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FORMULATION AND EVALUATION OF LEVOFLOXACIN OINTMENT

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Keywords:

Levofloxacin, Fluoroquinolones, Antibacterial Infection, Olegogenous and Emulsion base.

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ABSTRACT: We intended desired ointment developed for bacterial infection. So Levofloxacin is a fluoroquinolones of antibacterial drug effective in the treatment of bacterial conjunctivitis, sinus, kidney, bladder or prostate Here the main objective of the present work is besides delivering drugs to the body, A drug delivery system to improve patient compliance and dispersible are no exception. So we have selected the topical drug delivery system by using a formulation of ointment. The Levofloxacin ointment is prepared by the two ointment bases, namely Oleaginous and Emulsion bases. To assess the efficiency of Levofloxacin ointment by physical appearance, viscosity, PH and spreadibility, Rheological properties and micro biological studies. The Oleaginous base prepared by using white bees wax and petrolatum and emulsion base having the methyl paraben, propyl paraben, sodium lauryl sulfate, propylene glycol, stearyl alcohol white, white petrolatum, purified water. The % of drug content of Levofloxacin was found to be 99.53. The PH was found to be 5.1 % colour was found to be formulation A (Oleaginous) is light yellowish and formulation B(Emulsion) is cream colour. The viscosity was found to be for formulation A & B have 96600. The spreadability was found to be formulation A: 6, B: 7. Extrudability was found to be for formulation A & B have 97.6%. Globule diameter formulation A: 4.20 and B: 4.33. The evaluation tests, results are taken for 3 months; it gives the accurate and satisfactory results.

INTRODUCTION: Over the last decades the treatment of illness have been accomplished by administrating drugs to human body via various roots namely oral, sublingual, rectal, parental, topical, inhalation etc. Topical delivery can be defined as the application of drug containing formulation to the skin to directly treat cutaneous disorder or the cutaneous manifestations of general disease Ex: Impetigo, Folliculitis, Furuncle etc. It will show in the **Fig.** With the intent of containing the pharmacological or the effect of the drug to the surface of the skin or within the skin semi – solid formulations in all their diversity dominate the system for topical delivery, but foams, spray, medicated powders, solutions and even medicated adhesive systems are in use.

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Physiology of the skin:

The skin has several layers. The over laying outer layer is called Epidermis the layer below Epidermis is called Dermis. The dermis contains a network of blood vessels, hair follicle, sweat gland & Subaceous gland. Beneath the dermis are subcutaneous fatty tissues, bulbs of hair project into these fatty tissues.

The layers of Epidermis are:

1. Stratum germinativum (Growing layer)
2. Malpighion layer (Pigment layer)
3. Stratum spimnosum (Gtanular layer)
4. Stratum lucidum
5. Stratum corneum (Horny layer)

Absorption through skin:

Majority the drug absorbed through the skin by two ways. They are namely

A. Transepidermal Absorption
B. Transfollicular Absorption

Transepidermal Absorption:

It is now generally believed that the trans Epidermal pathway is principally responsible for diffusion across the skin. The resistance Encountered along this pathway arises in the stratum corneum. Permeation by the transepidermal route first involves partitioning into the stratum corneum.

Diffusion then takes place across this tissue. The current popular belief is that must substances diffuse across the stratum corneum via the intercellular lipoid route. This is a tortuous pathway of limited fractional volume and even more limited productive fractional area in the plane of diffusion. However there appears to be another microscopic path through the stratum corneum for extremely polar compounds and icons.

Otherwise these would not permeate at rates that are measurable considering their O/W distributing tendencies. When a permeating drug exits at the stratum corneum, it enters the wet cell mass of the epidermis and since the epidermis has no direct blood supply, drug is forced to diffuse across it to reach the vasculature immediately space for icons and polar non electrolyte molecules to diffusionally squeeze through. Thus, permeation requires frequent crossing of cell membranes, each crossings being a thermodynamically prohibitive event for such water- soluble species extremely lipophilic molecules on the other hand, or thermodynamically constrained from dissolving in the watery regime of the cell (Cytoplasm). Thus the viable tissue is rate determining when non polar compounds are involved. Passage through the dermal region represents a final hurdle to systemic entry.

