ISSN: 3079-6601

Preparation of Whitening Cream Combining Modified Yurong Powder with Niacinamide:Literature Review

Chunyuan Zhou[1],Lingyu Zhong[1],Dan Liu[1],Yuekun Xiao[1],Yanhui Cen[1*]

[1]*College of Basic Medical Sciences*, *Guangxi University of Chinese Medicine, Nanning 530200, China*

First author: Yanhui Cen(1316133198@qq.com)

*Corresponding author: Yanhui Cen(1316133198@qq.com)

Abstract

The review artitle shows that the history of traditional Chinese formula Yurong San and its formulation theory.It also shows the application prospects of Modified Yurong san compounding Nicotinamide in whitening cream manufacturing.As TCM classics whitening formula, Yurong san can treat facial pigmentation by dispelling wind, promoting blood circulation,drying dampness and resolvindg toxin. The main active ingredients of it are PCT,Glabridin,CAE, and so on,Which can inhibit the activity of tyrosinase,inhibit the proliferation of melanocytes, scavenge free radicals and reduce inflammation,and other multiple effects. Used as modern whitening ingredients,Nicotinamide can inhibit melanosome transport,repair the skin barrier,and so on,to lighten skin tone.Yurong san compounding Nicotinamide can synergistically form a multi-pathway synergistic whitening system,meanwhile,it can reduce single-ingredient and potential irritation.This paper also discusses the compounding whitening cream's preparation,its safety,its stability and efficacy evaluation,to provide theoretical basis for development of innovative whitening cosmetics.

Keywords

Modified Yurong Powder; Niacinamide; Whitening

Funding: Autonomous region level innovation training program of saiensxin College of medicine, Guangxi University of traditional Chinese medicine (s202513643038)

1.Introduction

To meet people's need for whitening skin care products ever-increasing, as well as public concerns over the safety of chemically synthesized ingredients.It is a important study direction to develop natural effective whitening ingredients from TCM in cosmetics industry.As TCM classics whitening formula, there are many kinds of Yurong san prescription by diffirent doctor.But the core treatments are the same :"dispelling wind, promoting blood circulation,drying dampness and resolvindg toxin."Modern pharmacological studies have confirmed that many active components can inhibit tyrosinase activity and reduce melanin production in Yurong San.At the same time, Nicotinamide can achieve whitening through inhibiting tyrosinase activity, melanin transport and melanosome migration to keratinocytes,etc.So Nicotinamide and TCM whitening formula complement each other.Scientifically modified Yurong San combined with niacinamide,this can form a multi-target, multi -pathway whitening system, ensuring both safety and efficacy.The review artitle aims to systematically analyze the whitening mechanism of modified Yurong San and niacinamide,also discusses its scientificity and feasibility to provide a reference for related product development.

ISSN: 3079-6601

2. Historical Evolution and Theoretical Basis of the Yurong Powder Formula

Yurong Powder is one of the representative formulas in Chinese cosmetic medicine. It first appeared in Essential Prescriptions for Emergencies Worth a Thousand Pieces of Gold under the name "Formula for Treating Facial Dark Spots, Wrinkles, and Chapped Skin," and was given its current name in Prescriptions for Universal Relief. Initially, it was used to treat facial dullness and darkening, pigmentation, and dry, cracked skin, with its efficacy described as achieving results"within five or six applications, after which the rough skin peels away and the spots are healed.[2]"

According to traditional Chinese medicine theory, the formation of facial pigmentation is closely related to factors such as pathogenic wind invading the skin, disharmony of qi and blood, and the stagnation of phlegm and fluids. As stated in Taiping Holy Prescriptions for Universal Relief: "Facial spots arise from phlegm and fluids in the internal organs or from pathogenic wind affecting the skin, leading to the disharmony of qi and blood, resulting in the formation of dark spots.[3]" Therefore, the formulation principles of Yurong Powder primarily emphasize wind-dispelling herbs and whitening agents, supplemented by aromatic herbs that transform dampness.

Throughout history, medical practitioners have applied various modifications to the Yurong Powder formula, but most have adhered to the traditional Chinese medicinal concept of "using white to nourish white," which involves the use of white-colored herbs such as Angelica dahurica, Poria cocos, Typhonii rhizoma, and Bombyx batryticatus. [4]As shown in Table 1, there are different components of Yurong San in different ancient books,but the core medicine are the same.Notably, traditional Yurong San have some toxic herbs such as Typhonii Rhizoma and Bombyx Batryticatus,etc.So caution is needed in cosmetic use.

