

Glutathione Face Wash: A Comprehensive Review of Skin Benefits and Applications

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ABSTRACT: Glutathione, a potent endogenous antioxidant, has been harnessed for its properties in promoting antioxidant protection, skin brightening, and potential anti-aging effects, has gained popularity in the skincare industry, especially in the form of face wash products. Glutathione is conveniently accessible in various forms for diverse applications. For topical use, it is found in serums, lotions, face washes, and creams. In addition, for oral consumption, it is available in the form of regular tablets, effervescent tablets, oral sprays, and syrup. We discuss its role in promoting skin health, reducing hyperpigmentation, and enhancing overall complexion, mechanisms of action, scientific evidence, safety considerations, and real-world experiences associated with glutathione face wash. Furthermore, we address the safety and efficacy of glutathione face wash and the future trends in this evolving field. This comprehensive review explores the skin benefits and applications of glutathione face wash, a recent addition to the skincare industry that has garnered significant attention for its potential to enhance skin health and appearance. This review also provides an in-depth analysis of the marketed glutathione face wash product and it concludes by highlighting the promising future prospects of this product in the ever-evolving landscape of skincare.

Keywords: Glutathione, Antioxidant, Skincare, Glutathione face wash, Anti-aging effect.

I. INTRODUCTION:

Glutathione, is an endogenous peptide with an essential antioxidant property found within the body, has been harnessed for its potential in skincare products. Glutathione, often abbreviated as GSH, is an integral component of cellular metabolism, consisting of a tripeptide structure comprised of the amino acid's such as glycine, cysteine, and glutamic acid. ⁽¹⁾It is commonly found in the liver within a concentration of 10 mmol l⁻¹. It plays a vital role in the biotransformation of xenobiotic compounds and

functions as a safeguard for the body against reducing agents. The process of glutathione conjugation, facilitated by a group of enzymes known as glutathione transferases, actively supports detoxification by capturing electrophilic substances that might otherwise bind to proteins or nucleic acids, potentially causing cellular harm and genetic mutations. Notably, studies have identified binding sites within the central nervous system with true specificity for glutathione (GSH), a crucial prerequisite for recognizing GSH's potential role as a neuromodulator, in addition to its diverse range of functions. ⁽²⁾

Glutathione exists in two interchangeable forms:

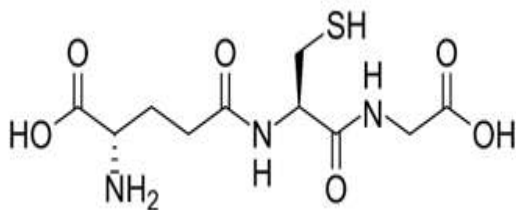
1. Reduced Glutathione (GSH or L-Glutathione): This represents the active, functional state of the antioxidant.
2. Oxidized Glutathione (GSSG): Conversely, this form represents the inactive state of Glutathione.

Due to its non-irritating nature, glutathione is suitable for topical application on all skin types, including sensitive skin. It can be directly applied to the skin after facial cleansing, both in the morning and evening. Notably, it is not photosensitive, although the additional application of sunscreen is advisable. Topically, oxidized glutathione is accessible in the form of a 2% w/w solution, often combined with other ingredients. Visible results can be observed in as little as 6 weeks with regular, twice-daily use. ⁽³⁾

The recent hype surrounding the antimelanogenic properties of glutathione has resulted in physicians frequently administering it as a "wonder" drug for skin lightening and treatment of hyperpigmentation, especially in ethnic populations with darker skin tones. Glutathione face wash products claim to offer a range of benefits, from antioxidant protection to skin lightening. This review examines the science behind these claims and their implications for skincare. ⁽⁴⁾

