



Unlocking the Potential of Rice Water in Trichology: A Review of Bioactive Components and Their Effects

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Abstract

The replenishing and rejuvenating qualities, rice water—the starchy liquid that remains after immersing or boiling rice—has long been used as part of conventional hair care rituals, especially in East Asian countries. The possible health advantages of this natural treatment for hair are attributed to its abundance of vital elements, such as inositol, vitamins (including B vitamins), minerals, amino acids, and antioxidants. Claims that rice water stimulates hair follicles, improves texture, adds shine, and moisturizes the scalp have sparked a recent spike in interest in using it as a hair treatment. But rice water has long been used to treat hair, there is still no scientific proof of its efficacy, but it is growing and shows promise in promoting hair health and lowering breakage. The increasing usage of rice water during hair care products and therapy, including shampoos, conditioners, masks, creams and serums and leave-in treatments, is examined in this paper. It has been demonstrated that the beneficial compounds in water extracted from rice, such as inositol, increase hair strength by mending damaged hair, increasing elasticity, and decreasing frizz. Furthermore, rice water may be used to cure dryness and dandruff on the scalp as well as to promote hair development. As the market for sustainable and natural beauty products grows, rice water has become a popular component for consumers and producers looking for environmentally responsible substitutes.

Keywords: Replenishing; Rejuvenating; Frizz; Scalp; Dandruff

Introduction

The several generations, people from many cultures, particularly in Asia, have utilized rice water—the liquid that is produced by boiling or soaking rice—for its possible health and cosmetic advantages. Rice water's therapeutic qualities and applications in complementary and alternative medicine are being investigated more and more in pharmacies. Additionally, it is being researched for its use as a component in personal care products, dietary supplements, and topical therapies in pharmaceutical formulations. Along with vital minerals and amino acids, this packed with nutrients solution is bursting with crucial vitamins B, C, and E [1]. It is a powerful treatment for enhancing hair texture, gloss, and general

vitality because of its nourishing, rejuvenating, and strengthening qualities. Because of this, rice water is now a well-known and praised component of hair care products in many cultures worldwide [2].

Human hair

The main protein component of human hair is keratin, a spongy, sulfur-rich protein that makes up 65–95% of the hair's weight and gives it strength, flexibility, and durability [3]. Human hair also includes lipids, colors, trace minerals, and water (about 32%) in addition to keratin. All of these elements work together to give the hair its overall functioning and longevity. Keratin provides hair

its strong qualities by forming a complex, layered structure. The structure and order of these kinds of proteins also greatly influence the physical attributes of hair, including its texture and form. The architecture of the follicles that grow hair has a major role in determining the form of hair; small ones give the formation of finer, “vellus” hairs, like those on the body, while bigger follicles generate thicker, “terminal” hairs, like those on the scalp. A person’s hair type, which differs depending on their ethnicity, is also influenced by the curvature of their hair follicles [4].

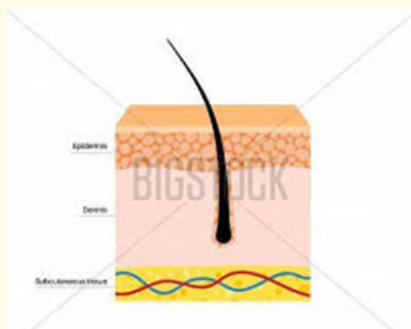


Figure 1: Human Hair.

Background

Rice water has a long history of use in hair care, particularly in Asian cultures where it has been valued for generations for its capacity to preserve and nourish hair. Because of its ease of use and potency in fostering hair health, rice water has been a traditional natural cure for centuries, whether it was utilized by ancient Chinese royal women or contemporary beauty lovers. It is still a common option in both contemporary hair care techniques and conventional beauty regimens around the globe. Not just in China is rice water used for hair treatment [3,5]. Women in Japan’s Imperial Court had started employing a rice treatment process for water known as “Yu-Su-Ru” to maintain thick, glossy, and robust hair about 1,200 years ago. In a similar vein, rice water was frequently used in hair care routines throughout East and Southeast Asia, including Korea, Thailand, Cambodia, among Indonesia. These ancient custom highlights the broad cultural significance of rice water as a hair-nourishing and hair-strengthening agent.



Figure 2: Fermented Rice Water.

