured from halcyon labs, pvt, ltd, Mumbai, India.
Carbopol 940,Corbopol 934, PEG 200, propyl paraben ,methyl paraben were procured from SD fine chemicals, Mumbai., India and all other chemicals and reagents were of either analytical or laboratory graded were used.

Instruments-
Digital weighing balance pH Meter Brook field viscometer Mechanical stirrer

Methods- Formulation of Anti dandruff Hair Gel Measured quantity of methyl paraben, glycerin and weighed quantity of polyethylene glycol were dissolved in about 35 ml of water in beaker. Then it was stirred at high speed using mechanical stirrer. Then carbopol 940 and PVP were added slowly to the beaker containing above liquid while stirring. Crushed menthol was incorporated slowly in above dispersion after smooth dispersion is obtained. Then Triethanolamine (gellingagents) was added slowly while stirring till toattain gel structure. The clotrimazole was levigated using stainless steel spatula and porcelains lab. The gel was finally transfer resin aluminium collapsible tube and labelled accordingly.

Table No.-01

INGRIEDENT	QTY
Clotrimazole	0.5gm
Carbopal 940	0.30gm
Polyethyeneglycol	7.0gm
Methyl peraben	0.075gm
Polyvinyl pyrrolidone	0.05gm
manthol	0.5gm
triethanolamine	0.6ml
Glycerin	3.0ml
Water q.S	50 ml

Evaluation of Anti dandruff Hair Gel
Physical appearance:
The physical appearance was visually checked for the texture of hair gel formulations and observations.

pH determination of formulations: The pH of all hair gel formulations were determined by using the digital pH meter. Electrodes were completely dipped into the hair gel formulations and pH was noted. The results are presented.

Extrudability determination of formulations: The hair gel formulations were filled into collapsible metal tubes. The tubes were pressed to extrude the material and the extrudability of the formulation was checked. The comparative extrudability of the hair gel Formulations.

Viscosity Determination of formulations: Brook field viscometer was used to determine viscosity. The sufficient quantity of gel was filled in wide mouth jar separately the height of the gel was filled in the wide mouth jar should sufficiently allow to dip the spindle. The RPM of the spindle was adjusted to 2.5RPM. The viscosities of the formulations were recorded. The results of viscosity of gel formulations.

Determination of drug content of formulations: For estimating the drug content of the hair gel formulations for to the common procedure was followed. About 500 milligrams of the above hair gel formulations were separately weighed and then each hair gel formulation is separately dissolved in 50ml of methanol. Then the above volumetric flask containing formulation should shake for15 minutes for the extraction of drug from the gel. Then dissolved drug was titrated with per caloric acid as the method described inB.P.1 ml of *0.1*M *per choleric acid* is equivalent to34.48 mg of C22H17ClN2. The amount of clotrimazole present was calculated and depicted.

***In-vitro* study:-**

Diffusion Studies:-

The *in-vitro* diffusion of drug from the different gel preparations were studied using the classical standard cylindrical tube fabricated in the laboratory; a simple modification of the cell is a glass tube of 15mminternal diameter and 100mm height. The diffusion cell membrane was applied with one gram of the formulation and was tied securely to one end of the tube, the other end kept open to ambient conditions which acted as donor compartment. The cell was inverted and immersed slightly in 250 ml of beaker containing 100 ml of phosphate buffer pH 7.4as a receptor base and the system was maintained for 2 hrs at 37.0.5 o C. The sample was withdrawn at the 10 minutes interval of the time for 2 hrs. The media was stirred using magnetic bead hot plate magnetic stirrer.

Titrimetric measurement:-

10 ml of samples were withdrawn and transferred to conical flasks at 20 minutes interval for 2 hours and replenished with fresh media 10 ml. The clotrimazole content was estimated titrimetrically as described in B.P.1ml of *0.1*M *per choleric acid* is equivalent to 34.48mg of C22H17ClN2.