Understanding Glutathione-

Glutathione (GSH) is an important tripeptide that finds extensive applications in the pharmaceutical, food, and cosmetic industries. At industrial level glutathione is produced by fermentation using *Saccharomyces cerevisiae* species, and the inclusion of various amino acids in the fermentation process has the potential to increase intracellular GSH content.⁽⁵⁾ It is an essential antioxidant found in plants, fungi, animals, and some bacteria and archaea. Glutathione is able to prevent damage to important cellular components caused due to the sources such as reactive oxygen species, free radicals, peroxides, lipid peroxides, and heavy metals. It is a tripeptide compound with a composed of glycine, cysteine, and glutamic acid and contain a gamma peptide linkage between the carboxyl group of the glutamate side chain and cysteine.⁽⁶⁾



Biosynthesis and occurrence-GSH is synthesized intracellularly by the consecutive actions of γ -glutamylcysteine (step 1) and GSH (step 2) synthetases:

- In first step, γ -glutamylcysteine is synthesized from cysteine and L-glutamate. Glutamate–cysteine ligase (GCL, glutamate cysteine synthase) enzyme require for this conversion.
- In second step, glycine is added to the C-terminal of γ -glutamylcysteine. Glutathione synthetase act as a catalyst for this step.

The synthesis of GSH is typically constrained by the availability of cysteine, making

it the commonly limiting substrate in this process. Intracellular glutathione is exported from most cells, but it is not significantly taken up by cells under normal conditions. Once outside of the cell, the γ -glutamyl bond of GSH may be cleaved by the membrane bound γ -glutamyl.^(6,7)

Occurrence- Glutathione is the most abundant thiol present in all mammalian tissues in animal cells that defends against oxidative stress, ranging from 0.5 to 10 mmol/L. It is distributed in both the cell's cytosol and its various organelles. Human beings synthesize glutathione, but a few eukaryotes do not, including some members of Fabaceae, *Entamoeba*, and *Giardia*.^(8,9)

The Mechanism of Glutathione Face Wash-

Glutathione is accessible in the commercial market in the form of face washes and creams.⁽¹⁰⁾ The application of topical 2.0% oxidized glutathione has the potential to enhance skin complexion in sun-exposed areas, as evidenced by changes in the skin melanin index.⁽¹¹⁾

What is in a glutathione face wash?

- Glutathione
- Vitamin C
- Niacinamide
- Kojic acid/kojic acid Di palmitate
- Licorice extract
- Ascorbic acid
- Arbutin
- Hyaluronic acid⁽¹²⁾

A detailed examination of how glutathione face wash products claim to work, including the reduction of oxidative stress, prevention of melanin synthesis, and potential anti-aging effects, is discussed in this section.