Pharmacological properties

A number of pharmacological characteristics of rice water, which is made by boiling or soaking rice, add to its medicinal and aesthetic advantages. Among these attributes are:

- **Antioxidant Activity:** Compounds in rice water aid in the body’s defense against free radicals, lowering oxidative stress and shielding cells from harm. This can promote general health and shield the skin from environmental harm and early aging [6].
- **Anti-inflammatory Effects:** It has been demonstrated that rice-based water has anti-inflammatory qualities that can help calm inflamed skin, lessen redness, and ease psoriasis and eczema [5].
- **Anti-aging:** Rice water’s high antioxidant and vitamin E concentration can help reduce wrinkles, increase skin suppleness, and promote collagen production—all of which assist in slowing down the obvious indications of aging [4].
- **Anticancer and Antitumor:** According to certain research, rice water may have antitumor and anticancer properties, especially due to its polyphenolic components. Although further study is required to completely establish these effects, these chemicals are believed to prevent the proliferation of cancer cells and decrease the spread of tumours [7].
- **Anti-mutagenic:** Rice water has anti-mutagenic properties that might lower the incidence of genetic abnormalities and associated illnesses by shielding DNA from alterations brought on by dangerous substances [5,7].
- **Anti-colitis:** According to certain research, rice water may offer protection against inflammatory bowel conditions like colitis. Rice water’s calming qualities may promote digestive health and lessen gastrointestinal inflammation.

Rice water hair benefits

Utilizing rice water on a regular basis can enhance hair in a number of ways, including:

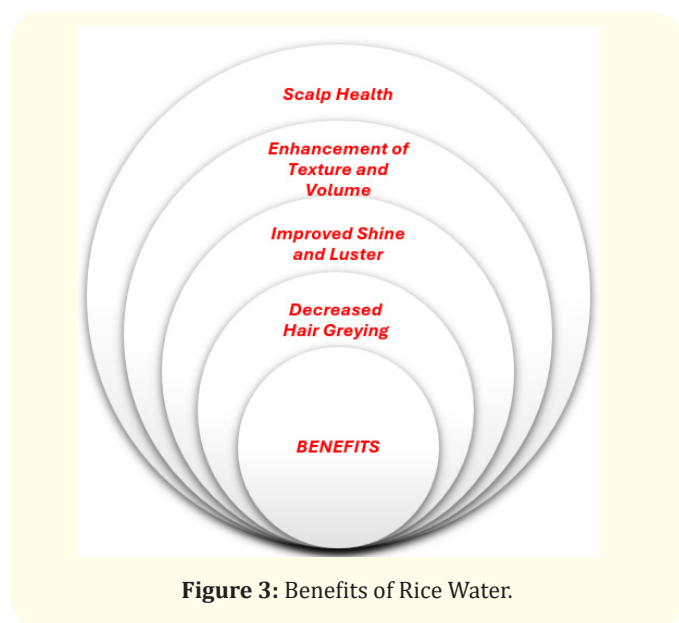


Figure 3: Benefits of Rice Water.

- **Improved Shine and Luster:** The nutrients in rice water aid in cuticle smoothing, which reflects light off hair strands for a healthier, glossier appearance [8].
- Rice water's proteins and lipids help strengthen hair from root to tip, preventing split ends and breakage.
- **Enhancement of Texture and Volume:** Adding volume to thin or limp hair makes it seem fuller and thicker.
- **Scalp Health:** By nourishing the scalp, the vitamins and amino acids in rice water provide a more favourable environment for hair development. Additionally, it helps support pH balance and scalp moisture.
- **Decreased Hair Greying:** Rice water can help postpone premature graying and keep hair looking vibrant and youthful for longer by feeding the hair follicles and preserving the strength of hair strands [9].

Plant information

Rice is a type of grain that grows well in warm regions and in fields that are frequently flooded. It is one of the most significant

staple crops in the world, especially in Southeast Asia, where it is essential to traditional medicine, agriculture, and cooking.

- **Botanical Name:** *Oryza sativa* Linn.
- **Biological Source:** Rice grains, which consist of the embryo and endosperm of the seeds of *Oryza sativa*.
- **Family:** Poaceae (also known as Graminae).

Scientific classification

- **Kingdom:** Plantae (plants)
- **Subkingdom:** Viridiplantae (green plants)
- **Super division:** Embryophyta
- **Division:** Tracheophyta (vascular plants)
- **Subdivision:** Spermatophytina (seed plants)
- **Class:** Magnoliopsida
- **Family:** Poaceae (grasses)
- **Genus:** *Oryza* L. (rice)
- **Species:** *Oryza sativa* L. (rice)



Figure 4: *Oryza sativa* Linn.

