FORMULATION AND EVALUATION OF TOPICAL GEL OF ROSE HIP OIL

[1] Dr. Kashid Vivekanand, Dept. of Pharmaceutics PRES's College of Pharmacy Chincholi, Nashik,
[2] Shaikh Almas, Student (M pharm) Quality Assurance.
[3]Dr. C.J. Bahngale principal PRES's College of Pharmacy Chincholi, Nashik.
[1] Dept. of Pharmaceutics, SavitribaiPhule Pune University, Pune, India
[1]PRES's College of Pharmacy Chincholi, Nashik, Maharashtra, India.

Abstract- The clinical evidence indicates that topical gel is a safe and effective treatment option for skin released diseases and used to reduce side effects associated with other conventional dosage forms. The gels are getting more popular now a days because they having the more stable and also can provide a controlled release than other semisolids. They also provide a better absorption characteristics and hence bioavailability of drug Topical gel formulations provide a better application property and stability as compare to other semisolid formulations such as creams, ointments, lotions, etc. topical gel drug administration is a localized drug delivery system anywhere in the body through ophthalmic, rectal, vaginal and skin as a topical route A topical application of drug offers potential advantages of delivering the drug directly on to the site of action and acting for an extended period of time. Topical gels are intended for skin application for local action or percutaneous penetration of medicaments for their action. Topical gel preparations avoid the Gl irritation, prevent the metabolism of drug in the liver and increase the bioavailability of the drug. The topical gel having the more penetration power than the other semisolid formulations.

Rose hip oil is the drug of choice in the treatment of Skin diseases Topical gel of Rose hip oil was prepared with aim to optimize the permeability of Rose hip oil using natural permeation enhancers and comparison of different natural oils Eucalyptus oil and peppermint oil with different concentrations. In preliminary study carbopol 934 were evaluated for their efficiency to form a Topical gel.

Keywords – topical gel, rose hip oil

1. INTRODUCTION

Rosa canina L., rosehip, is a wild shrub growing in Europe, northwest Africa, and western Asia. The fruits of the rosehip are utilized in folk medicine for a long time. Rosehips have prophylactic and therapeutic actions against the cold, infectious diseases, gastrointestinal disorders, urinary tract diseases, and inflammatory diseases. The rosehip seed contained valuable phytochemicals like phenolic compounds (2554 μg/g), carotenoids (2.92 μg/g), and vitamin C (1798 μg/g). Furthermore, the rosehip-seed oil was rich in polyunsaturated fatty acids, linolic acid (54.05%), omega 6 fatty acid (19.37%), and phytosterols, mainly β-sitosterol (82.1%).
Rosehip-seed oil has been used in cosmetics due to its therapeutic effect on skin disorders

- It hydrates
- It moisturizes
- It helps exfoliate and help brightens skin
- It helps boost collagen formation
- It helps reduce inflammation
- It helps protect against sun damage
- It helps reduce hyperpigmentation
- It helps reduce scars and fine lines
- It helps boost immunity

It is a well-documentedplant in the European and Asian Traditional Medicine. One among the foremost frequent use of rose hip oil in modern medicine is its application in cosmetics products like as creams and soaps. During clinical study topical administration of seed and shell powder of rose hip fruit had significant effect on crow's feet wrinkles improvement and also increase skin moisture and elasticity. In another clinical trials, R.canina seed oil could prevent epithelitis after radiotherapy and erythema of surgical scars.
Rose hip extract and a variety of its bioactive compounds are shown toreduce inflammation. Various molecular mechanisms are suggested for the inflammatory action of rose hip like inhibition of the NF-kappa signaling pathway which could attenuate pro-inflammatory enzyme.