Table 1. Comparison of Yurong Powder Compositions in Different Ancient Texts

Source	Main Ingredients	Indications	Characteristics
Golden Mirror of Medicine (Yizong Jinjian)	Angelica dahurica, Pharbitidis semen, Typhonii rhizoma, Bombyx batryticatus, etc.	Melasma, acne	Primarily wind-dispelling herbs, supplemented by herbs that invigorate blood circulation and promote diuresis
Orthodox Manual of External Medicine (Waike Zhengzong)	Typhonii rhizoma, Poria cocos, Angelica dahurica, etc.	Melasma, rough skin	Emphasizes dispelling wind and drying dampness
Selected Medical Prescriptions of Empress Dowager Cixi and Emperor Guangxu (Cixi Guangxu Yifang Xuan Yi)	Angelica dahurica, Typhonii rhizoma, Poria cocos, etc.	Dull complexion, melasma	Modified based on the classic formula

Modern improvements to Yurong Powder primarily focus on enhancing safety and efficacy. For example, a patent from Jiayi Biochemical Technology has optimized the Yurong Powder compound, consisting of licorice (Gancao, 10%–20%), hyacinth bletilla (Baiji, 10%–20%), white lotus seed (Bailianzi, 10%–20%), atractylodes rhizome (Baizhu, 10%–20%), Chinese angelica (Danggui, 10%–20%), poria cocos (Baifuling, 5%–10%), and lily bulb (Baihe, 5%–10%).[5] This formula removes potentially irritating herbs like giant typhonium rhizome and batryticated silkworm from traditional Yurong San, and adds gentler, anti-inflammatory herbs such as licorice and hyacinth bletilla. It is safer and more suitable for modern cosmetics.

ISSN: 3079-6601

The modified Yurong San used in this study is slightly adjusted to:

Poria cocos 20g, Bletilla striata 15g, Atractylodes macrocephala 12g, Polygonatum odoratum 12g, Centella asiatica 6g, and licorice 5g.

3.Modern Skin-Whitening Pharmacological Study on the Effects of the modified Yurong San

3.1Inhibition of tyrosinase activity and melanocyte proliferatio

Tyrosinase is a complex copper containing oxidoreductase with multiple subunits, and is the rate limiting enzyme regulating melanin production. Therefore, inhibiting its activity is one of the main strategies for the development of whitening cosmetics.Modern pharmacological studies have shown that some of the active ingredients in modified Yurong San have a significant inhibitory effect on tyrosinase.The natural active ingredient of white Poria, triterpenoid compounds, can inhibit the activity of tyrosinase, For instance, the natural triterpenoids found in Poria cocos (white Poria) can inhibit tyrosinase activity and its inhibitory effect is stronger than that of arbutin, and the inhibitory effect gradually increases with the increase in concentration[6].Bletilla striata polysaccharides and its liposomes can inhibit tyrosinase activity by competing with the binding site of tyrosinase [7].Aqueous extracts of Atractylodes macrocephala can also inhibit tyrosinase activity [8].

Melanocytes synthesize melanin through melanosomes in the cell, so inhibiting melanocyte proliferation can effectively reduce melanin production.The GLABRIDIN extracted from licorice in the modern improved formula of Yurong San has the ability to inhibit the proliferation of B16F10 cells in a dose-dependent manner. The mechanism is to inhibit the glycolysis-related genes. (HK2, hexokinase 2, Ldha, lactate dehydrogenase A) and protein expression and regulation of apoptotic-related genes. (Bax, apoptotic regulatory factor, Bcl-2, B lymphocyte tumor/leukemia-2 gene) Expressing [9], thereby achieving the goal of reducing melanin production.

