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COMPARATIVE STUDY ON SYNTHETIC AND HERBAL GEL BASES

VISHWAJEET V UPADHYE*, AMRUTA R BALEKUNDRI, PRAMOD H J

Department of Pharmacognosy, KLE College of Pharmacy, Belagavi, Karnataka, India.

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For Correspondence:

AMRUTA R BALEKUNDRI

Department of Pharmacognosy,
KLE College of Pharmacy,
Belagavi, Karnataka, India

E-mail:

amrutaabc11@gmail.com

ABSTRACT

A gel is a solid system of at least two constituents, consisting of a condensed mass enclosing and interpenetrated by a liquid. Gel base is a medium which is used for the preparation of gel. As we know synthetic gel bases containing certain chemical entities has some side effects such as allergic reactions, which may cause enzyme denaturation present in epidermis, problems with absorption and possible interactions with other ingredients, having poor permeability. With this respect trying to compare an synthetic gel bases with the Herbal gel bases having less side effects such as low allergic reactions compared to synthetic gel bases, which do not cause any kind of enzyme denaturation present in epidermis, less in problems with absorption and also less in possible interactions with other ingredients, having high permeability by checking or evaluating following parameters such as pH, viscosity, spreadability, washability, greasiness, appearance. The attempt towards the comparison of the gel study got into light advantages and disadvantages of both synthetic and herbal gel base.

INTRODUCTION:

A gel is a solid system of at least two constituents, consisting of a condensed mass enclosing and interpenetrated by a liquid. Gels are getting more popular nowadays because they are more stable and also can provide controlled release than other semisolid preparations like creams, ointments, pastes, etc. The gel formulation can provide better absorption characteristics and hence increase the bioavailability of the drug. A thorough investigation into the stability characteristics of the gel formulation over an extended period of time may provide scope for its therapeutic use for patients. Since certain herbal gelling agents are water soluble; consequently, it forms a water washable gel and has wider prospects to be used as a topical drug delivery dosage form. The principle advantage of topical drug delivery lies in targeting the drug action directly to the site of disorders by allowing accumulation of high local drug concentration within the tissue and around its vicinity for enhanced drug action this is more effective when drug with short biological half-life, narrow therapeutic index are applied with topical route. The clinical evidence shows that topical gel is a safe and effective treatment choice for use in the management of skin related diseases. Gel base is a medium which is used for the preparation of gel. As we know synthetic gel bases containing certain chemical entities has some side effects such as allergic reactions, which may cause enzyme denaturation present in epidermis, problems with absorption and possible interactions with other

ingredients, having poor permeability. With this respect trying to compare an synthetic gel bases with the Herbal gel bases having less side effects such as low allergic reactions compared to synthetic gel bases, which do not cause any kind of enzyme denaturation present in epidermis, less in problems with absorption and also less in possible interactions with other ingredients, having high permeability by checking or evaluating parameters such as pH, viscosity, spreadability, washability, greasiness, appearance. The attempt towards the comparison of the gel study got into light advantages and disadvantages of both synthetic and herbal gel base.

METHODS:

1. Physical appearance of the herbal gel base- In this evaluation parameter the color of the herbal gel, the appearance of the gel base and the consistency of the gel base is checked just by observation and touch.
2. pH- The pH of the herbal gel formulation is been checked by the digital pH meter.
3. Spreadability- The Spreadability of the gel base is checked by glass plate method. The gel base about 1g is placed in the center of the glass plate (20 * 20) on that other plate is placed and weight stones of 125gms are placed for 60sec and the diameter of the circle formed is measured from three different points the average is consider and added to the formula

$$\text{Spreadability} = D^2/4$$
 where, D= diameter formed by the gel base after spreading.
4. Washability- In this evaluation parameter the gel base prepared is checked by using

washing with water after application on skin.

5. Viscosity-The Viscosity of prepared gel base is checked by using Brookfield viscometer with speed of 60rpm and using spindle 1.
6. Greasiness- The prepared gel base is applied on the skin and checked for greasiness.