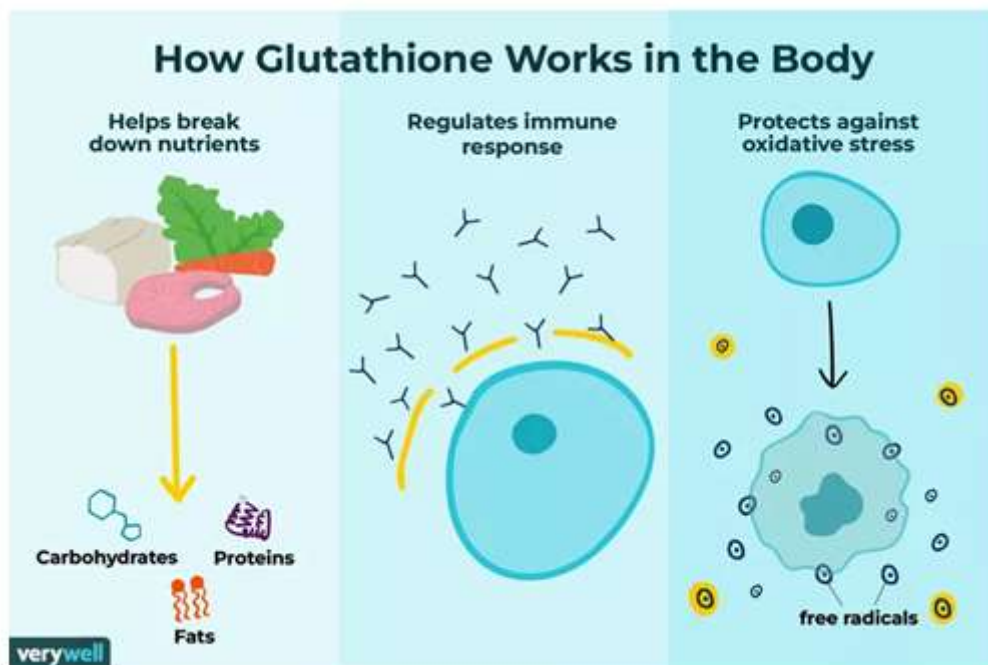


Fig. 2 How glutathione works in the body ⁽¹³⁾

Role of glutathione on oxidative stress-
 Oxidative stress is a condition in which the complete reproductive journey of both men and women is significantly affected, stemming from an imbalance between reactive oxygen species (ROS) and protective antioxidants. Glutathione is often heralded as the supreme antioxidant, the primary

detoxifying agent, and a conductor of the immune system's symphony. As a principal endogenous antioxidant, it takes a leading role in directly quenching free radicals and reactive oxygen species, while also overseeing the maintenance of exogenous antioxidants like vitamins C and E in their active, reduced states. ⁽¹⁴⁾

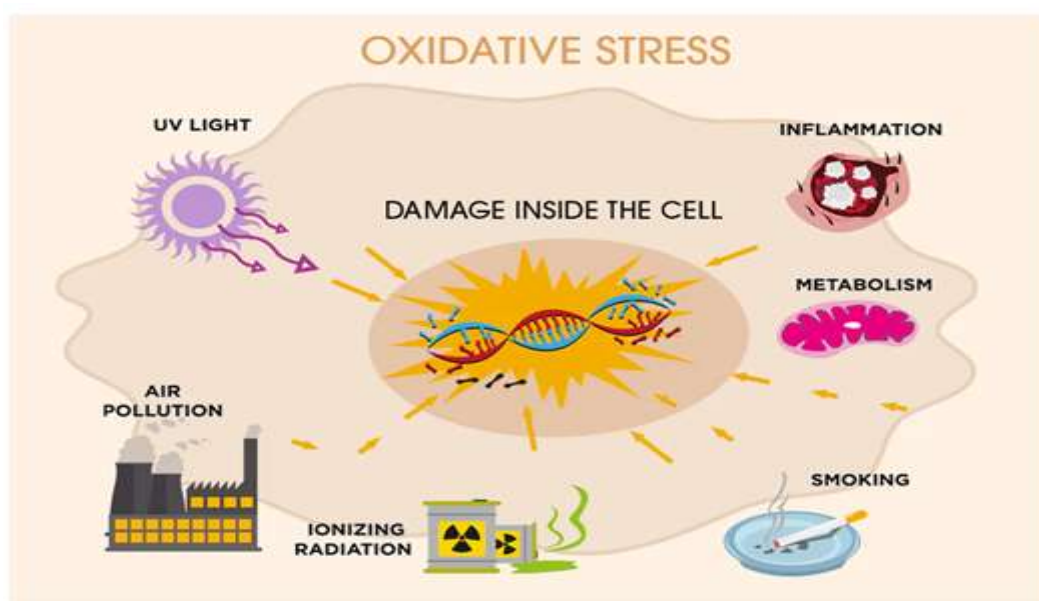


Fig. 2 Oxidative stress ⁽¹⁵⁾

Recent studies in cosmetic science provide strong confirmation that the introduction of exogenous glutathione offers substantial protection against H₂O₂-induced cytotoxicity in RAW 264.7 cells.⁽¹⁶⁾ Glutathione serves as a natural wellspring of readily deployable reducing potential, arming cells to counter the onslaught of oxidative stress. Its protective prowess, rooted in the sulfhydryl group (SH), acts as a potent shield against oxidative harm. Existing in two states, the reduced form (GSH) and the oxidized form (GSSG), glutathione marshals its defense against reactive oxygen species (ROS) through collaborative engagements with key enzymes like glutathione peroxidase and glutathione reductase.⁽¹⁴⁾