3.2 Antioxidant and Anti-inflammatory Effects

Oxidative stress and inflammatory response are important causes of pigmentation. Oxidative stress damages cells by producing excessive reactive oxygen species (ROS) and triggers the release of inflammatory factors.The activation of immune cells in the inflammatory response further generates ROS, creating a vicious cycle.Several components in the modified Yurong San have antioxidant and anti-inflammatory activity.For example, the gallic acid in white Poria has good antioxidant effects. Compared with the previously recognized free radical scavenger Vc, gallic acid is stronger than Vc in terms of DPPH, hydroxyl radical scavenging ability, and inhibition of lipid peroxidation reactions[10].Centella asiatica extract possesses pharmacological activities including antioxidant[11-12] and anti-inflammatory [13] effects. It can reduce the production of pro-inflammatory mediators (IL-1, MMP-1), enhance and repair the skin's inherent barrier function, and also promote collagen synthesis, glycosaminoglycan secretion, and fibroblast matrix activation. This increases skin hydration and the tension of the skin's basal layer, revitalizes and renews skin cells, resulting in skin soothing, lifting, enhanced radiance, maintained elasticity and firmness, and a smoothing of fine lines [13]. Polysaccharides from Poria cocos exhibit antioxidant and anti-inflammatory properties, reduce oxidative stress damage, and promote fibroblast proliferation and collagen synthesis [14]. Polygonatum odoratum polysaccharides demonstrate good in vitro antioxidant activity, showing strong scavenging ability against superoxide anions (O_2^-), 1,1-diphenyl-2-picrylhydrazyl (DPPH·) radicals, and hydrogen peroxide (H_2O_2), but weaker scavenging ability against hydroxyl radicals (·OH)[15]. Additionally, Polygonatum odoratum polysaccharides possess certain anti-aging effects; they enhance the clearance of free radicals by increasing superoxide dismutase

ISSN: 3079-6601

activity and inhibit lipid peroxidation by reducing malondialdehyde content, thereby mitigating damage to body tissues and delaying aging [16].

4.The Whitening Mechanism of Niacinamide and Its Application in Cosmetics

Niacinamide (Vitamin B3) is a water-soluble vitamin that has been widely used in cosmetics as a whitening ingredient in recent years.Its whitening mechanism differs from traditional tyrosinase inhibitors, primarily by inhibiting the transport of melanosomes from melanocytes to keratinocytes, thereby reducing the melanin content in the epidermis.This unique mechanism of action makes it very complementary to traditional Chinese medicine whitening ingredients.

In addition to inhibiting melanosomal transport, niacinamide has multiple effects on improving skin condition: first, it repairs the skin barrier. Niacinamide can increase the levels of ceramides and free fatty acids in the stratum corneum, enhancing skin barrier function and reducing transepidermal water loss[17].Secondly, anti-inflammatory effects: niacinamide can reduce skin inflammation by inhibiting the production of inflammatory factors and the infiltration of inflammatory cells, which is particularly important for the prevention and improvement of post-inflammatory hyperpigmentation.Third, it has antioxidant properties. Niacinamide can remove free radicals and reduce pigmentation caused by oxidative stress[18].

In cosmetic applications, the concentration of niacinamide is usually between 2% and 5%.Research shows that niacinamide concentrations below 2% have no significant whitening effect, while concentrations above 5% may cause irritation to some sensitive skin, leading to redness, stinging, and other discomforts[19].It is worth noting that nicotinamide is easily hydrolyzed to nicotinic acid under acidic conditions (pH < 5), which is more irritating to the skin, so the pH of the formulation should be controlled between 5.5 and 6.2.

5.Synergistic Effect Analysis of Modified Yurong Powder Combined with Niacinamide

5.1 Multi-pathway Whitening Synergy

The whitening mechanisms of Modified Yurong Powder and niacinamide act on different stages of melanin production and transfer, and their combination achieves multi-pathway synergistic whitening. Modified Yurong Powder primarily reduces melanin production at its source by regulating tyrosinase activity and inhibiting melanin metabolism [6-9]; niacinamide, on the other hand, blocks the distribution and deposition of melanin by inhibiting the transfer of melanosomes to keratinocytes [20]. This synergistic effect, achieved through the combination of ingredients with distinct mechanisms, delivers more comprehensive whitening outcomes.

