



FORMULATION & EVALUATION OF ALUM TONER

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ABSTRACT

Transdermal spray (TS) is believed to have more superiority over the conventional TDD systems in the light of its safety, and tolerability [11]. As compared to conventional TDD systems (patches, gel, and ointment), TS is readily available for application, provides flexible drug dosage delivery, and reduces the occurrence of skin irritation and the patients need not clean their hands after the application [11 12 13]. Because of volatile solvent content, the TS system creates a fast-drying and non-occlusive layer on the skin after its application and helps rapid drug permeation through the skin [14]. In the past, skin toner was a typical product used as a second cleansing agent for removing residual makeup after regular facial cleansing or used for removing excess sebum secreted from facial skin to prepare the skin before nourishing treatment. Toners may be categorized into alcohol-based or non-alcohol-based toners for various skin types such as oily skin, sensitive skin, or combination skin [10]. Nowadays, the diversity and prevalence of the products cause skin toners to be utilized more as cosmeceutical products with several purposes; for example, rehydrating skin, balancing skin pH, tightening skin pores, relieving irritation, and also antiseptics.

Keywords:- Toner, Acid toners, skin tonics, fresheners, etc.

INTRODUCTION

From the ancient days, people use naturally available resources to enhance their beauty [1]. It is known that cosmetics are the products used to enhance and impart beauty to the user [2]. In earlier days, naturally available ingredients were generally used as cosmetics, but with the passage of time and improvement in science, several chemicals came into existence that is said to impart or enhance beauty, thus used as cosmetics [3]. Using these chemical-based products can impart beauty for a particular time but it harms our skin when used for a long time. Many harmful effects have been noticed due to the usage of chemical-based products, thus now day's cosmetics industry mainly focuses on the preparation of herbal products [4]. Whether it is seasonal change to pollution,

there's several causes that can trigger acne. The zits may disappear enough, but what stays behind are acne scars! Fighting acne is still easy but dealing with those scars and dark spots is not that easy at all. They are the enemy of those who want clear and radiant skin! If you're tired of trying in-clinic treatments and are looking for a easy solution, then we suggest you use alum! Alum, which is also known as fitkari or phitkari, has amazing skin lightening benefits that can help to fade acne scars and dark spots. It can reduce blemishes, improve texture, and evens out fine lines.

ALUM

Alum is an inorganic chemical compound that is generally made up of water molecules, aluminium or other metals and sulphates. Alum is basically a hydrated double sulphate salt of aluminium. The general chemical formula for alum is $XAl(SO_4)_2 \cdot 12H_2O$. Alums can occur as minerals. For example, alunite, leucite. Aluminium percentage in an alum stone is a very small part of it (around 5%), but the most important is that when you wet the stone to apply it on your body the aluminium part is estimated to less than 0.5%, that is to say below all the safety limits describes by legal authorities. An astringent causes tissues to contract, making them shrink or tighten. People sometimes use astringents to reduce the appearance of pores on the skin.

Alum has a range of topical uses, including as an antiperspirant deodorant. It also features as an ingredient in certain products, such as styptic pencils, which help seal cuts from shaving. Alum is a term that can refer to several aluminum compounds. In cosmetics, it usually refers to potassium alum, a type of mineral salt.

Other types of alum include:

Soda Alum

Ammonium Alum

Chrome or chromium alum

Modern science view

Alum, a naturally occurring ingredient is considered to be good for tightening the skin. It has an astringent property that causes the cells to shrink and removes excess oil from the skin. Thus, Alum is used in the form of gels or creams for skin care

Ayurvedic view

Alum is an effective remedy for skin problems. Applying Alum on the affected area helps to control excess oil and tightens the skin due to its Kashaya (astringent) property.

PROPERTIES OF ALUM

Most alums tend to have an astringent and acid taste. They are odourless, colourless and often found in the form of a white crystalline powder.

- Alums are highly soluble in water (especially in hot water).
- They generally crystallize in the regular octahedral form when precipitated from aqueous solutions.

- The alum crystals can be liquified if heat is applied.
- Alums generally exist in the form of a white and transparent crystalline form.
- Its boiling point is around 200 degrees celsius.
- Its melting point is 92.5 degrees celsius.
- Its density is 1.725 g/cm³.
- They react acid to litmus.

USES OF ALUM

Some of the common uses of alum are;

- Alum is used in the baking and pickling process.
- Used in the tanning process of leather.
- As stated above used widely in the coagulation and flocculation process of water treatment.
- Acts as an acidulating agent in cooking.
- Used as a drying agent in a textile company.
- It is used as an antiseptic agent and adjuvant in vaccines.
- Acidic component of baking powder.
- Alums possess the property of anti-inflammatory agents and are commonly used in the gargling process to reduce teeth gum inflammation and pain. It is found as an ingredient in some toothpaste.[5]

Acne

Acne is one of the most common skin problems in teenagers and young adults, and causes significant emotional distress for many.