This is so regardless of whether permeation is transepidermal or by a shunt route. Permeation through the dermis is through the interlocking channels of the ground substance. Diffusion through the dermis is facile and without molecules since gaps between the collagen fibres are far too wide to filter large molecules. Since the viable epidermis and dermis lack measure physicochemical distinction, they are generally considered as a single shield of diffusion, expect when penetrates of extreme polarity are involved, as the epidermis offers measurable resistance to such species.

Transfollicular Absorption:

The skin appendages offer only secondary avenues for permeation. Sebaceous and eccrine glands are the only appendages, which are seriously considered as shunts by passing the stratum corneam since these are distributed over the entire body, through eccrine glands are numerous, their orifices are tiny and add upto a miniscule fraction of the body's surface. Moreover, they are either evacuated or so profusely active that molecule cannot diffuse inwardly against the glands output. For these reasons, they are not considered as a serious route for percutaneous absorption.

However, the follicular route remains an important avenue for percutaneous absorption since the opening of the follicular pore, where the hair shaft exits the skin, is relatively large and sebum aids in diffusion of penetrates. Partitioning into sebum, followed by diffusion through the sebum to the depths of the epidermis is the envisioned mechanism of permeation by this route. Vasculature sub serving the hair follicle located in the dermis is the likely point of systemic entry.

Absorption:

Across a membrane, the current or flux is and the terms of matter or molecules rather than electrons and the driving force is a concentration gradient (technically a chemical potential gradient) rather that a voltage drop. A membranes act as a "diffusion resistor". Resistance is proportional to thickness (h), inversely proportional to the diffusive mobility of matter with in the membrane or to the diffusion.

Coefficient (D) inversely proportional to the fractional area of a route where there is more than one (F), and inversely proportional to the carrying capacity of a phase.

$R = h/FDK$

R= Resistance of diffusion resistor

F= Fractional area

H= Thickness, D= Diffusivity, K= Relative capacity

Basic principle of permeation:
In the initial transient diffusion stage, drugs molecules may penetrate the skin aling the hair follicles or sweat ducts and then be absorbed through the follicular epithelium and sebaceous glands. When a steady state has been reached diffusion through stratum corneam becomes the dominated pathway.

The membrane-limited flux (J) under steady condition is described by expression

$$J = \frac{DAK_{o/w}}{rc}h$$

Kinetics of permeation:
Knowledge of skin permeation is cital to the successful developments formulation. Permeation of a drug involves the following steps, Sorption by stratum corneum, Penetration of drug though viable epidermis, Uptake of the drug by the capillary network in the dermal papillary layer.

This permeation can be possible only if the drug possesses certain physicochemical. The rate of permeation across the skin (dQ/dt) is given by:

$$\frac{dQ}{dt} = p_s (C_d - C_r)$$

Where **Cd and C**r are, the concentrations of skin penetrate in the donor compartment (e.g., on the surface of stratum corneum) and in the receptor compartment (e.g., body) respectively. Ps is the overall permeability coefficient of the skin tissues to the penetrate. This permeability coefficient is given by the relationship:

$$P_S = \frac{K_s D_{ss}}{H_s}$$

Where **K**s is the partition coefficient for the interfacial partitioning of the penetrate molecule form a solution medium on the stratum corneum, **Dss** is the apparent diffusivity for the steady state diffusion of the penetrate molecule through a thickness of skin tissues and Hs is the overall thickness of skin tissues. As Ks, Dssand hs are constant under given conditions, the permeability coefficient [Ps] for skins penetrate can be considered to be constant.

From equation [1] it is clear that a constant rate of drug permeation can be obtain when **C**d >>**C**r i.e., the drug concentration at the surface of the stratum corneam [**C**d] is consistently and substantially greater than the drug concentration in the body [**C**r]. The equation [1] becomes:

And the rate of skin permeation (dQ/dt) is constant provide the magnitude of **C**d remains fairly constant throughout the course of skin permeation. For keeping **C**d constant, drug should be released from the device at a rate [**R**r] that is either constant or greater than the rate of skin Uptake [**R**a] i.e., **R**r>>**R**a.

Factor affecting topical permeation:
Physicochemical properties of drug substances

- Partition coefficient
- pH – condition
- Drug solubility
- Concentration
- Particle size
- Polymorphism
- Molecular weight

Penetration enhancer:
Percutaneous absorption can be enhancing in two ways

A) Chemical enhancer
B) Physical method.

