

Formulation and Evaluation of Rice Water Toner for Skin

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Abstract: *The increasing demand for natural and sustainable skincare products has prompted the exploration of traditional remedies for modern cosmetic applications. This study focuses on the formulation and evaluation of a rice water-based toner, utilizing the bioactive compounds present in Oryzasativa (rice) to enhance skin health. Rice water, rich in amino acids, antioxidants, and vitamins such as B and E, was extracted through soaking and fermenting methods to maximize its efficacy. The toner was formulated using rice water as the primary active ingredient, with natural preservatives and essential oils to enhance stability and sensory appeal. Physicochemical evaluations including pH, viscosity, microbial load, and stability under varying storage conditions were conducted. Additionally, in vivo studies assessed the toner's effects on skin hydration, texture, and irritation potential over a four-week period in healthy volunteers. Results indicated that the rice water toner maintained stability and was well-tolerated, with participants reporting noticeable improvements in skin softness, brightness, and overall appearance. This research supports the potential of rice water as a cost-effective, safe, and beneficial ingredient in natural skincare formulations.*

Keywords: Rice water, Toner, Natural skincare, Oryzasativa, Skin hydration, Cosmetic formulation

I. INTRODUCTION

Nowadays, many people prefer natural and chemical-free products for their skin. One such natural ingredient is rice water, which is the water left after soaking or boiling rice. It has been used for many years, especially in Asian countries, because it is believed to make the skin smooth, glowing, and healthy. Rice water contains vitamins, minerals, and antioxidants that can help in improving skin texture, reducing dark spots, tightening pores, and slowing signs of aging. Because of these benefits, rice water is now being used in beauty and skincare products.

A toner is a skincare product used after washing the face. It helps clean any leftover dirt, balances the skin's pH, and prepares the skin to absorb creams or lotions better. Making a toner using rice water can give a natural and gentle product that is safe to use every day. In this study, we are preparing a rice water toner and testing its properties like appearance, stability, pH, and effect on the skin. The main aim is to create a simple, affordable, and effective herbal toner that can improve skin health naturally.

Rice water is a nutrient-rich, starchy liquid obtained by soaking, rinsing, or boiling rice, and has been used for generations as a natural remedy in traditional Asian beauty and health practices. This cloudy liquid is not merely a by-product of rice preparation—it is a natural elixir filled with vitamins (especially B-complex like B1, B2, B3, and B6), vitamin E, amino acids, antioxidants, and minerals such as zinc, magnesium, and potassium. In skincare, rice water acts as a natural toner, helping to brighten the complexion, tighten pores, balance sebum production, and calm inflammation or redness. It also supports the skin's barrier function and can aid in healing acne and minor irritations. In haircare, rice water helps to detangle strands, reduce split ends, promote hair growth, and increase shine due to the presence of inositol—a carbohydrate that strengthens and protects hair over time. Its versatility, affordability, and chemical-free nature have made rice water a timeless beauty treatment that is now being reintroduced and celebrated in modern cosmetic formulations worldwide. Despite its simple appearance, rice water is a scientifically supported and culturally treasured substance, deeply rooted in natural wellness traditions.



ADVANTAGES OF RICE WATER

- Natural and gentle – It is free from harmful chemicals, making it suitable for sensitive and acne-prone skin types.
- Hydrating and soothing – Helps calm inflamed or irritated skin while locking in moisture.
- Brightens skin tone – Regular use improves dullness and promotes a radiant glow.
- Tightens pores – Acts as a mild astringent that refines skin texture and minimizes large pores.
- Cost-effective – Easily prepared at home, making it a budget-friendly skincare option.
- Anti-aging effects – Contains antioxidants that protect the skin from early signs of aging.
- Balances pH level – Helps maintain the natural pH of the skin barrier.

HOW IT WORKS

Rice water toner works through a combination of hydration, nourishment, and gentle exfoliation:

- **Hydration and Barrier Repair:** Amino acids and inositol in rice water deeply hydrate the skin and support skin cell regeneration. Inositol also improves elasticity and helps repair the skin barrier.
- **Antioxidant Protection:** Ferulic acid and vitamin E act as antioxidants, protecting the skin from oxidative stress caused by pollution and UV rays.
- **Exfoliation and Brightening:** Phytic acid gently removes dead skin cells and impurities, leading to brighter, smoother skin.
- **Anti-inflammatory Action:** The starch and minerals have calming effects that reduce redness, irritation, and inflammation, especially in sensitive or acne-prone skin.