✚ Role of glutathione in prevention of melanin synthesis-

Variations in skin color among individuals can be attributed to the differing quantities and types of melanin pigments present. Melanin is synthesized within specialized cells called melanocytes, situated in the basal layer of the epidermis, a process known as melanogenesis. Melanogenesis encompasses a sequence of intricate biochemical and enzymatic reactions, primarily

driven by tyrosinase and related proteins, ultimately resulting in the creation of two distinct melanin varieties: eumelanin and pheomelanin. Excessive accumulation of these melanin's can lead to darkening of the skin's pigmentation.⁽¹⁷⁾ Glutathione is one of the compounds known for its capacity to suppress melanin production. In the body, GSSG undergoes efficient conversion to GSH, facilitated by the enzymatic action of glutathione reductase. Previous studies have confirmed the presence and enzymatic functions of glutathione reductase and glutathione peroxidase within the human dermis and epidermis.⁽¹⁸⁾ Scientific investigations have provided evidence supporting the role of glutathione in diminishing melanin synthesis, which, in turn, can contribute to achieving a more uniform skin complexion and minimizing the visibility of dark spots and hyperpigmentation.⁽¹⁹⁾

✚ Role of glutathione in anti-aging effects-

The application of GSSG lotion topically demonstrated a notable reduction in the formation of wrinkles, as substantiated by objective & subjective evaluation assessments.⁽²⁰⁾

