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Original Research Article

DESIGN, DEVELOPMENT AND EVALUATION ANTIFUNGAL OLEOGEL OF SERTACONAZOLE

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Abstract

The main purpose of the study is to develop a topical drug delivery (Oleogel) system of Serteconazole to reduce side effect the dose of the active drug, to improve patient compliance, and increase local onset absorption and action. Sartaconazole interacts with 14-α demethylase, a cytochrome P-450 enzyme necessary to convert lanosterol to ergosterol. As ergosterol is an essential component of the fungal cell membrane, inhibition of its synthesis results in increased cellular permeability causing leakage of cellular contents. Topical Oleogel formulations development of Serteconazole was prepared by using Different-different polymers by enhancer stability and viscosity with their different concentrations. Six different formulations of Serteconazole were evaluated parameters with respect to their appearance, Spreadability, viscosity, determination of pH, drug content of formulations, in vitro drug release studies, and stability studies. FT-IR study results that there were no any interaction between the drug, Polymers, and excipients. All the developed formulations of Serteconazole show acceptable standard physical properties.

Keywords: Serteconazole, Oleogel, Zeta potential, Lanosterol, Ergosterol, Cell membrane

INTRODUCTION

A gel may be a -element, move related 3-dimensional network along with structural substances interspersed by an ok however proportionally massive amount of liquid to make an limitless inflexible community structure which immobilizes the liquid continuous segment within components. The structural materials that form the gel community are regularly composed of inorganic debris or organic macromolecules, normally polymers. go hyperlinks are often fashioned through chemical or bodily interactions. This outcomes in gel class into chemical and bodily gel systems, respectively. Serteconazole interfare with 14-α sterol demethylase, a cytochrome P-450 enzyme essential for conversion of lanosterol to ergosterol. those flip in inhibition in synthesis of ergosterol and additionally decorate cell permeability of fungus because of reduced quantities of ergosterol present within the fungal mobile membrane. As ergosterol is an important aspect of the fungal cell membrane, inhibition of its synthesis outcomes in the multiplied mobile permeability causing leakage of mobile contents accountable for cellular loss of life.[1-6]

Classification of Gels: Gels may be classified supported colloidal phases,

nature of solvent used, physical nature and rheological properties.

1. Based on nature of solvent

Hydro gels (water based)

Here, water is included as a continuous liquid phase in bentonites, cellulose derivatives, carpullers, synthetic poloxamer gels, etc. Examples - Plastibase (low molecular weight polyethylene dissolved in oil), Olag (aerosol) gels, and dispersions of metal stearates in oil.

Oleogel

A Oleogel is a semi-solid formulation in gel form with an immobilized outer apolar phase. The non-polar phase is immobilized within the space of a 3D network structure formed by physical interactions between all polymers. This is the self-assembled structure of compounds considered gelling agents.[7]

Xerogels

Solid gels with low solvent concentrations are called xerogels. These are prepared by solvent evaporation or freeze-drying, leaving the gel scaffold in contact with fresh liquid to swell and reconstitute. Ex. Tragacanth ribbon, acacia tears β1-cyclodextrin, dried cellulose, and polystyrene.[8]

Preparation of Gels:

Gels are generally prepared at the industrial scale under room temperature. However few of polymers such-Synthetic and Natural need special treatment before processing. Gels are also prepared by following methods.10-11

1. Thermal changes
2. Flocculation
3. Chemical process/ reaction

MATERIALS AND METHODS

Serteconazole was received gift sample from Intas Pharma Ltd, Mumbai, India. All Other Chemicals used in the formulation development were of the standard analytical grade. Serteconazole formulations Oleogel were prepared by using different polymers with their different-differentconcentrations. Polymers are dispersed in distilled water with constant stirring by magnetic stirrer at a medium speed maintaining the temperature at 400C. Gels are packed in a wide mouthed glass jar, and it is covered with screw copped plastic lid after covering with aluminium foil. Various preparations of Serteconazole Oleogel are shown in Table 1. They all were kept in the dark and cool place. Evaluation of physicochemical parameters of prepared Oleogel of Serteconazole gel Drug-excipients compatibility studies by Fourier transfer infrared spectrophotometer (FTIR). The drug, polymer, and excipients interactions are studied using the FTIR method. In general, drug and excipients must be compatible with each other which produce a stable, safe, and efficacious formulation. IR spectral analysis of pure drug and polymers carried out. Pure drug that gives peak and patterns were compared with the peaks and patterns with the combination of polymer and drug.[11-15]

RESULTS

Drug-excipients compatibility studies

The IR studies of clear Serteconazole formulation comprises greater proportion of the polymers that are conducted to know about the bond between the used polymers and the drug.