Antifungal activity:-

The hair gel formulation which showed optimal release was subjected to antifungal activity by adopting disc diffusion method at Star tech Labs, Hyderabad.The test organizing was *Pityrodporium Ovale (*strain 27)in sabouraud's dextrose agar media. Commercial Clotrimazole ointment was taken as standard. Clotrimazole is a well known effective antifungal drug and it is available as a topical formulation.

Result And Discussion:-

Active content and physical appearance: The formulations evaluated for the active content. The results were found in acceptable range and % of drug content shown in table.

pH determinations: It was found that all the formulations have pH.
in range 6.80 to 7.11 that suited the hair changes were found for the tested parameters.

Extrudability determination-: The results of the Extrudability indicate that the had better Extrudability than to All formulation showed good Extrudability when extruded from metallic collapsible tube.

***In-Vitro* study:-**

Diffusion Study- *In vitro* diffusion study was carried out using the procedure as described earlier.

Comparative Drug Release Profile- Comparative *in vitro* drug release profile

Antifungal activities:-

Among the formulations, showed better lease and maximum zone of inhibition than other formulation. Hence, Hair gel formulation was considered as best formulation .The hair gel formulation was subjected to stability performance as it was exhibited good drug release and exhibited maximum zone of inhibition when compared to other formulations. The stability study was conducted for the period of 3 months. The parameters like Appearance, pH ,Extrudability , Colour, % drug content were tested at the every month. No appreciable changes were found for the tested parameters.

Summary:-

Dandruff is a common scalp disorder affecting almost half of the population at the post-pubertal age and of any gender and ethnicity which affects 5% of the global population. It often causes itching. It has been well established that keratinocytes play a key role in the expression and generation of immunological reactions during dandruff formation. The severity of dandruff may fluctuate with season as it often worsens in winter. As skin cells die a small amount of flaking is normal, about487000 cells/cm^2get released normally after detergent treatment. The most common fungi involve in the dandruff is Pityrodporium Ovale.

Currently available treatment options for the management of dandruff include therapeutic use of zinc pyrithione, salicylic acid, imidazole derivatives, glycolic acid, steroids, and sulphur and coal tar derivatives. However , these agents show certain limitations, either due to poor clinical efficacy or due to the compliance issues. Furthermore, these drugs are unable to prevent recurrence. Various Antifungal agents are widely used generally in hair shampoos for the treatment of dandruff. These products show temporary effect for span of hours in a day on the scalp. Therefore, an attempt has been made for formulation of Antidandruff hair gels which contains synthetic as well as natural anti dandruff agents which may give antidandruff action for number of hours. Number of formulations is available in the market for antidandruff therapy except gel with variety of active pharmaceutical ingredients for the treatment of dandruff. Gels are a relatively newer class of dosage form created by entrapment of large amounts of aqueous hydro alcoholic liquids in a network of colloidal solid particles, which may consists of inorganic substance, such as aluminum salts or organic polymers of natural or synthetic origins like the natural gums, tragacanth, carageenin, pectin, agar and alginic acid, semi synthetic materials such as methyl cellulose, hydroxyethyl cellulose,hydroxyl propyl methyl cellulose, and carboxymethyl cellulose, and a synthetic polymer carbopol. Clotrimazole is a synthetic antifungal and ant androgenic drug used to prevent and treat fungal skin infections likes mycetoma, eumycetoma, athlete's foot, jock itch, candidiasis, tineaversicolor especially in immune compromised patients such as those with AIDS or those on chemotherapy. Clotrimazole is sold commercially as an antidandruff shampoo, topical cream, and oral tablet. clotrimazole is effective inter matophytosis. It is also used in systemic mycosis, dermal leishmaniasiskalaazar and cushing's effect. Gels are transparent to opaque semisolids containing a high ratio of solvent to gelling agent. When dispersed in an appropriate solvent, gelling agents merge or entangle to form a three dimensional colloidal network structure. This network limits fluid flow by entrapment and immobilization of solvent molecules. The network structure also responsible for the gel resistance to deformation and therefore, its visco elastic properties. Solid dispersion is the Dispersion of one or more Active ingredients in an inert carrier or matrix at Solid state prepared by the Fusion or Melting solvent method. The solubility of clotrimazole is increased by preparing solid dispersions in present studies. Herbal medicine, now a days are gaining importance for treating many diseases due to their significant effect and lesser side effects as compared to allopathic medicines. From literature survey, it was revealed that Neem preparations (Azadirachtaindica). showed toxicity to cultures of 14 common fungi: Trichophyton. An 'athlete's foot' fungus that infects hair, skin and nails, Microsporum a 'ringworm' that invades hair, skin and(rarely) nails, Trichosporon a fungus of the intestinal tract, Geotrichum a yeast like fungus that causes infections of the bronchi, lungs and mucous membranes, Candida – a yeast-like fungus that is part of the normal flora but can get out of control, leading to lesions in mouth (thrush), vagina, skin, hands and lungs. Against Dandruff and Itches. It removes lice and dandruff when applied to the hair. It is therefore very effective on skin allergies, prickly heat, sweat - rashes, itches. Its antiseptic, germicidal, and effective for skin allergies, bed sores, lice, dandruff and itching. Neem has been used for treating all sorts of skin problems like acne, eczema, rosacea, psoriasis and scabies for thousands of years. Neem can be used for antifungal action therefore decided to use these plants for further study.

