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Preparation and Evaluation of Polyherbal Face Pack

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ABSTRACT
It is believed that Queen Cleopatra, the Egyptian goddess of beauty, used donkey milk in her baths to maintain her youthful appearance. Herbs are known to benefit the skin by providing a natural glow and softness, cleansing dead cells, and promoting the regeneration of new cells. This study aims to prepare polyherbal face packs (F1-F4) using natural ingredients such as turmeric, neem, orange peel, multani mitti, gram flour, rose petals, sandalwood, rice flour, and aloe Vera. The polyherbal face packs (F1-F4) were evaluated based on organoleptic properties, physicochemical parameters (loss on drying, ash content, and pH), rheological properties (angle of repose, Hausner's ratio, Carr's index, bulk and tapped density) and spreadability. The evaluation results showed that the all polyherbal face packs had favourable physicochemical and rheological properties and spreadability. This study successfully prepared and evaluated polyherbal face packs (F1-F4) using a combination of natural ingredients known for their skin benefits, such as turmeric, neem, orange peel, multani mitti, gram flour, rose petals, sandalwood, rice flour, and aloe vera. The face packs were subjected to a comprehensive set of tests to assess their suitability for cosmetic use.
Keyword: Polyherbal face pack, Physicochemical, Organoleptic, Rheology.

ABSTRAK
Ratu Cleopatra, dewi kecantikan Mesir, diyakini menggunakan susu keledai saat mandi untuk menjaga penampilan awet mudanya. Herbal diketahui bermanfaat bagi kulit dengan memberikan kilau dan kelembutan alami, membersihkan sel-sel mati, dan mendorong regenerasi sel-sel baru. Penelitian ini bertujuan untuk membuat masker wajah poliherbal (F1-F4) dengan menggunakan bahan-bahan alami seperti kunyit, nimba, kulit jeruk, tristeni mitti, tepung gram, kelopak mawar, cendana, tepung beras, dan lidah buaya. Face pack poliherbal (F1-F4) dievaluasi berdasarkan sifat organoleptik, parameter fisikokimia (kehilangan pengeringan, kadar abu, dan pH), sifat reologi (sudut diam, rasio Hausner, indeks Carr, curah dan kepadatan sadapan) dan daya sebar. Hasil evaluasi menunjukkan bahwa masker wajah poliherbal memiliki sifat fisikokimia dan reologi serta daya sebar yang baik. Penelitian ini berhasil menyiapkan dan mengevaluasi masker wajah poliherbal (F1-F4) menggunakan kombinasi bahan-bahan alami yang diketahui bermanfaat bagi kulit, seperti kunyit, nimba, kulit jeruk, tantani mitti, tepung gram, kelopak mawar, kayu cendana, tepung beras , dan lidah buaya. Paket wajah tersebut menjalani serangkaian pengujian komprehensif untuk menilai kesesuaiannya untuk penggunaan kosmetik.
Keyword: Face pack poliherbal, Fisikokimia, Organoleptik, Reologi.

1. Introduction

It was believed the Egyptian goddess of beauty the Queen Cleopatra used donkey milk in bath to enhance her youth and beauty [1]. Women knew to make homemade face pack by using herb and minerals like turmeric, aloe, tomato, honey, sandal wood, gram flour, potato, lemon, clay, mint, rose water, rock salt as facial scrub etc., to enhance their beauty. [2]. Nowadays, the identifying of various herbs for the development of new

products, which are more beneficial to the consumers by proving smoothness, depigmentation, increase glow etc., of their skin. Beauty products are having huge demand in the market. Several herbal extracts are included in the preparation of expensive cosmetics based on the medicinal properties [3]. Madame Rowley first invented facial mask was called as the Toilet mask or Face glove, and 1875 patented as 'Mask for Medical Purpose' Facial masks widely believed to provide nourishment, rejuvenation, cleanse the pores, increase skin glow and reduce facial wrinkles and pigmentation [4].

The facial skin reflects an individual's health [5,6], which is made up of amino acids, lipids, and carbohydrates, so, it requires a well-balanced supplement to maintain it glowing and healthy skin [7]. Since ancient times herbs were widely to manage the beauty. The face pack made up of herbs is used to treat pigmentation, sunburns, scars, wrinkles pimples and scars [8]. Natural face packs include secondary metabolites like phenolic, flavonoids, polyphenolic, terpenoids and essential vitamins possess antioxidant, anti-inflammatory, antiseptic and antimicrobial properties, are essential for our skin's wellness and radiance [9]. Multani Mitti also called as Fuller's Mitti, is composed of magnesium chloride, aluminium silicate and Calcium bentonite. In Indian history Multani mitti is used along with sandal wood paste and gram flour to enhance the beauty by various ways such as cleansing skin, reducing pore sizes, improving blood circulation, removing dead cells, complexion, soothing effect and reducing acne. Multani mitti was mixed with water and applied to the feet of solider to reduce inflammation during second world war [10].