5.2 Reduced Irritation and Complementary Efficacy

Certain ingredients in Modified Yurong Powder, such as Angelica dahurica and Glycyrrhiza uralensis extracts, along with added components like Centella asiatica and Polygonatum odoratum, possess free radical scavenging and tyrosinase-inhibiting properties [21], which can alleviate potential skin irritation caused by niacinamide. Additionally, the skin barrier-repairing effects of niacinamide complement the moisturizing and restorative functions of polysaccharides derived from Bletilla striata and Polygonatum odoratum in Modified Yurong Powder, collectively improving skin barrier function and enhancing overall skin health [22]. As shown in Table 2, the synergistic interaction between Modified Yurong Powder and niacinamide achieves a 1+1>2 effect, which holds significant value for modern individuals experiencing skin barrier damage due to environmental pollution, stress, and other factors.

ISSN: 3079-6601

Table 2: Analysis of the synergistic effects of Modified Yurong Powder and niacinamide

Action link	Effects of modified yurong San Decoction	Effects of Nicotinamide	Synergistic Effect
Melanin Biosynthesis	Inhibits tyrosinase activity[6-8]	Mildly inhibits tyrosinase activity	Enhances the inhibitory effect at the source
Melanin Transfer	No significant effect	Inhibits melanosome transfer to keratinocytes	Blocks the pathway of melanin distribution
Antioxidation	Polysaccharides, flavonoids and other components scavenge free radicals[21]	Scavenges free radicals and alleviates oxidative damage	Strengthens the antioxidant defense network
Anti-inflammation & Soothing	Glycyrrhizic acid and asiaticoside inhibit inflammatory factors[21]	Inhibits the production of inflammatory factors and inflammatory	cell infiltration Synergistically alleviates inflammation and pigmentation
Barrier Repair	Polysaccharides from Bletilla striata and Polygonatum odoratum provide moisturization and repair	Increases ceramide and free fatty acid levels	Synergistically strengthens the skin barrier function

5.3 Formulation Design Strategy

Based on the synergistic mechanisms described above,the formulation strategy combining Modified Yurong Powder and niacinamide can be approached from the following perspectives:first,consideration of dosage form—Modified Yurong Powder extract can be solubilized into an aqueous dosage form using technologies such as nanoemulsions to better synergize with niacinamide;second,optimization of the ratio—determine the optimal ratio of Modified Yurong Powder extract to niacinamide through in vitro tyrosinase inhibition assays and in vivo efficacy tests.

6 Preparation Process and Stability Study of the Synergistic Whitening Cream

6.1 Preparation of Modified Yurong Powder Extract

The preparation process of Modified Yurong Powder extract directly affects the content of active ingredients and the whitening efficacy of the final product.According to the preparation method provided by Jianong Biochemical Technology's patent(CN102000016B)[5],20 g ofPoria cocos,15 g ofBletilla striata,12 g ofAtractylodes macrocephala,12 g ofPolygonatum odoratum,6 g ofCentella asiatica,and 5 g ofGlycyrrhiza uralensiswere separately crushed and passed through a 20-mesh sieve before being mixed uniformly.The mixed medicinal materials were then placed into the extraction tank of a multifunctional thermal reflux extraction apparatus.A 50%–75%ethanol–water solution was added to the crushed Modified Yurong Powder compound at a solid–liquid ratio (g/mL) of 1:10 to 1:20[5].

The mixture was stirred and heated at 50 °C-95 °C for 0.5 to 4 hours[5].The precipitate was then re-extracted with 50%–75%ethanol–water solution under stirring at 50 °C–95 °C for 0.5 to 4 hours,and the extraction was repeated once to obtain the herbal residue[5].Thereafter,the residue after the first-stage ethanol extraction was transferred back into the extraction tank,heating and stirring were initiated,the temperature was raised to 90 °C,and the ultrasonic-assisted extraction system was activated[23].The ethanol extraction method offers high extraction efficiency,a simple process flow,convenient operation, and time

ISSN: 3079-6601

savings[23].Compared with the traditional hot-water bath extraction method,ultrasonic-assisted extraction significantly reduces the extraction time for polysaccharides and effectively improves the polysaccharide yield[24].This combined extraction process(ethanol extraction followed by water extraction)enables a more comprehensive recovery of active components from the various medicinal materials.

6.2 Formulation Design of the Synergistic Whitening Cream

Using Modified Yurong Powder dry extract powder combined with niacinamide as the core whitening agents,supplemented with a blank base cream,and with glycerol and 1,3-propanediol as co-solubilizers and dispersing agents,three gradient formulations were designed for 30 g batches.Throughout the process,the principles of"no particles, complete dissolution,and skin-compatible pH"were followed.The detailed preparation steps and formulation characteristics are shown in Table 3.