BENEFITS FOR SKIN

- Improves skin texture – Makes skin feel softer and smoother.
- Evens skin tone – Reduces hyperpigmentation, dark spots, and sun damage.
- Controls oil – Helps balance sebum production, beneficial for oily or combination skin.
- Treats acne – Its anti-inflammatory and antibacterial properties help calm breakouts.
- Delays aging – Antioxidants and vitamins help in reducing the appearance of fine lines and wrinkles.

II. LITERATURE REVIEW

Ayurvedic Use: Rice water has been used in Ayurvedic medicine for treating skin ailments like rashes and inflammation.

Sivarajan & Balachandran, 1994 – Ayurvedic Pharmacopoeia of India .Scientific Validation – Barrier Function:

Matsumoto et al., 2002, in the International Journal of Cosmetic Science, reported that rice starch water improved skin barrier function and reduced irritation in patients with atopic dermatitis.

Modern Cosmetic Applications:

Kim et al., 2010, in the Asian Journal of Beauty and Cosmetology, showed that fermented rice water improved skin hydration and had mild whitening effects, supporting its use in modern toners.

Traditional Use in Asia: Rice water has been historically used in Japan, China, and Korea for skincare. Women in ancient Asia used it as a natural toner for skin glow and smoothness. *(No specific author – historical cultural practice)*

Heian Period (794–1185 AD), Japan: Japanese court ladies during the Heian period used rice water (*komenukayu*) for washing their faces to maintain fair and soft skin. *(Referenced in historical beauty manuscripts – no specific scientist)*

Yao Women – China:

The Yao women of Huangluo village use fermented rice water for skin and hair care. Their traditional knowledge was later highlighted in ethnobotanical studies.

Zhang et al., 2010 – Documented traditional cosmetic practices in rural China.



OBJECTIVES

- To make a natural skin toner using fermented rice water because it is known to be good for the skin — it helps to keep the skin fresh, glowing, and calm.
- To prepare a safe and stable toner by adding other helpful ingredients like preservatives (to avoid spoilage), moisturizers, and pH adjusters.
- To check the basic properties of the toner like its pH, thickness, smell, color, and how well it stays the same over time.
- To test the toner for germs and see if the added preservatives are working properly to keep it safe to use.
- To make sure the toner is safe for skin and comfortable to use by testing it on a small patch of skin or asking people to try it and give feedback.
- To compare fermented rice water with plain (non-fermented) rice water and see which one works better for the skin.
- To check how long the toner can stay good by testing it under different storage conditions (like heat, light, etc.).

PLAN OF WORK: (table no. 1)

Sr no	Activity	Details
1	Selection of raw material	Rice(white, brown) , rose water, alovera, glycerine , preservati
2	Washing and soaking of rice	Clean and soak rice in distilled waterfor 24 hrs
3	Filtration of rice water	Use muslin clothorwhatman filter paper
4	Preparation of formulation	Mix all ingredients in sterile condition
5	pH adjustment	Use citric acid or NaOH to adjust pH(4.5-6.0)
6	Filling and storage	Fill in sterile . Store in cool and dry place
7	Physicochemical evaluation	Check pH , colour,odor, clarity, viscosity
8	Stability studies	Store at different temperatures evaluate at intervals(0, 7, 14, 30 days)
9	Microbial testing	Total bacteria and fungal count using standard plate method
10	Phytochemical screening	Performs test for flavonoids, phenols, carbohydrates
11	Skin compatibility test	Patch test compatibility test on human volunteer (24 hr observation)
12	Documentation and conclusion	Record results , analyze data

INGREDIENTS USED FOR 100 ML FACE TONER(table no.2)

Ingredients	Quantity	Purpose
Rice water extract	70 ml	Active ingredient (skin brightening)
Rose water	20 ml	Fragrance, toner
Aloevera gel	5ml	Soothing, moisturizing
Glycerine	2 ml	Humectant (prevent dryness)
Sodium benzoate	0.5 g	Preservative
Citric acid / NaOH	q. s to adjust pH	pH adjuster
Distilled water	To make up 100 ml	Solvent / base

III. METHOD OF PREPARATION

Preparation of rice water extract

Weigh 100 g of raw white rice (preferably unpolished or organic variety).