Acne is caused by inflammation in the pilo sebaceous unit, the place that harbors the hair follicle and the sebaceous gland. The sebaceous gland produces sebum, an oily substance that lubricates the skin. [6]

Four main factors cause acne:

- Excess oil (sebum) production
- Hair follicles clogged by oil and dead skin cells
- Bacteria
- Inflammation

People with darker skin types are more likely than are people with lighter skin to experience these acne complications:

- **Scars.** Pitted skin (acne scars) and thick scars (keloids) can remain long-term after acne has healed.

- **Skin changes.** After acne has cleared, the affected skin may be darker (hyperpigmented) or lighter (hypopigmented) than before the condition occurred.[7]

Properties of alum for the skin

Potassium alum has several properties that companies utilize in personal care products. Firstly, it is an astringent, meaning it causes the skin to contract or shrink. Astringents can temporarily reduce the size of pores and tighten the skin.

Alum is also bacteriostatic, which means it prevents bacteria from growing, making it useful as a preservative. It can reduce bacterial growth in personal care products and extend their shelf life.

In the production of vaccines, alum is also a common adjuvant Trusted Source, which means it enhances the immune system's response to the shot. However, scientists are not sure how it does this.

Benefits of alum for the skin

People have used alum medicinally for a long time Trusted Source. However, it is unclear if it has any long-term benefits for skin health, as there are no scientific studies on this topic. Much of what people know about alum's properties comes from anecdotal evidence or observation.

Scientists do know that alum inhibits the growth of several common strains of bacteria, including Staphylococcus and Streptobacillus. A 2014 laboratory study proved this by taking swabs from the armpits of five male participants, growing the bacteria in agar plates, and exposing them to alum.

However, this study only showed how well alum works in laboratory conditions on agar plates rather than on human skin.[8]

Toner

In cosmetics, skin toner or simply toner refers to a lotion or wash designed to cleanse the skin and shrink the appearance of pores, usually used on the face. It also moisturizes, protects, and refreshes the skin. [9]

Toners can be applied to the skin indifferent ways:

- On a cotton round. (This is the most frequently used method.)
- Spraying on to the face.
- By applying a tonic gauze facial mask—a piece of gauze is covered with toner and left on the face for a few minutes.

Types of toner

1. Skin bracers or fresheners

These are the mildest form of toners.

2. Skin tonics

These are slightly stronger and contain a small quantity of alcohol (upto20%), water, and a

humectant ingredient.

3. Acid Toners

These are a strong form of toner that typically contains alpha hydroxy acid and or beta hydroxy acid.

4. Astringents

These are the strongest form of toner and contain a high proportion of alcohol (20–60%), antiseptic ingredients, water, and a humectant ingredient.

Mechanism of action of the spray formulation:

When the button on the top of the spray bottle is pressed, it pumps the grooved button. This pumping action forces the air from the nozzle to the dip tube. Now there is a drop in the pressure of top of tube due to pressing the top button. After this difference pressure falls in the tube and the liquid is forced up from the tube. The liquid now leaves the nozzle through the actuator as small mist droplets due to pressure and applied on skin through force penetrating inside skin.

Mist Spray:-



Lab Scale Trials:

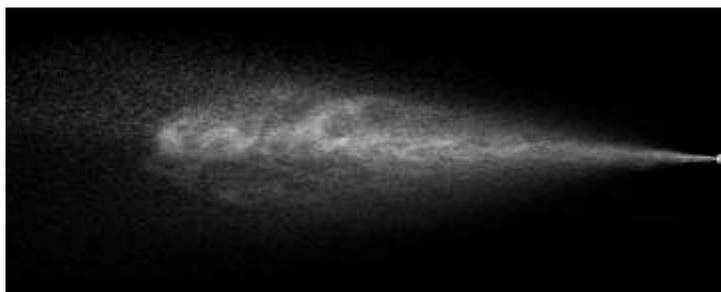
Trail 1: ALUM+HONEY+WATER

FORMULATION TABLE:

Sr. No	Ingredients	Quantity	Role of used ingredient
1.	Alum Powder	2gm	Astringent
2.	Honey	2 ml	Cleanser, Exfoliating agent
3.	Water	Q.S	Vehicle

PROCEDURE:

Water is boiled on a low flame and is added with given amount of alum powder in it. Stir properly to form homogenous solution. When uniform mixture is formed solution kept for cooling. After cooling add given amount of honey. Stir uniformly and add water till quantity sufficient. When formation formed, strain the mixture into spritzer bottle.



Result of Trial 1:

The formulation formed didn't show good odour and also showed change in consistency of the toner after a interval of time. This resulted in instability of the solution and therefore the formulation was discarded.

Trial 2: ALUM+ORANGE OIL+ROSE WATER

FORMULATION TABLE:

Sr. No	Ingredients	Quantity	Role of used ingredient
1.	Alum Powder	4gm	Astringent
2.	Orange Oil	1 gm	For glowing skin
3.	Rose Water	Q.S	Vehicle

PROCEDURE:

Water is boiled on a low flame and is added with given amount of alum powder in it. Stir properly to form homogenous solution. When uniform mixture is formed solution kept for cooling. After cooling add given amount of orange oil. Stir uniformly and add rose water till quantity sufficient. When formation formed, strain the mixture into spritzer bottle.



