



Formulation and evaluation of herbal mascara by using Xanthan Gum

AKSHAY R YADAV^{1*}, VAIBHAVI A SOUNDATTI²

¹ Department of Pharmaceutical Chemistry, Rajarambapu College of Pharmacy, Kasegaon, Sangli, Maharashtra, India-415404

² Bharati Vidyapeeth College of Pharmacy, Kolhapur, Maharashtra, India-416013

*Author for Correspondence: Email: akshayyadav24197@gmail.com

ARTICLE DETAILS	ABSTRACT
<p><i>Article history:</i> Received on 26 February 2021 Modified on 15 October 2022 Accepted on 21 October 2022</p> <p><i>Keywords:</i> Mascara, Xanthan Gum, Formulation, Evaluation.</p>	<p>Mascara is a cosmetic that is widely used to enhance eyelashes. It can darken the eyelashes, thicken, lengthen, and/or describe them. The modern mascara formulation usually has different formulations in one of three forms-liquid, powder, or cream; however, most contain the same basic components of pigments, oils, waxes, and preservatives. A liquid in a tube is the most common form of mascara. The present study was carried out using xanthan gum as a natural polymer to formulate herbal mascara. Xanthan gum polymer was used due to the side effects of the available synthesis. By the o/w emulsion method, various batches of herbal mascaras were prepared and evaluated on the parameters viz., skin irritation and patch test.</p>

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INTRODUCTION

The sign of beauty is the eyes. Every woman's dream was to possess long, thick and dark eyelashes associated with increased levels of beauty, trust and well-being. Mascara, an eye cosmetic that darkens, lengthens and thickens eyelashes momentarily [1]. Typically the modern mascara product has different formulations in one of three forms-liquid, cake, or cream; however, most contain the same basic components of pigments, oils, waxes, and preservatives. The natural beauty of the eyes is enhanced and accentuated by painting, lengthening, thickening or filling out there [2].

They come in many different colours, but black, brown, green or blue are the most common. For colours, mineral pigments are used. In pharmaceutical formulations, natural polymers are commonly utilized [3]. In nature, they are biodegradable and usually nontoxic. The pharmaceutical application of rosin is defined in this study. Rosin is derived from *Pinus palustris* as a natural non-volatile resinous mass [4]. The physico-chemical characteristics and ease of availability of rosin provide a platform for the film forming agent to use it as a polymer. This

inexpensive and easy to use gum is by far the most widely used natural gum in cosmetics and is extracted from the fermentation of the *Xanthomonas Campestris* plant bacteria. In vegetable glycerin, this anionic polysaccharide can disperse, but not hydrate. Xanthan gum is commonly used because it is compatible and readily available and flexible with most ingredients used in cosmetics. In hot or cold water, Xanthan gum can hydrate and produce a hazy yet neutral pH solution [5].

This gum can produce a gel that can handle the addition of a wide variety of active ingredients that are water-soluble. With galactomannans like Konjac, Xanthan is also highly synergistic. The viscosity of the gel can increase significantly when Xanthan is combined with Konjac. Xanthan is also heat and shearing resistant, making the gels produced with Xanthan extremely stable. This is particularly helpful if you deliver your goods to hot and humid places or in high heat. Mascara is a beauty product that gives the eye lashes a distinct appearance. On eye lashes, it amplifies length, curls, reinforces. You need mascara that adds some intensity and duration to the lashes whether they are short, sparse, fine

or brittle. In the industry, there are so many formulations available [6]. Xanthan Gum is a polysaccharide which is formed by *Xanthomonas campestris* bacteria. The fermentation process starts when this bacteria is put into a culture containing carbohydrates, and Xanthan Gum is produced as a by-product. It is isolated, dried and processed into a fine powder once Xanthan gum is produced.

Typically, the carbohydrates used to make Xanthan Gum derive from soy, wheat or maize. Xanthan Gum Clear is a cosmetic grade of Xanthan Gum that has been fermented specifically for cosmetic production requirements, giving it a lower micron count (80), resulting in clearer formulations and better stability than standard Xanthan gum. The gum forms a transparent thickener which, without adding colour, can be used in products. As the thickening is stable and temperature resistant, the Xanthan gum is particularly suited for cosmetic use. The special formulation easily thickens and blends well with other surfactants, emulsifiers, essential oils, fragrances, dyes, and particle suspension aids.