Rice water's nutritious make-up for hair

Rice water has several important ingredients that support its positive benefits on hair health. The following are some of the primary nutrients present in rice water:

- **Proteins (16%):** A significant quantity of protein, which is necessary for hair growth and strength, is present in rice water. Proteins make hair stronger and less likely to break by promoting general resilience and repairing damaged hair strands [9].

- **Lipids and triglycerides (10%):** These fats contribute to better moisture retention in the hair, which results in shinier, smoother hair strands. Additionally, they aid in cuticle sealing, which reduces frizz and improves texture.
- **Starch (9%):** A carbohydrate that gives hair strength and volume, starch is abundant in rice water. Starch gives thin or limp hair body and a fuller look by thickening the hair strands [10].
- **Carbs:** Rice water provides additional carbs besides starch, which enhance hair texture and create an optimal climate for hair growth. Inositol is a carbohydrate that strengthens hair shafts from the root, which is important for encouraging healthy hair development. It also helps to lessen split ends and heal damaged hair.
- **Phytic acid:** This type of antioxidant aids in protecting hair from environmental harm and oxidative stress. In addition to promoting nutrient absorption inside the hair follicle, phytotic acid can eventually lead to better hair [9,10].
- **Scalp Health:** By nourishing the scalp, the vitamins and amino acids in rice water provide a more favourable environment for hair development. Additionally, it helps support pH balance and scalp moisture.
- **Decreased Hair Greying:** Rice water intake can help postpone premature graying and keep hair looking vibrant and youthful for longer by feeding the hair shafts and preserving the strength of the hair strands [13].

Scientific evidence

Although rice water has been used for generations, there is currently no scientific proof that it is beneficial for hair health. Nonetheless, some research and anecdotal data indicate that it could help strengthen hair and enhance scalp health.

Uses of rice water for hair

Depending on one's hair type and personal choice, there are several simple methods to include rice water into a hair management routine:

- **Natural Shampoo:** A natural substitute for conventional soap is rice water. Just work the water made with rice into the hair and scalp, let it sit for a few minutes, and then give it a good rinse. This technique nourishes the hair and aids in scalp cleansing [11].
- **Final Rinse:** You can use rice water as a last rinse after shampooing your hair. Rice water's nutrients aid in cuticle sealing, making hair smoother, glossier, and easier to manage.
- **Hair Soak:** You may use rice water as a hair bath to provide your hair with deeper nutrients. Before washing it out, let the hair soak in rice-based water for 20 to 30 minutes. Over time, this technique aids in damage repair and increases the hair's ability to absorb nutrients [12].
- **Increased Sheen and Luster:** The minerals and vitamins in rice water aid in the smoothing of the hair cuticle, which makes it possible for light to bounce off the fibres and give the appearance of healthier, shinier hair. Rice water's proteins and lipids help strengthen hair from base to tip, preventing split ends and breakage.
- **Enhancement of Texture and Volume:** Adding volume to thin or limp hair makes it seem fuller and thicker.
- **Research on Inositol:** Inositol, a crucial ingredient in rice water, may be able to help mend damaged hair and keep it from breaking, according to research released in the European Journal of Beauty Science. This demonstrates the potential of rice water as a hair-strengthening agent [14].
- **Traditional Use:** For many centuries, rice water has been used for hair care in many cultures, especially in Asia, where it is said to provide advantages including smoothness, gloss, and less hair loss. Even though anecdotal accounts have extensively established these advantages, more clinical research are required to validate the scientific foundation [13,15].
- **Research on Rice Protein and Hair Care (2011):** Research examining the effects of dissolved rice proteins in hair care formulations was published in the Worldwide Journal of Cosmetic Science. According to the study, rice protein improved hair's ability to retain moisture, making it smoother and easier to manage. Given its protein composition, this implies that rice water could have a comparable moisturizing and conditioning impact on hair.
- **Fermentation Study (2020):** A study in Scientific Reports studied the health advantages of fermented rice and the improved antioxidant capacity in the fermented product. While the study largely focused on the intake of ferment rice, it suggested that the liquid that fermentation produces might have increased capabilities due to larger quantities of beneficial chemicals including phenolic chemicals and amino acids, all of which could be applied to hair care.