A. Chemical penetration enhancer:
By definition, a chemical skin penetration enhancer increase skin permeability by reversibly damaging or by altering the physicochemical nature of the stratum corneam to reduce its diffusion resistance. Among the alterations are increased hydration of stratum corneam and / or a change in the structure of the lipids and lipoproteins in the intercellular channels through solvent action or denaturation. These may conveniently be classified under the following main heading:
Solvents: These compounds increase penetration possibly by swelling the polar pathway and / or by fluidizing lipids. Examples include water, alcohols, methanol and ethanol; alkyl methyl sulfoxide, dimethyl sulfoxide, alkly homologs of methyl sulfoxide,dimethyl acetamide and dimethylformamide; pyrrolidones -2 – pyrrolidone,

N-methyl, 2-pyrrolidone; laurocapram (Azone), mieelancous solvents- propylene glycol, glycerol, silicone fluids, isopropyl palmitate.

Surfactant:
These compounds are proposed to enhance polar pathway transport, especially of hydrophilic drug, The ability of the surfactant to alter penetration is a function of polar head group and the hydrocarbon chain length. Commonly used surfactants are as follow

Anionic surfactant:
It can penetrant and interact strong with skin. Examples include are Dioctyl sulphosuccinate, sodium lauryl sulphate, Decodecylmethyl sulphoxide etc.

Cationic surfactant:
Cationic surfactants are reportedly more irritating than anionic surfactants and they have not been widely studied as skin permeation enhancer.

Nonionic surfactant:
Nonionic surfactants have last potential for irritation. Example includes are Pluronic F127, Pluronic F68 etc.

Bile salts:
Sodium taurocholate, sodium deoxycholate, and sodium tauroglycocholate.

Binary system:
These apparently open the heterogeneous multilaminatated pathway as well as the continuous pathways. Examples include are prolylene glycol – oleic acid and **1,4**-butane diol-linoleic acid.

Miscellaneous Chemicals:
These includes urea, N,N-dimethyl –m-toluamode, calcium thioglycolate etc.

Physical method of topical drug delivery:
Intophorosis:
Intophorosis is a process or a technique involving the transport of ionic or charged molecules into a tissue by the passage of direct or periodic electric current through an electrode solution containing the ionic molecules to be delivered using an appropriate electrode polarity.

Electroporation:
The process involves the application of transient high voltage electrical pulse to cause rapid dissociation of the stratum corneam through which large and small peptides, oligonucleotides and other drugs can pass in significant amounts. Electro portion or elecro – permeambrane voltage. The change in the membrane involves structural arrangement and conductance leading to temporary loss of semi-permeability of cell membranes suggesting formation of pores.

Sonophoresis:
Sonophoresis involves the usage of the frequency ultrasound waves. The ultrasound application has resulted in permeation of low frequency ultrasound was shown to increase the permeability of human skin to many drugs including high molecular weight protein by several orders of magnitude.

Ponophoresis:
The movement of drugs through living intact skin and into soft tissues under the ultrasound perturbation is called phonophoresis. The technique involves placing an ultrasound-coupling agent on the skin over to be treated and massaging the area with an ultrasound source.

Vesicular concept:
Drug enclosed vesicle made from phospholipids and nonionic surfactants are used for liposome, noisome and transfer some. The lipid vesicle serve as a rate limiting membrane barrier for system absorption of drug, non-toxic penetration enhancers for drug, organic solvents for solubilization of poorly soluble drugs and can incorporate both hydrophilic and lipophilic drugs.

Micro fabricated micro needles technology:
This technology employed micron-sized needles made silicon. These micro needles after insertion into skin create conduits for transfer of drug through the stratum corneum.

The drug after crossing stratum corneum diffuses rapidly through the stratum corneum. The drug after crossing stratum corneum diffuses rapidly through deeper tissues and taken up by capillaries for systemic administration.

Ointment:

Definition:

Etymology, ungudentum, a salve a semisolid extremely applied preparation usually containing a drug. Various ointments are used as "local analgesic, anaesthetic, antibiotic, astringent and depigmenting, irritant, and keratolytic agent". Also called salve, unction, unguent.