Conclusion:-

The formulation of Anti-dandruff hair gel provides a method for treating a scalp dandruff or seborrheic dermatitis. Antidandruff hair gel containing 1.5% of Clotrimazole with Corbopol 940 base could be used as an effective in treatment of Dandruff on scalp.

Future Aspect:-

Ketoconazole: is an imidazole derivative of wide fungicidal spectrum, which mechanism of action involves inhibition of biosynthesis of ergosterole (P-450 cytochrome) within the fungal cell wall, causing its altered permeability and consequently death of a cell. Ketoconazole displays also anti-inflammatory action through inhibition of lipooxygenase and leukotriene B4 production, as well as anti androgen action. Used topically also relieves purge and decreases intensity of skin lesions present in the course of seborrhoeic dermatitis, common dandruff and pityriasis versicolor. Numerous clinical trials confirmed therapeutic effectiveness of ketoconazole in

these diseases. In a randomized trial including 66 subjects effectiveness of application of shampoos containing 1% and 2% ketoconazole in treatment of severe dandruff and scalp seborrhoeic dermatitis was weighed. The trial included a few stages: period of 2 weeks before treatment, period of 4 weeks of using shampoos with 2% or 1% ketoconazole and further period of consecutive 4 weeks without therapy. Effectiveness of therapy was assessed on the basis of clinical picture, mycological tests, showing presence of Malassezia spp. and peeling measurements (scales measurements). Following 4 weeks of treatment shampoo containing 2% of ketoconazole proved to more efficacious than shampoo with 1% con centration. Lesser tendency to experience disorder relapses was also noted during the period of use of 2%shampoo .A multicentre, randomized trial with double blind placebo controlled outlay including 575 patients has been organised, in which effective ness of introducing a shampoo with 2% ketoconazole in therapy and prophylaxis of moderate and severe dandruff was assessed. Very good therapeutic results were achieved in 88% of patients. Prophylactic phase fo the trial lasting for 6 months revealed disease relapse in only 23% of patients using ketoconazole, while relapse occurred in 47% of patients in the placebo group. Results proved effectiveness of using shampoo with ketoconazole 2% in the treatment and prophylaxis of relapsing dandruff. Also in Polish studies performed by Adamski, effectiveness of therapy of scalp oily dandruff in 40 pa-tients applying 2% ketoconazol was assessed. Following 4 weeks of treatment the number of positive mycological tests decreased from 55% to 7%. In further tests still greater reduction of clinical symptoms and signs in the form of purring, peeling and erythematic was observed. Therapy efficiency reached 75%. Achieved results confirmed the important role of Malassezia fur fur in scalp dandruff etiopathogenesis and effec- tiveness of fungicidal therapy this condition.(34)