Potential risk and challenges

Although rice water has received a lot of acclaim for its possible advantages in hair care, it’s crucial to recognize that, similar to any natural cure, not everyone will benefit from it. The effects of utilizing water extracted from rice for hair care are still being studied by scientists, and there are a number of factors and possible hazards to be mindful [16].

- **Protein Sensitivity:** People with protein-sensitive hair in particular may be hypersensitive to the acids in rice water. Overuse of water made from rice may result in protein excess, which can make hair dry, brittle, or stiff. It’s advised to utilize rice water treatments sparingly and monitor your hair’s reaction.

- **Freshness and Storage:** To prevent bacterial development, rice water has to be kept correctly. Rice water made at home should be stored in the refrigerator and used within some time to avoid spoiling.
- **Patch Test:** To make sure you won’t experience an allergic response, it’s best to conduct a small test on a tiny section of skin prior to applying rice water to your scalp.
- **Allergy Reactions and Scalp Sensitivity:** Even though the water from rice is usually thought to be healthy, some people may be sensitive to the proteins, starch, or other substances in it or have allergic responses. This may result in redness, itching, peeling, or irritation of the scalp [17].

Marketed formulation

S. no	Categories	Marketed Product	Features
01	Shampoos	Pantene Pro-V Rice Water Shampoo Shea Moisture Rice Water Shampoo	Strengthens and fortifies hair strands Reduces hair fall and breakage
02	Conditioners	L’Oréal Paris Elvive Rice Water Conditioner Mielle Organics Rice Water Clay Mask	Moisturizes and softens hair Protects against breakage and split ends
03	Hair Masks	Garnier Fructis Grow Strong Rice + Ginseng TRESemmé Pro-Collection Rice Water and Vitamin B12 Strengthening Mask	Restores damaged hair Rebuilds hair’s natural strength and elasticity
04	Leave-In Conditioners and Sprays	Dove Rice Water and Cucumber Leave-In Conditioner Creme of Nature Rice Water and Aloe Leave-In Conditioner:	Provides lasting hydration Helps reduce frizz and adds smoothness
05	Scalp Treatments	Ordinary Multi-Peptide Serum for Hair Density Rice Water & Aloe Scalp Treatment by Hairvivi	Reduces scalp inflammation and dandruff Hydrates and soothes the scalp
06	Hair Serums	L’Oréal Paris Elvive Dream Lengths Super Detangler Serum WOW Skin Science Rice Water Serum	Adds shine and smoothness Protects against heat styling damage
07	Hair Growth Products	Wild Growth Hair Oil Wild Growth Hair Oil	Prevents hair thinning and shedding Strengthens hair from the roots to tips

Table 1

Future prospective

In East Asia in particular, rice water has been utilized for millennia to support strong, healthy hair in conventional hair care practices. In the current hair care market, rice water has drawn a lot of interest due to its rich vitamin profile, which includes vitamins, minerals, amino acids, and antioxidants. The potential of rice water in hair care appears ready for further research and development in the future, given the growing customer desire for natural

and environmentally friendly alternatives. its long-term, organic advantages [19]. New formulations that are mixtures with other natural substances, and innovative techniques like nanotechnology may improve the efficacy of rice water as study continues. Additionally, rice water may become a more popular and environmentally beneficial component in cosmetics for hair as a result of the cosmetics or wellness sectors’ growing emphasis on sustainability [20].

Rice water having the chance to become a standard component in the worldwide hair care industry due to its rich nutritional profile and numerous uses, providing customers with an easy-to-use and all-natural way to get healthier hair [19,21].

Conclusion

A great deal of vitamins, minerals, amino acids, and antioxidants, rice water has drawn a lot of attention for its possible uses in hair care. Rice water has been used for millennia, especially in East Asia, and has shown promise as a natural treatment for improving the health of hair. Promoting hair development, strengthening hair, increasing softness and luster, decreasing breakage, and boosting scalp health are just a few of its many advantages. The usefulness of rice water in restoring hair is supported by a substantial number of personal experiences and traditional use, even as the scientific proof for these assertions keeps growing. It is a desirable component in the current hair care industry because of its capacity to preserve scalp health, promote hair development, and enhance hair texture [22].

The use of water made from rice in hair care has a promising future. The full potential of rice water in cosmetics will probably be better realized with developments in formulating technological advances, such as nanoparticles and individualized treatment. Ice water is still a useful and adaptable component in hair care products, with both real-world uses and a lot of room for creativity. In order to assist individuals, obtain thicker, healthier hair naturally, rice water is expected to become an increasingly more important part of contemporary hair care regimens as more scientific studies and public awareness grow [22,23].