Types:

Most commonly available ointment bases are

A. Oleaginous
B. Emulsion base
C. Absorption base
D. Water soluble base
E. Water washable base

Purpose of the ointment:

They act as vehicle for medicinal agent for topical application. They may protect or act emollient to the skin. A few are counter irritants ointments are limited only by number of medicinal that can be incorporated into them.

Aim & objective:

The main aim of the present work (or) research is to formulate and evaluate of topical composition of Levofloxacin ointment in a suitable semi solid dosage form for the treatment of Bacterial diseases or infections like Impetigo, Folliculitis, Furuncle, Carbuncle, Erysipetas etc.

MATERIALS AND METHODS:

TABLE 1a: INSTRUMENTS USED IN PREPARATION OF FORMULATION

Instruments	Purpose
Mettler wt. balance	API/ Excipients weighing
Electronic wt. balance	API/Excipients weighing
Stirrer	Foruniformmixing/dissolution dispersion of drug
PH meter	Adjustment of PH
Brookfield viscometer	To determine consistency of the ointment
Remi centrifuge	To centrifuge the formulation
Sonicator	To increase the solubility of drug
Uv spectroscopy	Absorbents concentration and Standard curve
HPLC	For proper identification of active Ingredients

Procedure for preparation of Levofloxacin ointment:

Formulation – A (Oleaginous ointment base)

Melt the white bees wax in china dish and add little quantity of white petrolatum to heat it at a temperature of 70 degree centigrade to form a ointment base. It is mixed with Levofloxacin 100:1 ratio. Finally Levofloxacin ointment is prepared from fusion method.

Formulation – B (emulsion base):

Stearyl alchol white and white petrolatum are mixed and melted together at 75 degree centigrade the other agents of formulations B having sodium lauryl sulfate, propelene glycol are dissolved in purified water and melted together and the above oilphase and finally add propyl paraben and methyl paraben to form a emulsion bse ointment the ointment is mixed with Levofloxacin by the using ointment slab.

TABLE 2a: MATERIALS USED IN PREPARATION OF FORMULATION

Materials	Manufactures/suppliers
Levofloxacin	Aurobindo pharma Ltd
White bees wax	Choral labs
White petrolatum	Noveon inc
Methyl paraben	Clariant
Propyl paraben	Clariant
Sodium lauryl sulfate	Glenmark
Propelene glycol	Merck
Steryl alchol white	croda chemicals
Purifed water	

FORMULA FOR FORMULATION 'A ':

S. no	Ingredients	Qty. In grams
1	White bees wax	0.5 g
2	White petro latum	95 g
		100g

FORMULA FOR FORMULATION 'B'

S. no	Ingredients	Qty. In grams
1	Methyl paraben	0.25g
2	Propyl paraben	0.15g
3	Sodium lauryl sulfate	10g
4	Propylene glycol	12g
5	Steryl alchol white	25g
6	White petro latum	25g
7	Purified water	37g
		100g

RESULTS AND DISCUSSION:

Determination of physical Appearance:

The colour is observed visually the ointment 'A' having light yellow colour and 'B' having cream colour is observed dark back ground. The results are shown in the **Tables 1**and **2**

TABLE 1: FOR FORMULATION 'A' (OLEGIENOUS BASE)

S. no	Batch no	colour
1	F1	light yellowish semisolid ointment
2	F2	light yellowish semisolid ointment
3	F3	light yellowish semisolid ointment

TABLE 2: FOR FORMULATION 'B' (EMULSION BASE)

S. no	Batch no	colour
1	F1	cream colour semisolid ointment
2	F2	cream colour semisolid ointment
3	F3	cream colour semisolid ointment

Determination of pH:

The pH of the ointment were found immersing pH meter to a depth of 0.5cm in a beaker containing ointment. The determinations was carried out in triplicate and the average of three readings are recorded. The readings are shown in the **Table 3 and 4**. For adjusting PH we can used trail & error method of 0.1NHCL adding to the normal ointment and adjust the PH upto 5.5 by addition of 0.1NHCL 2 to 3ml. We can achieve the pH 5.1. The result are shown in the **Table 3** and **4**.