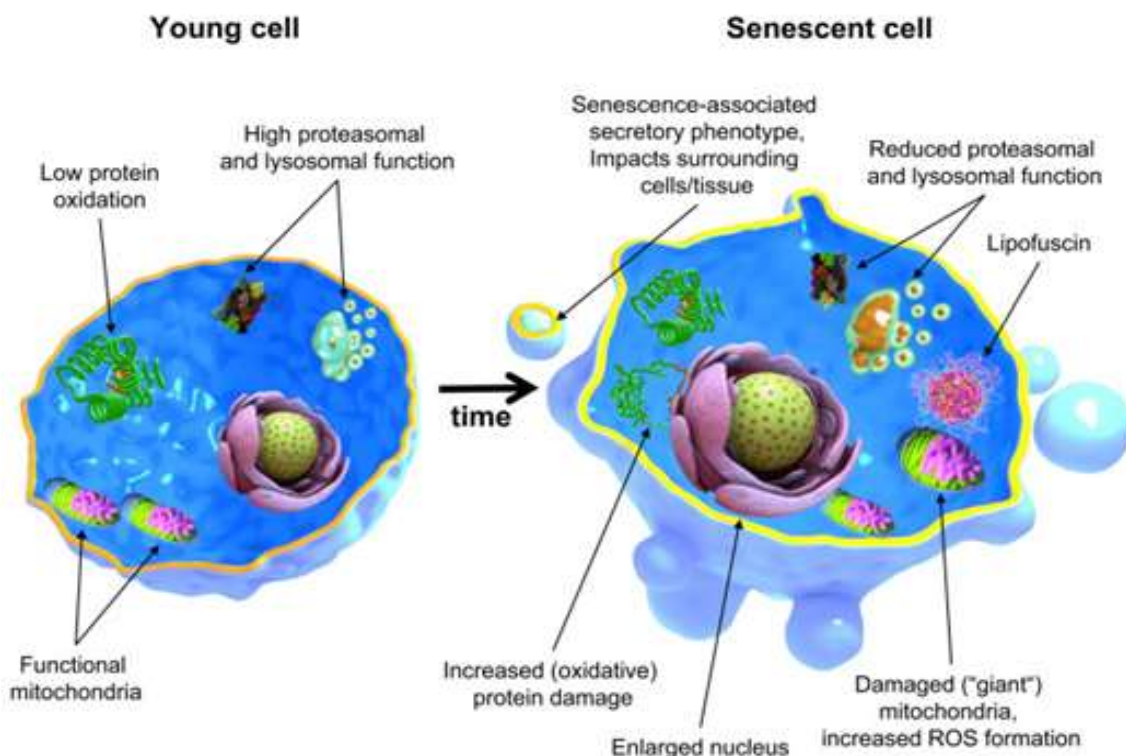


Fig 3. Conversion of young cell into senescent cell⁽²⁰⁾

Oxidative stress has a close and well-documented relationship with the aging process. Numerous studies have established that oxidative stress plays a pivotal role in the onset & progression of various age-related conditions. One of the significant outcomes of oxidative stress is the initiation and advancement of cellular senescence, which is recognized as a hallmark of the aging process. Senescent cells exhibit a multitude of distinctions from their healthy counterparts, including heightened levels of oxidative protein damage, impaired mitochondria, among others. The visual representation in Fig 3. illustrates some of the most notable disparities.⁽²⁰⁾ The utilization of this ingredient offers a multitude of advantages when used consistently, including diminishing the appearance of wrinkles & age spots, enhancing scar visibility, augmenting collagen synthesis, reducing melanin production, & more. Normally, the proper and accurate use of Glutathione is paramount for attaining optimal

results; excessive usage or incorrect dosage forms could potentially yield negligible benefits.⁽²¹⁾

Role of glutathione in skin brightening- One of the primary claims associated with glutathione face wash is its potential to reduce hyperpigmentation and promote even skin tone. We investigate the evidence supporting these claims and explore their applications in addressing conditions like melasma and dark spots. Glutathione is one of the most powerful antioxidants and helps in skin whitening and lightening by converting melanin to a lighter color.⁽²²⁾ The skin-lightening properties of glutathione face wash are attributed to its dual mechanism of action, involving both direct and indirect suppression of the tyrosinase enzyme, and a shift from eumelanin to pheomelanin production. It is conveniently accessible in various forms, including oral, parenteral, and topical applications.⁽¹⁰⁾



Fig 4. Glutathione in skin brightening⁽²³⁾

Marketed product of glutathione face wash-

Glutathione Face Wash with Vitamin C & Kojic Acid

This clinically validated skin brightening solution incorporates proven melanin-targeting components, combining Glutathione and Vitamin C to function as potent 'depigmenting agents.'



Key Ingredients

- Anti-acne: Lauric Acid, Salicylic Acid, Niacinamide
- Antioxidant: Vitamin C
- Cell-communicating ingredient: Niacinamide
- Exfoliant: Salicylic Acid, Lactic Acid
- Skin brightening: Licorice Extract, Niacinamide, Vitamin C
- Skin-identical ingredient: Glycerin
- Soothing: Licorice Extract, Allantoin, Salicylic Acid, Dexpanthenol⁽²⁴⁾

✚ L-Glutathione Face Wash - 100 g



Trycane L- Glutathione and Vitamin C Face Wash is formulated with L- Glutathione, Vitamin-C and many other Natural Actives which prevents damage from UV rays, regenerates and repair tissues, lightens hyperpigmentation, dark spots, age spots and melasma. It also boosts skin Collagen production that gives you firmer more plump skin and helps to protect skin's natural oils, treats acne, fine lines, wrinkles, dullness and gives you whiter, brighter and Glass skin tone making it look younger.

Quality product - Made from combination of L- Glutathione, Vitamin-C and other Natural Actives that are Premium quality ingredients without SLS, Paraben & Mineral Oil that'll give you the best quality products.

Skin whitening- L- Glutathione and Vitamin C together controls Melanin and move it from basal layer to the surface.