• EVALUATION-

Sr. No	Gel Base (0.5%)	pH	Viscosity (Poise)	Spreadability (g.Cm/Sec)	Consistency	Appearance	Washability	Greasiness
1	Carbopol 934	7.57	0.38	32.19	Very Good	Semisolid	Very Good	Very Good
2	HPMC	8.57	0.79	5.80	Very Good	Semisolid	Very Good	Very Good
3	Xanthan Gum	5.43	0.67	0.92	Good	Semisolid	Good	Good
4	Guar Gum	5.82	0.38	9.9	Good	Semisolid	Good	Good

• Stability study of carbopol934 gel base-

Parameters	Initial	Room Temperature			Accelerated temperature		
		25 ⁰ C±2 ⁰ C/RH 60±5%			40 ⁰ C±2 ⁰ C/RH 75±5%		
		7 th Day	15 th Day	30 th Day	7 th Day	15 th Day	30 th Day
pH	7.57	7.57	7.55	7.56	7.57	7.58	7.56
Viscosity (poise)	0.38	0.36	0.37	0.39	0.38	0.37	0.38
Spreadability (g.cm/sec)	32.19	32.18	32.17	32.19	32.18	32.18	32.19

• Stability study of HPMC gel base-

Parameters	Initial	Room Temperature			Accelerated temperature		
		25 ⁰ C±2 ⁰ C/RH 60±5%			40 ⁰ C±2 ⁰ C/RH 75±5%		
		7 th Day	15 th Day	30 th Day	7 th Day	15 th Day	30 th Day
pH	8.57	8.57	8.55	8.54	8.55	8.56	8.57
Viscosity (poise)	0.79	0.78	0.76	0.78	0.79	0.76	0.77
Spreadability (g.cm/sec)	5.80	5.78	5.79	5.80	5.81	5.82	5.80

• Stability study of Xanthan gum gel base-

Parameters	Initial	Room Temperature			Accelerated temperature		
		25 ⁰ C±2 ⁰ C/RH 60±5%			40 ⁰ C±2 ⁰ C/RH 75±5%		
		7 th Day	15 th Day	30 th Day	7 th Day	15 th Day	30 th Day
pH	5.43	5.43	5.43	5.42	5.42	5.43	5.43
Viscosity (poise)	0.67	0.65	0.56	0.50	0.66	0.60	0.54
Spreadability (g.cm/sec)	0.92	0.94	0.96	1.00	0.96	1.00	1.05

• Stability study of Guar gum gel base-

Parameters	Initial	Room Temperature			Accelerated temperature		
		25 ⁰ C±2 ⁰ C/RH 60±5%			40 ⁰ C±2 ⁰ C/RH 75±5%		
		7 th Day	15 th Day	30 th Day	7 th Day	15 th Day	30 th Day
pH	5.82	5.81	5.82	5.82	5.83	5.81	5.80
Viscosity (poise)	0.38	0.36	0.35	0.35	0.37	0.36	0.38
Spreadability (g.cm/sec)	9.9	1.0	1.05	1.08	1.02	1.04	1.06

RESULT:

- The pH of HPMC gel base was found to be highest (8.57) whereas lowest pH was found to be of Guar gum gel base (5.82).
- The Viscosity of HPMC gel base was found to be highest (0.79) whereas lowest Viscosity was found to be of Carbopol 934 (0.38) and Guar gum (0.38) respectively.
- The maximum Spreadability was found to be of Carbopol 934 (32.19) while minimum was found to be of Xanthan gum (0.92).
- Consistency, washability, Greasiness of synthetic gel bases were better compared to herbal gel bases one.

DRAWBACKS:

- Viscosity and spreadability is less than the optimum requirement of gel bases.
- In case of stability the herbal gel bases are less stable than the synthetic gel bases.

FURTHER STUDIES:

- Further studies will be carried out on herbal gel bases to improve the viscosity and spreadability by addition of suitable viscosity enhancing agents.
- To increase the life of Herbal gel bases stabilizers will be added.
- If we are able to achieve the optimum viscosity and Spreadability along with stability, we can replace the synthetic gel bases with the herbal gel bases which will take us towards the green evolution.

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