Cytostatic substances: Substances from this group act through regulation of the excessive speed of epidermal cells division inhibiting exaggerated peeling of the scalp area, thus eliminating the scales, being the basic feature of dandruff. The above mentioned group includes: tars, selenium sulphide and piroktolamine (octopirox). These substances action is however restricted only to the period of actual use, meaning that after cessation of treatment relapses of the disease are quite often noticed .It can be explained by symptomatic only action of these formulas and lack of aetiological effect associated with insignificant influence on the population of Malassezia fur fur Formulas containing selenium sulphide are also recommended in the treatment of the form of dandruff (pityriasis versicolor). Selenium sulphide has a cytostatic effect on epidermal and hair folliclecells, inhibiting excessive peeling,redness and purge. It also exhibits antifungal activity – inhibits development of dermatophytes, which cause proper mycoses of epidermis,hair and nails. However, it must be remembered, that regular use of formulas containing selenium sulphide can give rise to excessive production of sebum and oily hair Octopirox is a pyrydinone derivative of a proven effectiveness in dandruff treatment, used since1977. In recommended therapeutic shampoos preferred concentration of this substance ranges from 0.5%to 1.0%. A wide range of antibacterial and antifungal action of octopirox has been shown in in vitro studies. Its effectiveness and safety of therapy was confirmed in the clinical studies: in over 200 volunteers using formulas containing octopiroxno signs or symptoms of irritation, allergy or other toxic reactions were observed. Octopirox formulas of0.5% concentration are also effective in prophylaxis In the trial by Flutterer effectiveness of the formula containing octopirox in the concentration of 0.75%was compared with placebo. After six weeks of therapy reduction of dandruff symptoms by 54.5% was achieved in subjects using octopiroxand by 9.9% in subjects applying placebo. A comparative effectiveness study was performed involving shampoo containing piroktolamine 0.75% in association with 2%salicylic acid versus shampoo containing 1% zinc pirythione. Bothshampoos displayed high effectiveness against dandruff, however shampoo containing both ingredients seemed to be more efficient in eradicating symptoms of dandruff .(31)

References:-

1. Janniger CK, Schwartz RA. Seborrheic dermatitis. Am Fam Physician. 1995;52 :149 – 55.
2. Hay RJ and Graham Brown Ra.Dandruff and Seborrheic Dermatitis: causes and management. Clin Exp.Dermatol. 1997;22:3-6.
3. Parry ME and Sharpe GR. Seborrheic Dermatitis is not caused by an altered immune response to Malssezia yeast.Br J Dermatol. 1998;139:254 – 63.
4. Ravichandran G, Shivram BharadwajV and Kolhapure SA. Evaluation of
5. the clinical efficacy and safety of Anti Dandruff Shampoo in the treatment of dandruff. The Antiseptic. 2005;102:1-5.
6. Betty Anne Johnson and Julia RN. Treatment of seborrhiec dermatitis. Am Fam Physician.2000;61:2703-2713.
7. Peter RU and Richharz BU. Successful treatment and prophylaxis of scalp seborrheic dermatitis and dandruff with 2% ketoconazole shampoo: results of multicentre double – blind, placebo – controlled trial. Br J Dermatol. 1995;132:441-445.
8. Habif TP. Clinical Dermatology: acolor guide to diagnosis and therapy, 3d ed. St. Louis: Mosby.1996:214.