TABLE: 3 FOR FORMULATION 'A' (OLEGOGENOUS BASE)

Formulation	A	B	C	AVG	After add 0.1N Hcl or buffer
pH	6.2	6.3	6.7	6.4	Reaching 5.1ph

TABLE: 4 FOR FORMULATION'B' (EMULSION BASE)

Formulation	A	B	C	AVG
PH	6.2	6.3	6.7	6.4

Determination of viscosity:

The viscosity of formulated ointment base was determined the viscosity determinations were carried out on brook field viscometer using spindle number **' 4 '** and determinations were carried out in triplicate the average 3 reading are recorded the results shown in **Table 5 & 6**.

TABLE 5: FOR FORMULATION 'A' (OLEGIENOUS BASE)

Sp. no	Rpm	Time	Cp trials			Avg Cp	Arc
			A	B	C		
4	1	2min	99000	99000	92400	96600	13.7

TABLE 6: FOR FORMULATION 'B'(EMULSION BASE

Sp.no	Rpm	Time	Cp trials			Avg cp	Arc
			A	B	C		
4	1	2min	96600	95500	97000	96600	13.7

Micro biological studies:

Microbiological studies are done by the cupplate method. For testing the Bacterial growth in the storage period Nutrient Agar medium is prepared serial dilutions. The sample is inoculated by the help of sterile inoculum loop. The total experiment is only done at Aseptic conditions.

- When the medium preparation the maintained parameters are:
- Temp - 121 degree centigrade
  Time - 20 min
  Pressure - 15lb

After solidification of Agar medium and our sample is inoculated for observing the zone of inhibition. After incubation of 48 hours at 37 degree centigrade±2 degree centigrade temperature. The result absorption shown in the **Fig. 1** and **2**

OBSERVATION:

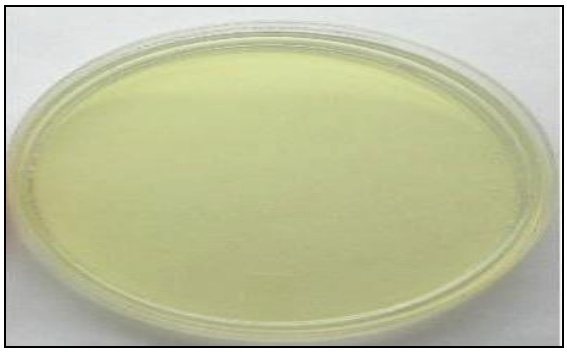


FIG. 1: NOGROWTH OBSERVED

It having ointment sample

FIG.2: GROWTH OBSERVED

It having no ointment sample

Anti-bacterial activity:

The Anti-bacterial activity of Levofloxacin is acts against the (all type of Bacteria) both gram +ve and gram –ve bacteria. So in the experiment of microbiological studies we can observe the no bacterial growth (or) zone of inhibition.

Determination of Spreadability:

The parallel plate method is the most widely used method for determining and quantifying of semisolid preparations. The advantages of the method are simplicity and relative lack of expense. Also the Assemblies can be designed and fabricate the according to individual requirements to type of data required. On other hand, the method is led precise and sensitive, and the data it generates must be manually interpreted and presented. Later vennat *et al.* validated the spreading diameter measurements of ointment on the basis of cellulose derivatives and established the linearity of spreading capacity of the ointment formulations was measured 48 hours after preparation by measuring the spreading diameter 1g of the ointment between two 20 × 20 cm glass plates after 1min. The mass of the upper plate was standardized at 125g panigrahi et al. Used a similar apparatus to assess the spreadability of ointment.

The following equation was used for the purpose.

$$S = M \times L/T$$

Where:

S, is the spreadability of ointment formulation
M, is the weight (G) tied on the upper plate
L, is the length (cm) of the glass plates, and
T, is the time taken for plates to slide the entire length.