Anti acne - Vitamin E and Berry Extracts helps to control Acne and remove acne scar⁽²⁵⁾

Application and skin benefits of Glutathione face wash-^(26,27,28)

Glutathione face wash has gained popularity in the skincare industry due to its potential application and skin benefits. Here's a breakdown of its application and the associated advantages:

- **Antioxidant properties-** Being a potent antioxidant, it plays a pivotal role in counteracting the formation of free radicals induced by prolonged exposure to ultraviolet radiation and environmental pollutants.
- **Cleansing-** Glutathione face wash is primarily used as a cleanser to remove dirt, excess oil, and impurities from the skin. It provides a fresh and clean canvas for subsequent skincare products.
- **Treats pigmentation-** Glutathione is celebrated for its depigmenting prowess. Through the inhibition of tyrosinase activity, it fosters skin brightening and the attainment of a more uniform skin tone. Additionally, it facilitates the transformation of eumelanin into pheomelanin, effectively modulating melanogenesis (the process of melanin production) and diminishing the appearance of dark spots while reducing hyperpigmentation.
- **Promotes skin elasticity-** Its demonstrated ability to enhance the body's collagen and elastin stores contributes to skin firmness and a more plump appearance. Furthermore, it effectively diminishes the visibility of fine

lines and wrinkles, resulting in smoother, rejuvenated skin.

- **Anti-inflammatory content-**Due to its anti-inflammatory properties, Glutathione effectively lowers the levels of pro-inflammatory mediators, offering relief from conditions like acne, post-inflammatory hyperpigmentation, and melasma.
- **Reduce redness-** The synergistic action of Vitamin C and Glutathione combines effectively to address a range of skin inflammatory conditions, mitigating skin redness and promoting the attainment of a fair and even complexion.
- **Protects against sunburns-** Prolonged sun exposure triggers the production of free radicals within the skin category of highly reactive, electron-deficient atoms. These free radicals act as 'electron thieves,' inflicting considerable damage to the skin. In response, the master antioxidants Glutathione and Vitamin C play a pivotal role in shielding skin cells from these free radicals, stimulating cell turnover, & replenishing damaged cells with fresh, healthy ones. This process ultimately leads to a reduction in skin redness and promotes skin health.
- **Detoxification-**Integral to the body's detoxification system, Glutathione functions as a catalyst, enhancing the natural detoxification processes. While detoxifying harmful substances, this process generates harmful free radicals that can harm healthy cells. To mitigate this, numerous enzymes rely on glutathione to effectively detoxify and eliminate these toxins from within the cell. In the absence of sufficient glutathione, the body's ability to neutralize these toxins would be significantly compromised.
- **Anti-aging properties-** Glutathione offers a myriad of advantageous effects, including its notable anti-aging attributes. Its most potent role lies in serving as an antioxidant powerhouse, combatting free radicals and shielding the body from the oxidative harm they can inflict. These health benefits are intricately linked to its regulation of pivotal bodily processes, including
 - gene expression
 - enzyme function
 - cell differentiation and proliferation.

Antioxidants are often heralded as the world's anti-aging nutrients, and by incorporating this antioxidant into your routine, you can

safeguard your body from the browning effects that contribute to cellular aging.

- **Other benefits-** Skin moisture, Skin firmness, Wrinkle reduction & skin smoothing etc.

Safety and Efficacy of Glutathione face wash:

An essential aspect of any skincare product is its safety and effectiveness. We explore the available research on glutathione face wash, potential side effects, and considerations for safe product selection. Glutathione, renowned for its potent antioxidant properties, has found widespread use in skincare products, particularly in the Asian market, where it is often incorporated for its skin-lightening benefits.⁽²⁹⁾ No substantiated adverse effects have emerged in clinical trials of glutathione applied topically to the skin. However, it is essential to note that when administered in high doses through direct injection into the bloodstream, glutathione may lead to a variety of negative side effects, such as the development of hypopigmented patches, potential melanoma risk, decreased liver glutathione content, and even a lightening of hair color.⁽¹²⁾ This thorough literature review has examined recent clinical investigations into the skin-whitening potential of various glutathione (GSH) formulations. Regrettably, the current body of evidence does not provide strong support for its efficacy, and controversies surrounding GSH utilization persist. Despite the general safety of GSH application, both topically and orally, limitations in the studies evaluating its effectiveness hinder our understanding of its full potential. Moreover, the challenge of maintaining skin tone after discontinuing GSH usage is a noteworthy concern. Consequently, there is a compelling need for further clinical studies characterized by improved methodologies, larger sample sizes, extended observation periods, and careful consideration of GSH blood levels to comprehensively assess the safety and effectiveness of GSH in skincare.⁽³⁰⁾