Table 3: Preparation of Modified Yurong San Decoction and Nicotinamide Compound Whitening Cream

Group	Blank Base Cream (g)	Modified Yurong San Decoction Dry Extract Powder (g)	Glycerol (g)	Nicotinamide (g)	1,3-Propanediol (g)
1	27.36	0.60	0.72	0.60	0.72
2	25.38	1.20	1.44	0.90	1.08
3	23.40	1.80	2.16	1.20	1.44

The formulation design of the synergistic whitening cream must take multiple factors into consideration:first,pH control—niacinamide is most stable in the pH range of 5.5–6.2,and acidic conditions should be avoided to prevent its hydrolysis into nicotinic acid;second,compatibility —since the extract of Modified Yurong Powder has a complex composition, compatibility tests are required to ensure that it does not interact with niacinamide or other formulation components(such as emulsifiers, preservatives,etc.).

6.3 Stability and Efficacy Evaluation

6.3.1 Stability

The stability evaluation of the compound whitening cream includes physical stability and chemical stability. Studies have shown that after centrifugation, the absence of oil-water separation indicates the quality stability of the prepared sample [25]. For this compound whitening cream, evaluation can be conducted from two dimensions: physicochemical properties and accelerated testing. A score of 5 is given if the apparent properties (delicacy and glossiness) and viscosity meet the requirements. A score of 3 is given if there is no separation or coarsening of the cream when heated to 42°C and then returned to room temperature; a score of 0 if it fails. A score of 3 is given if there is no separation or coarsening of the cream when cooled to approximately -10°C and then returned to room temperature; a score of 0 if it fails. A score of 3 is given if there is no water separation or coarsening during centrifugation; a score of 0 if it fails [26].

6.3.2 Efficacy Evaluation

(I) In Vitro Experimental Validation

Tyrosinase Inhibition Activity Assay: The L-DOPA oxidation method is used, with arbutin as a positive control, to detect the inhibition rate of different concentrations of the compound sample on tyrosinase activity [27]. This method effectively evaluates the ingredient's regulatory effect on the source of melanin synthesis. An inhibition rate ≥ 50% is determined as significant activity.

ISSN: 3079-6601

Melanin Production Inhibition Assay: B16 mouse melanoma cells are used. The MTT method is employed to assess the sample's effect on cell viability, and an enzyme-linked immunosorbent assay is used to measure intracellular melanin content [28]. This model simulates the in vivo melanin production process. A decrease in melanin content in the sample group by ≥ 30% compared to the control group is considered effective.

Melanin Transfer Inhibition Assay: A co-culture system (melanocytes-keratinocytes) is used, and the transfer of melanosomes is observed via immunofluorescence. This method directly verifies the transfer-blocking effect of niacinamide. The compound system should be able to significantly reduce melanin deposition within keratinocytes.

(II) Safety Evaluation

Skin Irritation Test: To ensure the compound whitening cream does not cause cosmetic dermatoses [29], research indicates that using a cosmetic product patch test is beneficial for diagnosing such conditions [30]. A closed patch test can be conducted on 30 subjects. Patches are applied to the skin on either side of the subjects' backs, with a distance of no less than 2 cm between each patch to avoid mutual interference of reactions. Observations are made after 24 and 48 hours; no adverse reactions such as redness, swelling, or itching are determined as a pass.

Long-Term Use Safety Monitoring: During the open-use test period on humans, the occurrence of adverse skin reactions in subjects is recorded. An incidence rate of < 5% is determined as having good safety [31]. This monitoring effectively identifies potential cumulative irritation risks.

7. Summary and Outlook

As a classic Chinese medicinal formula for skin whitening, Yurong San embodies the therapeutic principles of "dispelling wind, activating blood, eliminating dampness, and resolving turbidity," which share conceptual parallels with modern dermatological understandings of the mechanisms underlying hyperpigmentation. Modern pharmacological studies on the modified version of Yurong San have confirmed that its various active components exert whitening effects through multiple pathways, including inhibition of tyrosinase activity, suppression of melanocyte proliferation, antioxidant activity, and anti-inflammatory effects. Combining the modified Yurong San with niacinamide enables the development of a multi-pathway synergistic whitening system that balances both safety and efficacy.