Procedure:

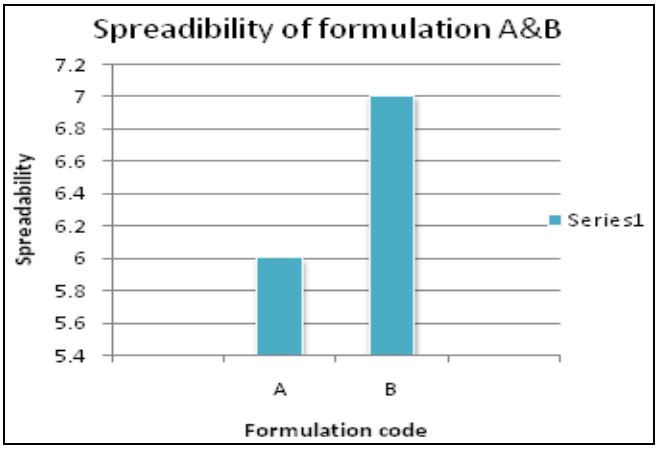
Two glass slide of 20 × 20 cm were selected. The ointment formulation whose spreadability had to be determined was placed over one of the slides. The other side was placed upon the top of the ointment such that the ointment was sandwiched between the two slides in an area occupied by a distance of 60cm along 100g weight was placed upon the upper slide. So that the ointment between the two slides was pressed uniformly to form a thin layer. The weight was removed and the fixed to a stand without slightest disturbance and in such a way only the upper slide to slide off freely, to the force of weight tied to it. A 20g weight was tied to upper side carefully. The time taken for the upper slide to travel the distance of 6cm and separate away from the lower slide under the certain of weight was noted. The determinations were carried out in triplicate and the average of three reading recorded. The results were shown in **Table 7** and **8**.

TABLE7: FORMULATION 'A' (OLEGOGENOUS BASE)

Formulation	A	B	C	Avg g/sec
Spreadability	5.3	5.8	6.7	6

TABLE 8: FORMULATION 'B' (EMULSION BASE)

Formulation	A	B	C	Avg g/sec
Spreadability	6.4	6.7	7.6	7



GRAPH 1: SPREADIBILITY OF FORMULATION A&B

Loss on Drying:

Take the petridish and filled with ointment weighed. The weighed petridish is put on water bath for drying at 105 degree centigrade. The formula can be used for the calculation of loss on drying.

$$\% \text{ of Loss on Drying} = \frac{\text{Wt.of After heat} - \text{Wt of}}{\text{Wt.of after heat}}$$

Formulation 'A': (olegogenous base)

Weight of empty petridish = 96.94g
Weight of petridish and ointment = 105.67
Heated petriplate +ointment = 106.05

$$\text{Loss on drying} = \frac{100\times (106.05-105.67)}{106.05}$$

$$= \frac{100\times (0.30)}{106.05}$$

$$= 0.28\text{g}$$

Formulation 'B': (emulsion base)

Weight of empty petridish =96.94 g
Weight of petridish and ointment =105.67
Heated petriplate +ointment =106.05

$$\text{Loss on drying} = \frac{100\times(106.05-105.67)}{106.05}$$

$$= \frac{100\times (0.30)}{106.05}$$

$$= 0.28\text{g}$$

Determination of Globule Diameter:

The globule size was determined by with the help of microscope. The results were shown in **Table 9** and **10**.

TABLE 9: FORMULATION 'A' (OLEGOGENOUS BASE)

Formulation	A	B	C	Avg
Globule diameter	4.24	4.22	4.15	4.20

TABLE 10: FORMULATION 'B' (EMULSION BASE)

Formulation	A	B	C	Avg
Globule diameter	4.39	4.36	4.26	4.33

Determination of Extrudability:

It is a useful Empirical test to the measure he forces to extrude the material from a tube. Since the packing of ointment having gained a considerable importance in delivery of desired quantity of ointment from jar of extrusion of ointment collapsible tube, therefore measurement of Extrudability becomes an important criteria for ointments.

Procedure:

The ointment formulation was filled in standard caped collapsible lami – tube and sealed. The tube was weighted recorded. The tube was placed between two glass slides and was clamped.

A 500g weight was placed over the glass slide and then glass slides were clamped. A 500g weight was placed over the glass slide and then cap was opened. The amount of ointment extruded was calculated and grades were allotted d (++++ Excellent, +++ good, ++fair, +poor). The results were shown in **Table 11** and **12**.