Fig 1.1; Rose hip fruit

2. EXPERIMENTAL WORK

2.1 Material and Method

2.1.1 Material

Rose hip oil (Global Merchants), Carbopol 934 (Kalapi chemical pharma), Triethanolamine (Vinamax organic Pvt. Ltd.), Methyl Paraben (Cynergypharma), liquid paraffine (Cynergypharma), Eucalyptus oil (Nilgiri essential oil Company), Peppermint oil (Talent pharma agency)

2.1.2 Method

0.35 gm Carbopol-934 soaked in 100 ml of water over night (12 s). Then swelled polymer stirred by mechanical stirer to ensure the uniform dispersion of polymer. pH is adjusted to 7.0 by Triethanolamine with the help of pH paper. Clear gel base is form. Mixture of liquid paraffinand rose hip oil is added to gel base and stirred well.Eucalyptus oil/peppermint oil (penetration enhancer) with liquid paraffin is added to topical gel base.

Table no. 2.1: Formulation profile

Formulation	API	Carbopol 934	TEA	D/W	Methyl paraben	Eucalyptus oil	Peppermint oil
F1	1ml	0.35 gm	q.s.	100 ml	0.1 gm	1 ml	-
F2	1ml	0.35 gm	q.s.	100 ml	0.1 gm	1.25 ml	-
F3	1ml	0.35 gm	q.s.	100 ml	0.1 gm	1.5 ml	-
F4	1ml	0.35 gm	q.s.	100 ml	0.1 gm	-	1 ml
F5	1ml	0.35 gm	q.s.	100 ml	0.1 gm	-	1.25 ml
F6	1ml	0.35 gm	q.s.	100 ml	0.1 gm	-	1.5 ml

3. EVALUATION OF TOPICAL GEL

3.1 Organoleptic characteristics:

- Color
- Odor

3.2 Measurement of pH

The pH of gel formulations was determined by using pH meter.

3.3 Homogeneity

All developed gels were tested for homogeneity by visual inspection after the gels are set within container. They were tested for their appearance and presence of any aggregate

3.4 Spread ability

The Spread ability of the gel was measured by spreading of 0.5gm of the gel on a circle of 2cm diameter premarket on a glass plate and then a second glass plate was employed. Half kilogram of weight was permitted to rest on the upper glass plate for 5min the diameter of the circle spreading of the gel was determined.

3.5 Viscosity of the gel

The measurement of the formulated gel was done with the Brook-field viscometer. The gel was rotated at 200 rpm by using the spindle no. 96.Samples were measured at 37°C+1 as Bottom, Middle and at the Top.

3.6 Drug content

The drug content was determined using spectrophotometric method t measuring the absorbance

3.7 UV-spectrophotometricaly study of Rose hip oil in liquid paraffin:
Preparation of standard stock soluition: 0, 55 ml of rose hip oil was first dissolved in 100 ml of liquid paraffin theresultant solution was then transferred to a 100 ml volumetric flask. The volume of solution was made up by using liquid paraffin to give aresultant solution of concentration 100 µg/ml.

3.8 Preparation of calibration curve of Rose hip oil in liquid paraffin:
Working stock solution: The standard stock solution was then appropriately diluted with liquid paraffin, to get a series of rose hip oil solution in the concentration range of 16.8-84.3 µg/ml the absorbance of all the solutions was measured against blank at 258 mm using (UV 1650, Shimadzu. Indu). A standard plot of absorbance versus concentration of drug in µg was plotted. This graph was used for the estimation of drug concentration in the Topical gel for in-vitro drug release studies.

3.9 Ex-vivo drug permeation study:
The ex-vivo permeation studies of topical gel of drug through excsed layer of membrane filter paper 0.45mm were carried out using Franz diffusion cell having 5.495cm effective diffusional areas. It consists of two compartments one is donor compartment and another is receptor compartment of 17 ml capacity. The cell contents. Were stirred with a magnetic stirrer and temperature was maintaining at 36 °C in the experiment. The membrane filter was mounted between two chambers and in receptor chamber phosphate buffer of pH 6.8 was filled and membrane filter was allowed to stabilization for the period of 1 hr. After stabilization the 0.2gm of prepared topical gel was placed into the donor compartment and was wetted with 1ml of phosphate buffer the amount of drug permeated through the membrane was determined by removing samples periodically and same volume fresh medium was replaced. Then the samples were analyzed by using UV-Visible spectrophotometer (Simadas-1650) at of 258 m. The cumulative amount of permeated drug was plotted versus time, and the steady state flux (Jss) was calculated using the formula

$$Jss- \Delta M/Ax \quad \Delta t$$

Where,
ΔM is the amount of drug transported across the membrane during the time Δ and Ais the diffusional area.