Current research on this combination is still in its early stages, with future investigations warranted in the following areas: first, in-depth mechanistic studies, particularly regarding the interactions between active components of the modified Yurong San and niacinamide at the level of cellular signaling pathways; second, optimization of the formulation ratio using mathematical models such as isobolographic analysis to quantitatively assess synergistic effects and determine the optimal proportions; third, development of novel delivery systems, including nanocarriers and liposomes, to enhance the stability and skin permeability of the active ingredients; and fourth, rigorous clinical validation through large-scale randomized controlled trials to evaluate the whitening efficacy and safety of the combined formulation across diverse populations, particularly among Asian individuals with sensitive skin. With continued advancements in the modernization of traditional Chinese medicine and the refinement of cosmetic evaluation systems, the combination of modified Yurong San and niacinamide is poised to become a significant direction for developing innovative whitening products that integrate the distinctive features of traditional Chinese medicine with scientifically validated efficacy, thereby injecting new momentum into the innovation and development of the cosmetics industry.

ISSN: 3079-6601

References

[1]Zhao Y Q. The Application of Niacinamide in Skin-Lightening Cosmetics and Its Diverse Uses[J].Science and Technology Innovation,2025,(02):93-95.

[2]Sun S M. Essential Prescriptions for Emergencies Worth a Thousand Pieces of Gold[M]. Beijing: China Press of Traditional Chinese Medicine, 2011.

[3]Wang H Y. Taiping Holy Prescriptions[M]. Beijing: People's Medical Publishing House, 2016.

[4]Ding N,Song Y Q,Zhang X. A Brief Analysis of the Principles of Medicinal Formulations for the External Treatment of Melasma in Traditional Chinese Medicine [J]. Yunnan Journal of Traditional Chinese Medicine and Materia Medica, 2013, 34 (03): 13-14. DOI:10.16254/j.cnki.53-1120/r. 2013.03.028.

[5]Nanjing Jianong Biochemical Co., Ltd. Compound Yurong San Extract: Its Preparation Method and Applications: 201010556085.3[P]. 2012-06-20.

[6]Chen Y,Liang W,Zheng S Q. Inhibitory Effects of Poria Triterpenoids on Tyrosinase [J]. New Economy, 2016, (Z1): 156.

[7]Kong L Y, Xiang H, Tang K H, et al.Preparation of polysaccharde l iposomes from Betti la striata and their effects on tyrosinase activity [J].Food & Machinery,2020,36(05):160-163,174.DOI:10.13652/j. issn.100 3-5788.2020.05.030.

[8] Li S S, Yin Q, Xie B, et al. Research progress on the mechanism of Chinese herbal medicine in hyperpigmentation allevia-tion and skin whitening[J/OL]. Lishizhen Medicine and Materia Medica Research, 1-10 [2025-11-19].https://link.cnki.net/urlid/42.1436.R.20251011.1711.004.

[9] Gao C X, Wang Y M, Li D F, et al. Glabridin Induces Apoptosis in Melanoma B16F10 Cells by Altering Glycolysis[J]. Natural Product Research and Development, 2017, 29(5): 836-842.

[10]Xie X Y, Liu H T, Zhang J, et al. Xie X Y, Liu H T, Zhang J, et al.S tudy on the a ntioxida tive a ctivity of ga llic a cid in vitro[J]. Journal of Chongqing Medical University, 2011, 36(3): 319-322.

[11] Abdul Hamid A., Shah Z. Md., Muse R., Mohamed S. Characterisation ofantioxidative activities of various extracts of Centella asiatica (L) Urban. FoodChemistry, 2002, 77: 465-469.

[12] Zainol M. K., Abd-Hamid A., Yusof S., Muse R. Antioxidative activity and totalphenolic compounds of leaf, root and petiole of four accessions of Centella asiatica(L.) Urban. Food Chemistry, 2003, 81:575-581.

[13]Yan M Q, Ren J. Application of Centella asiatica in personal care products[J]. Flavour Fragrance & Cosmetics, 2009, (6): 44-46.