The ability to suspend particles makes Xanthan Gum particularly useful for exfoliating formulations. Usually, xanthan gum is used between 0.1% and 0.5%. It is possible to disperse xanthan gum into water and mix it by creating a vortex in the water and then gently sprinkling the xanthan gum into the water. However, the easiest and most efficient option is to blend Xanthan Gum into Glycerin, where it will create a paste that can be mixed into your formulation easily. Xanthan Gum should be added to the water component of cream-based formulations and is heat resistant, so it can then be heated and combined with oil. Over the next few days after production, Xanthan Gum will continue to thicken. The final thickness of the product based on Xanthan Gum will be greatly influenced by the amount of shear to which the product was subjected during manufacture. The higher the shear, the thinner the final consistency [7].

Aesthetic adornment is a cultural universal and mascara in ancient Egypt can be documented. Records from around 4000 B.C refer to a substance used to darken eyelashes, eyelids, and eyebrows called kohl. Kohl was used by both men and women to mask their eyes, believed to ward off evil spirits and to protect the soul. In order to keep the kohl from running, it was often

composed of galena; malachite; and charcoal or soot, crocodile stool; honey; and water [8]. In the subsequent Babylonian, Greek and Roman empires, the use of kohl persisted through the influence of Egypt. Kohl fell into disuse on the European continent after the fall of the Roman Empire, where it was considered solely a cosmetic; conversely, it continued to be widely used for religious purposes in the Middle East [9].

Social opinion shifted radically to the promotion of cosmetics during the Victorian era, and women were known to spend most of their day occupied with beauty regimens. In order to create the illusion of long, dark eyelashes, great efforts have been made. Victorian women made a type of mascara in their own homes in an attempt to do this. They would heat on a plate a mixture of ash or lamp black and elderberry juice and apply their eyelashes with the heated mixture. It was not until the 19th century that the product that people would recognise as mascara today evolved [10]. Using the newly invented petroleum jelly, a chemist named Eugène Rimmel created a cosmetic. In the Portuguese, Spanish, Greek, Turkish, Romanian, and Persian languages today, the name Rimmel became synonymous with the substance and still translates to "mascara." Thomas Lyle Williams created a remarkably similar substance for his sister Mabel across the Atlantic Ocean, and at about the same time, in 1915. In 1917, he started a product mail-order business that grew to become the Maybelline company. In a set ratio, the mascara developed by these two men consisted of petroleum jelly and coal. It was undeniably messy, and they soon developed a better alternative. A dampened brush was rubbed in equal proportions against a cake containing soap and black dye and was applied to the lashes. It was still extremely messy. Until 1957, with an innovation by Helena Rubinstein, no significant improvement took place. In Paris, in the early 20th century, the events leading to Rubinstein's improvement began. There, in the world's fashion capital, mascara was quickly gaining popularity and common use. Two giants in the American beauty industry, Elizabeth Arden and Helena Rubinstein, watched and kept abreast of its development. American customers were excited for new goods after the First World War. Sensing a shot, Rubinstein and Arden both launched their own makeup labels that included mascara.

In American society, mascara eventually achieved respectability and favour through the efforts of these two rivals and public temperament. The invention of photography and motion photography introduced the success and use of mascara in America. In particular, motion pictures advertised a new standard of beauty and sex appeal. For their glamorised looks, which the average woman tried to imitate, popular actresses of the classic movie period, such as Theda Bara, Pola Negri, Clara Bow, Greta Garbo, Marlene Dietrich, Bette Davis, and Jean Harlow, relied heavily on mascara. In 1933, a woman named in court documents as Mrs. Brown decided to permanently dye her eyelashes. Unfortunately, as the dyeing agent, the formula, Lash Lure, used para-phenylenediamine, a chemical that is highly toxic to the body.

At the time, the Federal Drug Administration had uncontrolled cosmetics, and the risks of paraphenylenediamine were unknown. Mrs. Brown started having significant symptoms of stinging and burning eyes within hours of the procedure. Mrs. Brown's eyes had formed ulcers that oozed and had swollen shut by the next morning. In Mrs. Brown and fifteen other women, the use of Lash Lure resulted in blindness and also caused the death of another through a bacterial infection.

It was only after the Lash Lure case and many others like it, recorded in the book entitled American Chamber of Horrors by Ruth deForest Lamb, that Congress granted the authority to control cosmetics to the Food and Drug Administration (FDA) in 1938. Years later, in 1957, Rubinstein developed a formula that turned mascara into a lotion-based cream from a hard cake. In a tube to be sold with a brush, she packed the new mascara.