The IR spectrum of pure Serteconazole and Serteconazole gel formulations that used greater proportion of polymer that gives comparable basic patterns and peaks. Outcome status that no notable drug and polymer interactions.

Visual inspection:

Visual determination is done to examine the physical properties and color of the developed formulation.

Determination of pH:

The pH value of all developed gel was in the range of 6.5–7.4. This is sufficient for appealing to skin and avoid the chances of irritation with local application.

Spreadability

The study has a few major elements that show the gel character that emerges out from the tube. Spreadability test is carried for all the formulations.

Determination of drug content

The drug content of the formulated gel was estimated. The drug content manifests that the drug was distributed equally throughout the gel.

Percentage yield and viscosity

Percentage yield of a topical gel consisting of Serteconazole was in the range of 94.15–98.55%. This was identified that the percentage yield of F5 formulation showed an increase in percentage yield than the other preparation due to use of guar gum polymer.

In vitro drug release

The drug release profile of Serteconazole topical gel formulations was accomplished by Franz diffusion cell. As an outcome of the in vitro release studies of all formulations are given in Table 3, and the statistically represented.

DISCUSSION

The imidazole derivative of Serteconazole is one of the best drugs used for the treatment of fungal infections. In this study, the topical gel preparation of Serteconazole was formulated for efficient that absorption of the drug across the skin. Advanced formulations of Serteconazole were analyzed for physiochemical parameters such as viscosity, Spreadability, drug content, and in vitro drug release studies.

CONCLUSION

By analysing the above results, concluded that our drug Serteconazole was incorporated with success into the topical gel development among all the designed formulation, the formulation F2 shows better Spreadability, drug content, viscosity, and drug release studies. Therefore, this was concluded that our formulation would be very effective and safe topical alternative for the treatment of skin fungal infections.

Table:

Table 1: Serteconazole Formulation

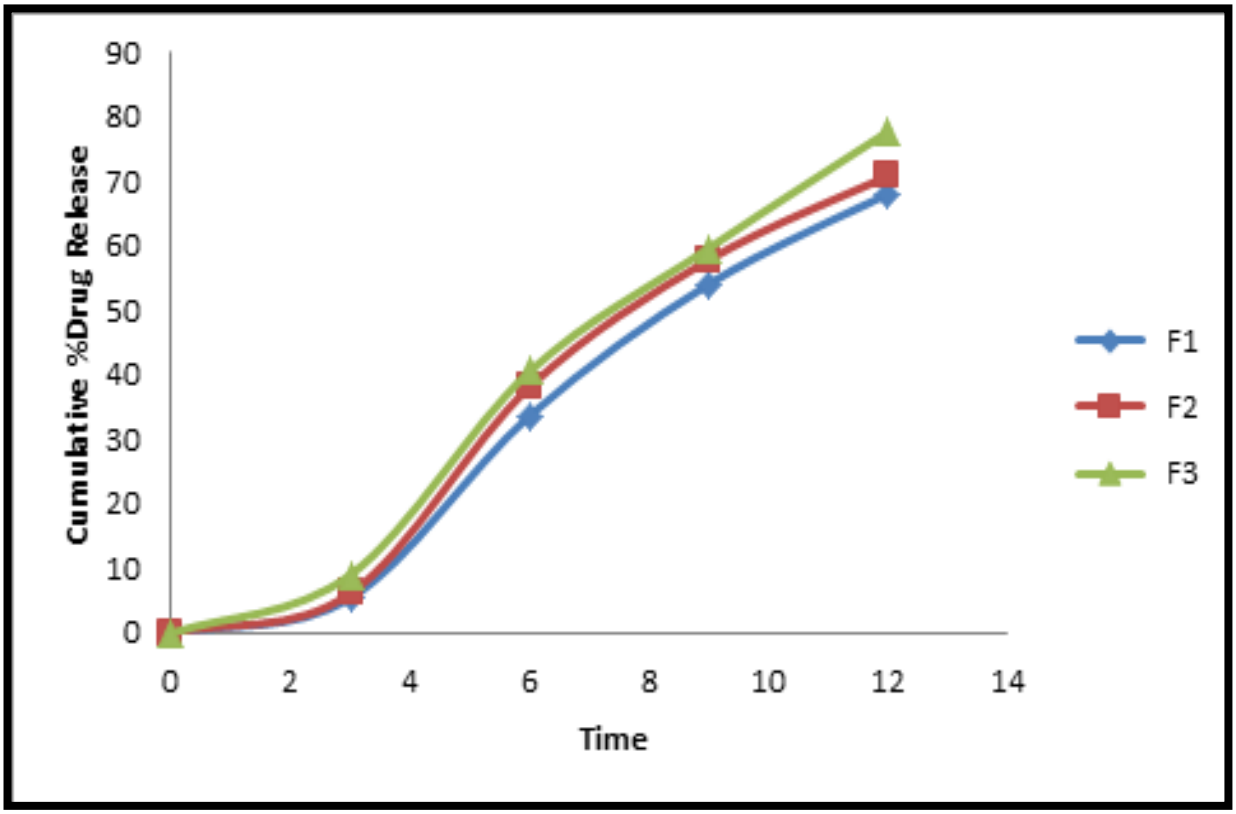
Ingredients (mg)	F1	F2	F3	F4	F5	F6	F7	F8	F9
Sertaconazole	2	2	2	2	2	2	2	2	2
Carbopol	2	2	2	2	2	2	2	2	2
Tween-80	2	4	6	-	-	-	-	-	-
Coconut Oil	-	-	-	2	4	6	-	-	-
Lemmon Oil	-	-	-	-	-	-	2	4	6
Propyll Galate	1	1	1	1	1	1	1	1	1
Methyl Paraben	2	2	2	2	2	2	2	2	2
Propyl Paraben	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Water	90	88	84	90	88	84	90	88	84