Wash the rice thoroughly with distilled water 2–3 times to remove dirt and excess starch.

Transfer the clean rice into a sterilized 500 mL glass beaker.

Add 300 mL of distilled water to the rice



Cover the beaker with aluminum foil or a sterile lid to avoid contamination.
Allow the rice to soak for 24 hours at room temperature ($25 \pm 2^\circ\text{C}$).
Stir the mixture gently every 4 hours using a sterilized glass rod to enhance extraction.
After 24 hours, filter the mixture:
First through a muslin cloth to remove solid particles.
Then through Whatman No.1 filter paper to obtain a clear rice water extract



Fig (1) : preparation of rice extract

Formulation of rice water face toner

Take 70 mL of the rice water extract in a sterile glass beaker.
Add 20 mL of rose water to the extract and mix gently.
Incorporate 5 mL of pure aloe vera gel into the mixture for soothing properties.
Add 2 mL of glycerin to act as a humectant and moisturizer.
Add 0.5 g of sodium benzoate as a preservative to inhibit microbial growth
Stir the mixture continuously for 15–20 minutes using a magnetic stirrer under aseptic conditions to ensure homogeneity.
Measure the pH of the formulation using a digital pH meter.
Adjust the pH to 5.5 ± 0.2 using either:
0.1 N citric acid (to decrease pH), or 0.2
0.1 N sodium hydroxide solution (to increase pH), if necessary.
Filter the final formulation again through Whatman filter paper to remove any particulate matter and improve clarity
Transfer the toner into sterilized spray bottles to protect it from light and store in a cool, dry place (preferably in a refrigerator).

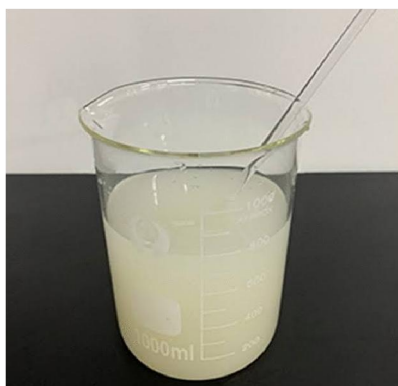


Fig (2) :Rice extract



fig (3) Rice water toner



EVALUATION PARAMETER : (table no.3)

Parameter	Method used	Observation
Colour	Visual inspection	Milky white to translucent
Odor	Sensory evaluation	Mild , pleasant, characteristic rice aroma
pH	Litmus paper	4.5-5.5 (mildly acidic ,skin friendly)
Clarity	Visual observation	Clear to slightly turbid ,no visible particles
Viscosity	Flow time method (simple funnel)	Measured the time taken in second for 10 ml of toner to flow through a standard funnel , longer time indicates higher viscosity
Stability	Store at RT 4°C , 40°C for 14 days	No phase separation, colour or odor change
Microbial load	Plate count method	Total bacterial count less than or equal to 100 CFU/ml,
Patch test	Application on human volunteer n=10	No irritation, redness or allergic reaction

RESULT : (table no.4)

Parameter	Result	Remark
Colour	Milky white to translucent	Natural appearance preserved
Odor	Mild , pleasant rice aroma	Characteristic and acceptable
pH	4.5-5.5	Mildly acidic, skin friendly
Clarity	Clear to slightly turbid, no visible particles	Proper filtration achieved odor change
Viscosity	Average flow time 12 sec for 10 ml through funnel	Low viscosity water like consistency
Stability	No phase conversion, colour and odor change in 14 days	Physically and chemically stable
Microbial load	Total bacterial count 45 CFU /ml No pathogens detected	Within acceptable cosmetic limit

IV. CONCLUSION

The formulated rice water face toner demonstrated desirable physicochemical properties including a mildly acidic pH compatible with skin, clear appearance, pleasant natural aroma, and low viscosity suitable for easy application. Stability studies confirmed the formulation remained physically and chemically stable under various storage conditions. Microbial evaluation showed the product to be safe, with microbial counts within acceptable limits and no pathogenic contamination. Additionally, patch testing indicated that the toner is non-irritating and safe for topical use. Overall, the rice water toner developed in this study is a promising natural skincare product with potential benefits for skin hydration and soothing effects .

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