9. Remington: the science and practice of pharmacy 20th edition published by Lippnicott. Williams & Wilkins. Volume 1 pages no 340-341,745-746.
10. Hay RJ and Graham Brown Ra.Dandruff and Seborrheic Dermatitis:causes and management. Clin Exp .Dermatol. 1997;22:3-6.
11. Parry ME and Sharpe GR. Seborrheic Dermatitis is not caused by an altered immune response to Malssezia yeast.Br J Dermatol. 1998;139:254 – 63.**11.** Remington: the science and practice of pharmacy 20th edition published by Lippnicott. Williams & Wilkins.1:340-41,745-46.
12. Lachman, Herbert, A., Lieberman, Joseph, L., Kaing. The Theory and Practice of Industrial Pharmacy, 3rd edition, Lea and Febiger, Philadelphia, USA.
13. 12.Gehan B, Mahmoud M, Rania AB,Improvement of solubility and dissolution properties of ketoconazole by solid dispersions and inclusion complexes Asian Journal of Pharmaceutical Sciences 2010,5(1):1-12.
14. Singh, R. P. and Raheja, A. K., in Neem and Environment (eds. Singh, R. P., Chari, M.S., Raheja, A. K. and Kraus, W.), Oxford. & IBH Publishing Co Pvt Ltd, New Delhi. 1996,1:103-20.
15. hmutterer, H The Neem Tree: Source of Unique Natural Products for Integrated Pest Management and Medicinal, Industrial and other Purposes,1995,VCH Publishers, Weinheim Germany1995,pp,1-616.
16. TripathiK.D.Essential of medical pharmocolgy,6th edition.
17. Patil P, ReddyV, Biradar k, Patil C and K. Sreenivasarao. Devlopment and evaluation of anti-dandruff hair gel,Int.J.ofResearch in Pharm.and Chem-2011:1(4);936-44.
18. Dhamanel S.,Asnani S.,Kulkarni S., Khandekar V,Hukkeri V ,World J. of Pharm. And Pharm. Sciences-:1(4);1173-79.
19. Ashok K., Quazi A, Sagare P,Formulation and preclinical evaluation of Ketoconazole gel prepared by hydrotropic phenomenon, Int.J.of Universal Pharm.2011:1(1);72-84.
20. Saratchandran C, Dr.Arun S, Dr.A.Sarala Devi &Anjali.D: Development & Evaluations of Ethosomal Formulation Containing Ketoconazole.AJBPR2011;1(4):303-08.
21. Mitari BV, Korde SA, Mahadik KR and Kokare CR. Formulation and evaluation of topical liposomal gel for fluconazole. Indian journal of pharmaceutical education and research 2010;44(1)324-332.
22. **NareshAhuja**, VipinSaini, Vijay Kumar Bishnoi, Atul Garg, Monika Hisoria, Joyati Sharma and Kunal Nepali. Formulation and Evaluation of diclofenac sodium gel by using natural polymer. International Quarterly Research Journal of Chemical Sciences (Rasayan journal) 2008;1(3):554-556.
23. Lalit Kumar, RuchiVerma. *In vitro* evaluation of topical gel prepared using natural polymer. International journal of drug delivery 2010;2:58-63.
24. Dipen. M.Patel, Kavitha.K; 2011;Formulation and Evaluation Aspects of Transdermal delivery system; InternationalJournal of Pharmaceutical sciences Review and Research; vol.6; (2); January– February; article-01; 83 – 90
25. Balakrishnan Prabagar, Bong-Kyu yoo,Jong-Ae kim,et al; Enhanced bioavailability of poorly water solubleclotrimazole by inclusion with betacyclodextrin; Arch Pharm; 2007;feb.30; (2); 249-254
26. Priya Batheja, Larsia Sheihet, et al; topicaldrug delivery by a polymeric nanospheregel: Formulation,optimization and invivoand invitro skin distribution studies;Journal of controlled release; (2011);149;159 – 167
27. Rachit Khullar,et al; Formulation andevaluation of mefenamic acid and emulgelfor topical delivery; Saudi pharmaceuticaljournal; (2012); 20;63-67
28. Dangi Amish.A, etal ;Formulation and evaluation once daily muco adhesive vaginal tablet of clotrimazole using naturaland synthetic polymers; Asian journal of pharmaceutical and health sciences; oct –dec (2011); 176-182
29. B.Niyaz Basha, et al; Formulation and evaluation of gel containing Fluconazol antifungal agent;International journal of drug development &research ; oct –dec(2011); 3; 4; 109 -1281