4. RESULT AND DISCUSSION
During the study of organoleptic characteristics, it has been found that the gel has characteristic odor and white in color with ph 7.0.

4.1 Viscosity:
For the viscosity study of optimized batch formulation F3, the Brookfield used, T-Bar sort of used having spindle number 96 the spindle code was F. The viscosity of the optimized formulation F3 determined and found be 2812 at Centipoise at torque 60. The consistency of the substance one among the foremost important features to topical due to applied to the thin layers of the skin so that the gel viscosity plays a crucial role in controlling of drug Permeation.

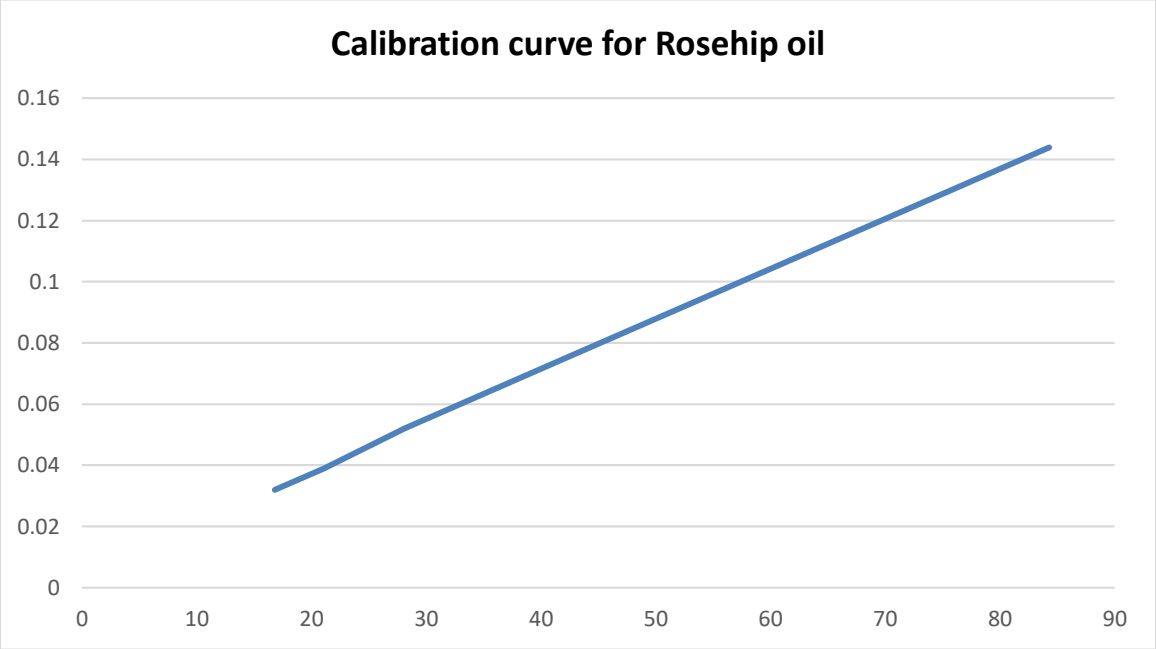
4.2 Spread ability:
Initial radius of is 1cm amount of sample placed is 0.5gm weight placed on upper glass plate is 0.5kg final radius is 4.5cm gel speeded is 3.5cm in 5min. The Spread ability of optimized formulation F3 was considered high by having spread of time. The therapeutic efficacy of gel depends on their spread. The gel spreading helps within uniform application of the gel to the skin.

4.3 Homogeneity:
All formulated batches of topical gel showed good homogeneity with absence of lumps and is smooth in nature. The formulated preparation were slightly opaque in nature.