Other potential adverse effects associated with glutathione-

- **Lightening of hair colour:** is a potential consequence of glutathione supplementation, as it may affect the quantity and type of melanin, which largely determine hair color. However, it is noteworthy that as of now, clinical reports confirming this particular adverse effect are lacking.

- Hypopigmented patches, particularly in sun-exposed areas, have been observed following 10-12 doses of intravenous glutathione injections, based on practitioners' unpublished observations. Their experience suggests that the initial patchy hypopigmentation tends to resolve after approximately 30-40 doses, likely due to the development of a more uniform skin-lightening effect.
- Depletion of natural hepatic stores of glutathione: Hypothetically, there is concern that long-term supplementation with synthetic compounds, such as glutathione, could potentially signal the body to reduce its natural production, leading to a dependency on these supplements. Depletion of liver glutathione levels, where glutathione is predominantly stored, is speculated to have adverse health implications. Although not yet clinically reported, this hypothetical effect bears resemblance to the hypothalamic-pituitary axis suppression seen in the extended use of systemic corticosteroids.
- Exacerbation of *Helicobacter pylori* associated peptic ulcers: This is based on the understanding that *H. pylori* thrives on macrophages and neutrophils, which are often found in abundance at the inflammation site of ulcers. Given glutathione's potential to enhance macrophage numbers and activity, it raises the possibility of intensifying peptic ulcer-related issues, although this effect has not been widely documented in clinical reports.
- Increased susceptibility to melanoma: Theoretical concerns have been raised about long-term systemic glutathione administration potentially increasing susceptibility to melanoma.⁽¹⁰⁾

Real-World Experiences-

The article provides insights from individuals who have used glutathione face wash, sharing their real-world experiences, results, and practical considerations for those considering the integration of these products into their skincare regimens. Here are some customers review and personal experience's regarding to the glutathione face wash. The data were collected from the various online E-commerce site which provide the consumer's real- world experiences.

- ✚ Product review from amazon e-commerce site- Individual have been using the Trycone glutathione facewash since last few months and it works amazingly well on their skin and

makes it smooth and soft. Individual have been using this facewash and as it contains glutathione it really helps in making the skin youthful and bright. So, individual would definitely like to recommend it.⁽³¹⁾

- ✚ Product review from ethicare e-commerce site- Individual use Glutafine Face Wash which is really very good product. After 10 years individual get the best solution for their pimples problem. They would like to 100% recemented to this product for others. really very very best product.⁽³²⁾

- ✚ Product review from Jezara e-commerce site- Individual use Jezara Face Wash erich with natural extra mate want to get rid of acne, blackheads, and scars? Definitely yes! people who have been struggling for dry skin problems individual is using this product which contains L glutathione which helps in pigmentation and skin lightening. Also, it has vitamin C which is very good for skin. It leaves my face very soft after using this. facewash is really good. must buy it.⁽³³⁾

II. CONCLUSION-

This comprehensive review explored the potential benefits and issues surrounding glutathione face wash. It may help brighten the skin and fight signs of aging, but there are still questions and debates. Using it on your skin seems safe, but taking it intravenously should be done with caution, as it might lead to temporary results. More research is needed with larger groups of people over a longer time to fully understand how effective and safe it is. The world of skincare is always changing, and glutathione is an exciting part of that evolution, offering the promise of healthier, more beautiful skin. In summary, glutathione face wash is a novel addition to the world of skincare, with the potential to promote radiant, healthy skin. Its rise in popularity suggests a bright future for glutathione-based skincare products, with ongoing research expected to shed more light on its true potential.

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