Result of Trial 2:

The formulation formed results in pungent smell due to the combination of orange oil and rose water. It also showed mild irritation to the skin. The formulation when applied showed stickiness and uneasy to wash off. This resulted in instability of the solution and therefore the formulation was discarded.

Trial 3: ALUM+ROSE WATER+WATER

FORMULATION TABLE:

Sr. No	Ingredients	Quantity	Role of used ingredient
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1.	Alum Powder	4gm	Astringent
2.	Rose Water	20%	Smoothing Agent
3.	Water	Q.S	Vehicle

PROCEDURE:

Water is boiled on a low flame and is added with given amount of alum powder in it. Stir properly to form homogenous solution. When uniform mixture is formed solution kept for cooling. After cooling add given amount of rose water. Stir uniformly and add water till quantity sufficient. When formation formed, strain the mixture into spritzer bottle.



Result of Trial 3:

The concentration of alum was increased for better results on skin. But resulted in skin irritation and dryness of skin. Therefore the above formulation was discarded.

Trial 4: ALUM+GLYCERIN+ROSE WATER+WATER

FORMULATION TABLE:

Formulation table

Sr. No	Ingredients	Quantity	Role of used ingredient
1.	Alum Powder	2gm	Astringent
2.	Glycerin	7 ml	Humecant
3.	Rose Water	20%	Smoothing Agent
4.	Water	Q.S	Vehicle

PROCEDURE:

Water is boiled on a low flame and is added with alum powder in it. Stir properly to form homogenous solution. When uniform mixture is formed solution kept for cooling. After cooling add given amount of glycerin and 20% rose water. Stir uniformly and add water till quantity sufficient. When formation formed, strain the mixture into spritzer bottle.

Ingredients used in a topical spray formulation

Sr. No.	Name of Ingredient	Image	Active constituent	Use/purpose
1.	Alum powder		Aluminium Potassium Sulphate	Anti Acne, Dark spot reduction, Anti Inflammatory, Tightens Skin
2.	Glycerin	-	Alpha Hydroxy Acids like Lactic Acid, Glycolic Acid, Hyaluronic Acid, Propylene Glycol, Butylene Glycol, Sorbitol	Humacent : substance that retain moisture to the skin
3.	Rose Water	-	Phenethyl alcohol, Citronellol , Geraniol	Smoothing Agent , Lightening Skin Pigmentation , Anti-Aging Activity
4.	Distilled Water	-	-	Vehicle

STABILITY TESTING:

1. Stability test at the day of manufacture:



Result: Formulation Stable.

2. Stability test after 1 month of manufacturing:



Result: Formulation Stable.

3. Stability test after 3 month of manufacturing:

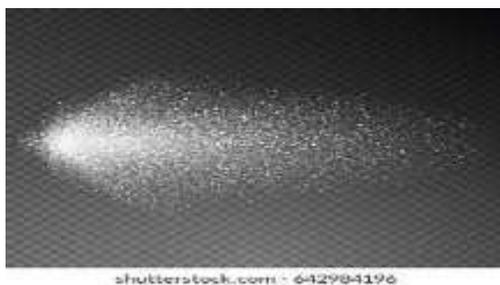


Result: Formulation Stable.

The interpretation of results on hand-



Before application of Toner



After application of Toner

Directions:

1. Rinse hands and face with warm water.
2. Cleanse face with face wash.
3. Pat skin dry.
4. Spray toner to skin and allow some time to remain on the skin.
5. Wipe out the with cotton balls or clean cloth.

6. Use when needed.

Caution:

For external use only. If swallowed, seek medical attention.

Avoid contact with eyes and mucous membranes. In case of eye contact, flush with cold water.

Keep out of reach of children.

Methods for evaluation of various physical Parameters:

1. pH-

The formulation 25ml was taken in a beaker with graduations and now the calibrated Ph meter was made stand in the formulation for sometime and reading was recorded.

2. Skin irritation-

Small amount of the mist toner was sprayed on left hand dorsal skin and kept for sometime, result was found non-irritant on the skin.

3. Stickiness-

The mist particles were not found to be much sticky in nature.

4. Skin conditioning-

The appearance of the skin after application of the mist was seen to be smooth, hydrated and supple.

5.

Sr No.	EVALUATION PARAMETER	RESULT
1	pH	7.2
2	Skin irritation	Non-irritant
3	Stickiness	No stickiness found
4	Skin conditioning	Smooth,hydrated and supple
5	Temperature variation	Stable in all condition
6	Light Exposure	No discoloration formed
7	Washability	Washable
8	Odour test	Pleasant odour
9	Uniformity	Uniform

Temperature variation

The formulation was exposed to different temperatures at 45° C and -10 ° C for 3 months to check the stability.

6. Light Exposure

The product is exposed to direct sunlight in its original packaging to see any discoloration of formulation occurs. No discoloration was seen.

7. Washability –

Applying a small amount of cream on the hand and then washing it with tap water.

8. Odour test

To determine the smell/ fragrance of product.

9. Uniformity

To determine the uniformity of substance .

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