TABLE 11: FOR FORMULATION 'A': (OLEGOGENOUS BASE)

S. no	Batch no	Load apply	Ointment out in (cm)	%Extrudability
1	F1	15gm	13.8cm	99.6
2	F2	15gm	14.2cm	98.6
3	F3	15gm	13.9cm	94.6

TABLE 12: FORMULATION 'B' (EMULSION BASE)

S. no	Batch no	Load apply	Ointment out in (cm)	%Extrudability
1	F1	15gm	14.2cm	99.6
2	F2	15gm	13.6cm	98.6
3	F3	15gm	13.4cm	94.6

Diffusion studies of levofloxacin ointment:

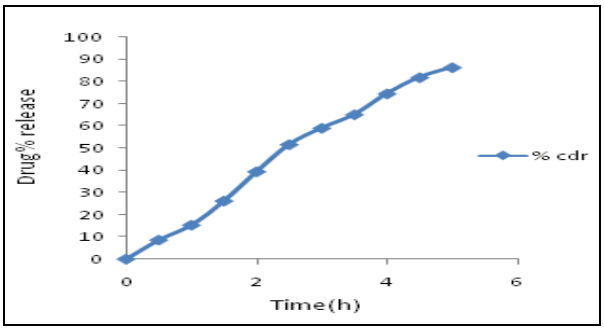
Instrument: Kiescary chain, Diffusion cell

Procedure: 2gms of ointment kept in donar compartment. After the entire cellophane membrane is contact with the receptor compartment containing 22ml of Phosphate buffer pH 7.4. The receptor compartment is stirred continuously at (100rpm) using magnetic stirrer. The temperature maintained at 37± 1 degree centigrade. The surface area is calculated for Diffusion studies 3.14cm sq for hours. The sample was withdrawn at 30min interval. Same volume was replaced with free Phosphate buffer. Levofloxacin is measured after dilution. Repeat the test for **3** times. Average values are noted. Ointment applies on body surface applied topically surface tissue of the skin after application of substance.

The skin is potentially appendages than through the matrix of stratum, corneum. Diffusion has been established. Dominant Diffusion mode properly into appendages. But occurs of the matrix of stratum, corneum. Penetration of remaining epidermal layer and corneum circulation via capillaries. This is carried by Agar Nutrient medium. Any concentration poured into petridish a hole was made at the center Ointment was placed on it. Time taken for ointment to diffuse was noted. The results are shown in the **Table 13** and **14.**

TABLE 13: DIFFUSION STUDIES OF OLEAGINOUS OINTMENT BASE

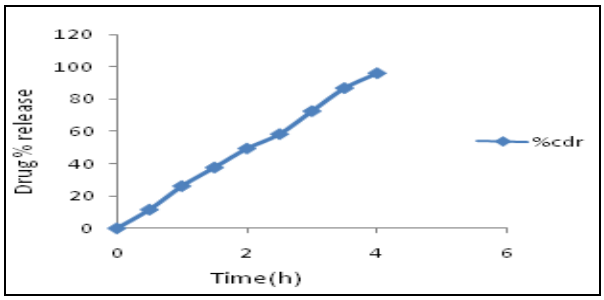
Time(h)	% cdr
0	0
0.5	8.6
1	15.3
1.5	26.2
2	39.4
2.5	51.6
3	59
3.5	65.1
4	74.5
4.5	81.8
5	86.3



GRAPH 2: DIFFUSION STUDY OF FORMULATION A (OLEGOGENOUS BASE)

TABLE 14: DIFFUSION STUDY OF EMULSION OINTMENT BASE

Time(h)	%cdr
0	0
0.5	11.6
1	26.1
1.5	37.6
2	49.3
2.5	58.2
3	72.4
3.5	86.6
4	95.8



GRAPH 3: DIFFUSION STUDY OF FORMULATION B (EMULSION BASE)

In Diffusion studies of formulation A&B results are shown in the above. An after 5th hour was found to be 86.3% and drug release from formulation B after 4th hour 95.8%. The results are depicted in graph **2** and **3.**

CONCLUSION: A Therapy is used to treat the Bacterial infection. This can be achieved by the Levofloxacin ointment by using oleaginous and emulsion bases. In this formulation Liquid paraffin, stearyl alcohol white, white bees wax and propylene glycol and methyl and propyl paraben are used. From the study the two ointment bases are more useful as a vehicle for topical application on the skin for bacterial infection. Compare to other formulations of Levofloxacin, The levofloxacin ointment will be more compliance to the patients.

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