Table 2: Evaluation of Serteconazole Gel

Characterization	Formulation code								
	F1	F2	F3	F4	F5	F6	F7	F8	F9
pH	7.2	7.1	7.3	7.1	7.1	6.9	7.0	7.3	7.1
Viscosity	70	96	132	157	173	169	196	232	266
Gelling capacity	++	++	++	++++	++++	++++	+++	++++	++++
Content uniformity	95.19 ±0.18	96.54 ±0.10	97.15 ±0.11	97.55 ±0.14	98.08 ±0.11	97.90 ±0.14	96.53 ±0.17	96.68 ±0.11	96.74 ±0.18

Table 3: Cumulative % drug release of Serteconazole

Time	Cumulative %Drug Release								
	F1	**F2**	**F3**	**F4**	**F5**	**F6**	**F7**	**F8**	**F9**
0 hr	0	0	0	0	0	0	0	0	0
3 hr	5.46	6.18	9.06	4.98	7.03	12.03	9.31	11.41	13.04
6 hr	33.72	38.20	40.60	34.37	38.20	60.23	65.12	58.99	55.80
9 hr	54.12	57.85	59.70	54.63	64.12	72.32	84.35	72.60	72.16
12 hr	68.12	70.90	77.78	74.73	81.45	93.18	95.32	93.68	94.54



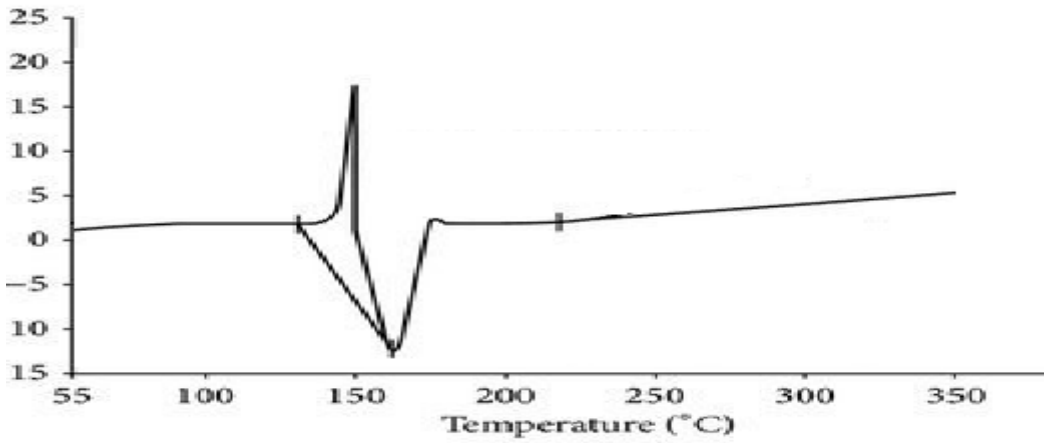


Figure: DSC of Serteconazole

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