Figure 1: Application of mascara on eye

The cream was squeezed onto the brush for use and placed on the lashes. It was a step towards the modern mascara product, while still messy. Soon, they patented a grooved rod. The same amount of mascara was obtained from this system for each use. The grooved rod was then modified to a brush similar to those used today. The improvement in the applicator made it much simpler to use mascara, and its popularity grew. With many mascaras, including lash-boosting serums, botanicals, and pro-vitamin-enriched formulas, mascara is now trending towards multi-functional use. The advancement of Korean technology is at the forefront, and tubing formulations are used by a variety of brands to coat the lash.

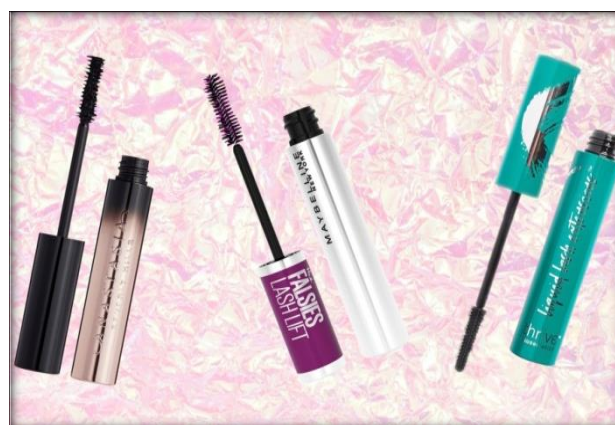


Figure 2: Mascara

Properties of the perfect mascara-Rapid dryness, shine, duration, simple to apply, no allergic reaction, even pigment. They offer all the properties of a good mascara, but they also have a harmful effect on the eyes due to their chemical organic origin. Even some chemicals used in mascara, after some time, exhibit carcinogenic effects, skin irritation, eye swelling. All ingredients are extracted from plants and animals in a natural way. In the preparation, less ingredients (wax, oil, and pigments) are used for the main purpose of producing herbal mascaras that do not have any chemical reactivity. It is more effective than the chemical mascara [13].

Types of Mascara

Cake Mascara

Until the 1960s, the cake or block style was the most common form of mascara in the twentieth century. It was known as 'water cosmetique' or 'mascaro' in the nineteenth century, and it was only after 1900 that its name started to change to the mascara that we are familiar with today. This form of mascara includes a combination of soap

and pigments, but this substance causes discomfort such as tears and pain due to soap. By mixing black or brown pigments into sodium stearate soap chips, the water cosmetics, mascaras and early cake mascaras were all made the same way. These early mascaras were essentially black soap, so it is not surprising that the mixture was extruded from a plodder into strips after milling, which were then cut to length, a technique often used to produce soap cakes [14-16].



Figure 3: Cake Mascara

A wet brush was scrubbed over the cake to apply the mascara in order to pick up the colour, which was then brushed onto the lashes. Unfortunately, water was not always available, so many women used saliva instead, either by placing the brush in their mouth or spitting directly on the cake, giving the questionable name of 'spit black' to this cosmetic [17-19].

Cream Mascara

It's another kind of cake mascara as well. After being cut down by water, it can be applied with a brush [20].



Figure 4: Cream Mascara

Liquid Mascara

Liquid mascaras could be produced by adding colour to a dilute mucilage of gum made from gum tragacanth, quince seed or some other mucin, with more modern forms such as hydroxyethylcellulose produced using a synthetic hydrocolloid. As compared to other mascaras, it is available for a very long period¹⁷. It can be extracted by water quickly. Liquid mascaras, like cake mascara, did not require water to be applied, but tears and transpiration also affected them. They often appeared to stick the lashes together and, when dry, with a tendency to flake, become brittle. Liquid mascaras have also been made to create a kind of lacquer on the lashes by suspending powdered black or other pigments in an alcoholic solution of a resin such as rosin (colophon) or benzoin. As for isopropyl alcohol or the more expensive ethyl alcohol, turpentine or industrial methylated spirits may be used as the solvent [21-23].



Figure 5: Liquid Mascara

Quality Characteristics

- It should be easy to apply.
- It should not form a smudge.
- It should not cause the sticking of eyelashes together.
- It should be easy to remove [24-25].