[14] He X., Wang X., Fang J., et al. Bletilla Striata: Medicinal Uses, Phytochemistry andPharmacological Activities[J]. Journal of Ethnopharm -acology, 2017, 195: 20-38

[15]Ning H, Li H N, Yang P J. Antioxidant effect of polysaccharides in Polygonatum odoratum[J]. Journal of Shaanxi University of Technology (Natural Science Edition), 2013(6): 59-65.

[16]Shan Y, Pan X Y, Jiang D, et al. Experimental observation on the effect of Polygonatum odoratum polysaccharideson on anti-aging[J]. Chinese Journal of Clinical Rehabilitation, 2006, 10(3): 79-81.

[17]Patamu Mohemaiti, Aerziguli Tuerxun, Reshalaiti Abuduwayite, et al. Effects of Nicotinamide on Melanin Transportation in Human Skin Melanocytes [J]. Journal of Environment and Health, 2009, 26(8): 680-683.

[18]Yang C,Zheng Y Q,Dai M. Recent Advances in Research on the Pharmacological Effects of Niacinamide [J]. Journal of Clinical Pulmonary Medicine, 2011,16 (12): 1914-1916.

[19]Xu J.Effect of nicotinamide Concentration on skin melanin transfer and Its Mechanism[J]. Laboratory Testing ,2024,2(06):124-128.

[20]Patamu Mohemaiti,Jin XP,Zhang YB.INtervention of Nicotinamide on human skin Melanosome velocity and Distribution change after UVA Irradiation[J]. China Surfactant Detergent&Cosmetics ,2007,(01):65-67. DOI:10.13218/j.cnki.csdc.2007.01.018.

[21]Li SF,Dong BY,Zhang SW,et al.Research Progress on Application of Chinese Medicine Whitening Active Ingredients lin Cosmetics[J]. Guangzhou Chemical Industry ,2025,53(11):4-7+15.DOI:10.20220/j.cnki. 1001-9677.2025.11.002.

ISSN: 3079-6601

[22]Yin MH,Tao LL,Yang L.Plant-dverived Ingredients for anti-Aging[J]. China Cosmetics Review ,2026,(01):116-120.

[23] Zhejiang University. Ethanol Extraction of Natural Pigments from Purple Sweet Potatoes:CN00127847.9[P]. 2006-05-10.

[24]Du YF,Li W,Dan YL,et al.Study on the Ultrasonic-Assisted Extraction of Polysaccharides from Armillaria luteo-virens[J]. Journal of Plateau Agriculture ,2023,7(3):298-304.

[25]Song J, Yu X D, Zhang S, et al. Preparation Process and Quality Evaluation of Compound Ligusticum Chuanxiong Whitening Cream [J]. China Pharmaceutical, 2024,33(19):71-75. DOI:10.3969/j.issn.1006-4931. 2024.19.015.

[26]Yang X. Screening of Traditional Chinese Medicine Ingredients for Skin Lightening and Research on the Preparation of Skin-Lightening Creams[J].Journal of China Prescription Drug,2017,15(10):37-38.

[27] Jin J Y, Chen L, Wang X Z, et al. Whitening efficacy and mechanism study of compound of Ganoderma atrum(mushroom) extract and pearl extract [J]. Daily Chemical Industry, 2022,52(02):166-171.

[28] Zhang W, Gao J, Zhang M, et al. Bio-efficacy of seven skin-lighteners on dermal melanocytes in vitro [J]. Journal of Pharmaceutical Practice, 2011,29(01):24-26+40.

[29] Li Y,Meng Q N. The Application of Cosmetic Patch Tests in the Diagnosis of Cosmetic-Induced Skin Disorders[J]. Journal of Shandong Medical College,2024,46(2):63-64. DOI:10.3969/j. issn.1674-0947.2024.02.029.

[30] Zhao J, Shi Y, Li T T, et al. Clinical significance of patch test in patients with contact dermatitis of facial cosmetics [J]. Xinjiang Medicine, 2021,51(3):261-264.

[31]Li J,Li X L,Tang X L. Evaluation of the Efficacy, Adverse Reaction Rate, and Safety of Cyclophosphamide in the Treatment of Lupus Nephritis[J]. Renowned Doctor,2018,38(z1):102. DOI:10.3969/j.issn.1002-19 49.2018.z1.092.