Bibliography

1. Cruz C F, *et al.* "Human hair and the impact of cosmetic procedures: A review on cleansing and shapemodulating cosmetics". *Multidisciplinary Digital Publishing Institute (MDPI)* 3(2016): 3.
2. Milner Y, *et al.* "Exogen, shedding phase of the hair growth cycle: Characterization of a mouse model". *Journal of Investigative Dermatology* 119.3 (2002): 474-481.
3. Plikus MV and Chuong C M. "Complex hair cycle domain patterns and regenerative hair waves in living rodents". *Journal of Investigative Dermatology* (2008).
4. Tobin D J. "Ageing of hair follicle pigmentation system". *International Journal of Trichology* 1.2(2009): 83-93.
5. Mesler A L, *et al.* "Hair follicle terminal differentiation is orchestrated by distinct early and late matrix progenitors". *Cell Report* 19.4(2017): 809-821.
6. Kruglikov I L and Scherer P E. "Dermal adipocytes and hair cycling: Is spatial heterogeneity a characteristic feature of dermal adipose tissue depots?" *Experimental Dermatology* 25.4 (2016): 258-262.
7. Geyfman M, *et al.* "Resting no more: Re-defining telogen, the maintenance stage of the hair growth cycle". *Biological Reviews of the Cambridge Philosophical Society* 90.4 (2015): 1176-1196.
8. Lyle S, *et al.* "Human hair follicle bulge cells are biochemically distinct and possess an epithelial stem cell phenotype". *Journal of Investigative Dermatology Symposium Proceedings* 4.3 (1999): 130-136.
9. Mistriotis P and Andreadis S T. "Hair follicle: A novel source of multipotent stem cells for tissue engineering and regenerative medicines". *Tissue Engineering Part B: Reviews* 19.4 (2013): 265-278.
10. Martel J L, *et al.* "Anatomy, Hair Follicle". StatPearls (2018).
11. Hsu Y C, *et al.* "Dynamics Between Stem Cells, Niche, and Proliferation in the Hair Follicle". *Nature* 144.1 (2011): 92-105.
12. Plikus MV. "New activators and inhibitors in the hair cycle clock: Targeting stem cells' state of competence". *Journal of Investigative Dermatology* 132.5 (2012): 1321-1324.
13. Berg D, *et al.* "Promotion of anagen, increased hair density and reduction of hair fall in a clinical setting following identification of FGF5-inhibiting compounds via a novel 2-stage process". *Clinical, Cosmetic and Investigational Dermatology* 10 (2017): 71-85.
14. Schneider MR, *et al.* "The hair follicle as a dynamic mini-organ". *PubMed.Gov* 19.3 (2009): 192-198.
15. Higgins CA, *et al.* "From telogen to exogen: Mechanisms underlying formation and subsequent loss of the hair club fiber". *Journal of Investigative Dermatology* 129.9 (2009): 2144-2147.

16. Rodriguez CN. "Identifying quiescent stem cells in hair follicles". *Methods in Molecular Biology* 1827 (2018): 137-147.
17. Wang K., et al. "ANNOVAR: Functional annotation of genetic variants from high-throughput sequencing data". *Nucleic Acids Research* 38.16 (2010): e120.
18. https://ijprajournal.com/issue_dcp/Formulation%20and%20Evaluation%20of%20Fermented%20Rice%20Water%20Herbal%20Shampoo%20For%20Antihairfall%20Activity.pdf
19. Meduri Teja Sri., et al. "Formulation and Evaluation of Fermented Rice Water Herbal Shampoo". *Journal of Drug Delivery and Therapeutics* 11.4 (2021): 127-130.
20. Barsagade PD., et al. "A formulation of face pack and hair products of rice water for the use of face and hair problem". *Journal of Cosmetics and Pharmaceutical Sciences* 9.4 (2020): 683-694.
21. Umadevi M., et al. "Rice: Traditional medicinal plant in India". *Journal of Pharmacognosy and Phytochemistry* 1.1 (2012): 6-12.
22. Harrison S and Sinclair R. "Telogen effluvium". *Clinical and Experimental Dermatology* 27.5 (2002): 540-546.
23. Erdoğan B. "Anatomy and Physiology of Hair". *Journal of Dermatology Research* 30 (2017): 67-73.