4.4 Drug content:
The drug content was determined using spectrophotometric method by measuring the absorbance, ה max=258nm

Table no.4.1: Calibration curve for Rose hip oil

Sr.no.	Concentration (µg/ml)	Absorbance (nm)
1.	16.8	0.032
2.	21.07	0.039
3.	28.1	0.052
4.	42.15	0.075
5.	84.3	0.144



Ex- vivo drug permeation study-

Table no. 4.2: Percentage drug release of F1

Sr.no.	Time (Hrs)	Percentage Drug release (%)
1	1	26.30
2	2	27.32
3	3	28.53
4	4	30.55
5	24	63.75

Formulation F1 in which eucalyptus oil (1.0ml) shows 63.75% drug released after 24 hours.

Table no. 4.3: Percentage drug release of F2

Sr.no.	Time (Hrs)	Percentage Drug release (%)
1	1	31.97
2	2	39.86
3	3	49.58
4	4	63.09
5	24	76.19

Formulation F2 in which eucalyptus oil (1.25ml) shows 76.19% drug released after 24 hours.

Table no. 4.4: Percentage drug release of F3

Sr.no.	Time (Hrs)	Percentage Drug release (%)
1	1	86.61
2	2	87.63
3	3	88.69
4	4	92.26
5	24	107.86

Formulation F3 in which eucalyptus oil (1.5ml) shows 107.86% drug released after 24 hours.

Table no. 4.5: Percentage drug release of F4

Sr.no.	Time (Hrs)	Percentage Drug release (%)
1	1	0.068
2	2	1.61
3	3	2.63
4	4	3.44
5	24	5.05

Formulation F4 in which Peppermint oil (1.0ml) shows 5.05% drug released after 24 hours.

Table no. 4.6: Percentage drug release of F5

Sr.no.	Time (Hrs)	Percentage Drug release (%)
1	1	2.02
2	2	4.25
3	3	6.88
4	4	8.5
5	24	11.73

Formulation F5 in which Peppermint oil (1.25ml) shows 11.73% drug released after 24 hours.

Table no. 4.7: Percentage drug release of F6

Sr.no.	Time (Hrs)	Percentage Drug release (%)
1	1	3.44
2	2	4.45
3	3	6.27
4	4	7.28
5	24	9.10

Formulation F6 in which Peppermint oil (1.5ml) shows 9.10% drug released after 24 hours.

Table no.4.8: percentage drug released of F1-F3

Time (Hrs)	Percentage Drug released (%)		
	F1	F2	F3
1	26.30	31.97	86.61
2	27.32	39.86	87.63
3	28.53	49.58	88.69
4	30.55	63.09	92.26
24	63.75	76.19	107.86

The result in which Eucalyptus oil is used as a penetration enhancer, it showed that the percentage drug released increase. It increases as a F1<F2<F3. Because the amount of penetration enhancer is maximum in formulation F3 than F1 and F2

Table no.4.9: percentage drug released of F4-F6

Time (Hrs)	Percentage Drug released (%)		
	F4	F5	F6
1	0.068	2.02	3.44
2	1.61	4.25	4.45
3	2.63	6.88	6.27
4	3.44	8.5	7.28
24	5.05	11.73	9.10

The result in which Peppermint oil is used as a penetration enhancer, it showed that the percentage drug released increase. It increases as a F4<F6<F5.

5. CONCLUSION

Rose hip oil is the drug of choice in the treatment of Skin diseases Topical gel of Rose hip oil was prepared with aim to optimize thepermeability of Rose hip oil using natural permeation enhancers and comparison of different natural oils Eucalyptus oil and peppermint oil with different concentrations. In preliminary study carbopol 934 was evaluated for their efficiency to form a Topical gel

Different parameters studied were carried out for Topical gel formations Carbopol 934 was found to be suitable candidate as at gives better consistency, viscosity, spread ability, pH, homogeneity, and Ex-vivo drug release. Carbopol 934 concentration was optimized by trial and error method. Permeation enhancers were used for increasing the permeability and Ex-vivo drug release of Rose hip oil of between two oils, Eucalyptus oil best suitable candidate as it gives better Ex-vivo drug release and high flux than the other oils,

Results showed that Ex-vivo drug release increase after addition of permeation enhancers in topical gel formulation. So, it was concluded that carbopol 934 topical gel with permeation enhancer is effective in the treatment of Skin disease.

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