MATERIALS AND METHODS

• Xanthan Gum

They are polysaccharides that are derived from carbohydrate fermentation. Xanthan Gum is derived from glucose or corn syrup, while sorbitol is derived from Biosaccharide Gum-1. In a broad range of cosmetics and personal care products, including bath products, lipstick, skin and hair care products, and toothpaste, Xanthan Gum and Biosaccharide Gum-1 are used.

- **Charcoal**

It is also known as activated carbon, and is used for the prevention of oral poisoning. It should be used in a short time to be effective. In the preparation of eye cosmetics, it is also used.

- **Coconut Oil**

It is an oil that is derived from a coconut kernel that is gathered or picked from a coconut palm. Because of the high saturated fat content, they have many applications.

- **Rose Water**

It is prepared by distilling steam from the rose petals. It is fragrant, and the scent is natural. In what is now Iran, it is believed to have arisen. In beauty products, it is traditionally used and now used in food and drink products.

- **Aloe Vera**

Aloe vera is prepared with fleshy, young, pointed green aloe leaves, which also have laxative properties and are used for cosmetic preparation in natural remedies. Leaves are able to store water, which makes the leaves thick to prepare aloe vera products with the "gel".

Method of Preparation:

Oil in the Water Emulsion

Take all the ingredients and weigh them accurately. Mix the coconut oil and Aloe vera gel together. Add a given volume of rose water and glycerin to the mixture in quantity. Stir in the remaining ingredients and heat for 10 minutes. The pigment is mixed together after heating.

Formulation of Herbal Mascara

After many studies and three formulations Viz., F1, F2 and F3 all formulations were formulated with different quantities and ingredients.

Table 1: Formulation of Herbal Mascara

Ingredients	F1	F2	F3
Xanthum gum	0.50 gm	0.70 gm	1gm
Charcoal	-	-	1 mL
Rose water	5 mL	-	8 mL
Coconut oil	4 mL	5 mL	1 mL
Aloevera gel	1 mL	-	15 mL
Glycerine	1 mL	-	1 mL
Result	Doesn't Dry	Doesn't Dry	Have all characters

Assessment of Mascara:

- **Evaluation of Eye Preparation**

In order to ensure that the correct ingredients and the required quantity are used, accuracy and purity checks are conducted at various stages in the development of eye preparation. These studies have tested the existence of microorganisms and allergens.

- **Patch Testing**

Two types of dermatitis require patch inspection to assess if the substance in contact with the skin causes skin inflammation (skin dermatitis): irritant, allergic dermatitis.

- **Open or Closed Patch Testing**

The difference between irritant and eye contact dermatitis must can be made evident or similar to patch inspection can be done as with shadows, if the makeup is the cause of the dermatitis.

- **Irritant Contact Dermatitis**

An irritant is one that, when administered at a sufficiently high concentration for an appropriate duration, will cause inflammation in almost any person. An irritant reaction that is caused by a near contact of the skin irritant and is not associated with the immune system.

- **Allergic Contact Dermatitis**

In specific, allergic reactions to the individual and to the substance or group of substances and allergens referred to in the call. Hypersensitivity (oversensitivity) to a substance, also affecting the immune system, is an allergy. If contact with the material is avoided, any sections of the skin that are in contact with allergens can produce a rash.

Method

Checking is performed by positioning the eye cream at the corner of the eye for 5 days, followed by an allergic or irritant contact dermatitis skin test.

- ✓ Allergens are combined with a non-allergic substance.
- ✓ They are put in close contact with the skin.
- ✓ Adhesive tape is used to hold them in place.
- ✓ The test side is labelled.
- ✓ The patch is left in place for 48 hours, during which time it is necessary not to wash the area or play competitive sport because the adhesive tapes peel off the procedure would have to be repeated.

RESULTS AND DISCUSSION

Xanthum gum was picked after all the formula parameters and herbal mascara was formulated in 3 batches. The final optimised formula coding F3 was chosen from among these and measured.

Table 2: Evaluation of herbal mascara

Sr. no.	Test	Result
1	Irritant contact dermatitis	No irritation was occurs
2	Allergic Contact Dermatitis	No allergic action was occur

CONCLUSION

In the context of the present study, this formulation was found to be ideal for use in systematic clinical trials in order to obtain access to the formulation with a view to enhancing efficacy.

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