Turmeric (Curcuma longa L.) is commonly called as haldi (Zingiberaceae), is used as spice and is important drug in the traditional systems of Ayurveda, Unani, and Siddha [11]. Sometimes referred to as 'Indian saffron,' is a golden yellow spice, native to Southeast Asia. It's rich in skin-care substances, such as vitamins, antioxidants, fatty acids, and phenolic compound called curcumin. Curcumin is responsible for the vast majority of turmeric's skin benefits [12].The turmeric widely used to treat various diseases like respiratory disorders, rheumatism, diabetic, skin cancer, wounds, urinary tract infections, liver disorders etc.,[13]. Turmeric contains one of the important phytochemicals are curcuminoids (curcumin), which possess various pharmacological properties like antimalarial, anticancerous, hypolipidemic, immunostimulatory, antioxidant etc., [14-18]. Turmeric has important role as cosmetic: antiaging, depigmentation and reduced scars due to its antioxidant and anti-inflammatory properties.

Neem (*Azadirachta indica*) belongs to family Meliaceae, contains various phytoconstituents such as nimbin, nimbidin, nimbolide, and limonoids. skin color depends pigment melanin which is synthesized by pathway called as melanogenesis. Hyperpigmentation condition leads brown or gray patches on facial skin. Azadirachta indica useful in hyperpigmentation because it contains phytochemicals like limonoids which acts as melanogenesis inhibitors [18]. The pharmacological properties reported including antioxidant [19], anti-inflammatory [20], antidiabetic [21] , antipyretic, antimicrobial [22], anticancerous [23], and hepatoprotective [24]. Sandal wood (Santalum alba), belong to family Santalaceae, commonly called as Chandana. Sandalwood is an astringent, induce soft tissue contraction which leads to sooth and tighten, brighten the skin and reduces the appearance of pores and also useful in skin conditions like eczema, dermatitis and psoriasis. It also helps reduce infection in areas hosting pimples, cuts or superficial wounds and keep the skin clean. Sandalwood paste is applied to the skin to reduce aging, tanning, acne and redness, it can dry out and heal faster due to its a drying effect [25]. Products have long been employed in health foods and for medical purposes. It has anti-inflammatory, antifungal, antioxidant properties, which indicates excellent potential in antiaging cosmetic and skin protection products.

Aloe Vera (*Aloe barbadensis*), contains vitamins (A, C, E, D, B1-3), minerals, essential amino acids, terpenoids, phenolic compounds and polysaccharides provides protection the skin. [26-28]. Traditionally Aloe vera was used to treat skin diseases due to its anti-microbial property. Aloe vera has a great moisturising effect on skin. Aloe vera pharmacological activities reported: anti-inflammatory [29], laxative [30], anti-viral, anti-tumour [31], antiseptic, moisturizing and antiaging activities [32]. Gram or Besan flour (*Cicer arietinum*), belongs to family Fabaceae, has long been used in India as pulse and for skin. Gram flour is rich in fatty acids, vitamins (like riboflavin, foliate and niacin), proteins and beta carotene. Gram flour exfoliates the skin without irritation and helpful in restoration of natural skin by reducing tan, oil and reduce pores. Gram flour acts as antiaging, fades acne scars and removes blockheads [33-34].

Rice flour (*Oryza sativa*), belongs to family Oryzoideae, has been used as a beauty aid for both skin and hair. Rice contains allantoin, ferulic acid, para-amino benzoic acid, phytic acid flavonoids, anthocyanins,

proanthocyanins, tocopherols, tocotrienols and γ-oryzanol [35]. Bioactive components of rice possess antiaging, skin glowing, prevent damage from ultraviolet rays, shed outermost dead cells and makes skin looks younger. The Rice flour also shows antioxidant, wound healing, anti-inflammatory and antimicrobial activities [36]. Rose petals powder, The queen of flowers! And the symbol of love and beauty. Rose petals contains various active compound like anthocyanin, glavonols, procynaidins and proanthocyanidins, ellagitannins and phenolic acids [37-39]. Rose petal powder useful as a nerve healer, cleanses and nourished skin, maintains skin tone, as exfoliant, antioxidant, anti-inflammatory and Antiaging properties [40].

Orange peel (*Citrus sinensis*) belongs to family Rutaceae, are rich in vitamin C, flavonoids, beta carotene, heperidin, pectin, fibre, minerals (Zinc, potassium, sodium, iron, manganese, calcium) folic acid and amino acids [41]. Orange peel has been reported to present antibacterial [42], antioxidant [42], larvicidal, anti-tumour and anti-inflammatory [43]. Peel is used in cosmetic formulation such as antifungal soaps, face packs, in lotions and creams [44]. Vitamin C and natural oils helpful in keeping skin hydrated, reduces the appearance of aging signs. Presence of vitamin C, natural oils and citric acid in orange are very beneficial properties such as cleanse, as toner and glow the skin, depigmentation, removal of wrinkle and minimizes DNA damage [45-46].

2. Material and Methods

2.1 Plant Materials

The materials such as turmeric, neem, orange peel, multani mitti, gram flour, rose petals, sandal wood, rice flour and aloe vera, were purchased from local market, Chickballapur district, Karnataka, India. dried and powdered and used for preparation of herbal face pack.

2.2 Preparation of polyherbal face pack

Four formulations of polyherbal face pack (F1-F4) are composed of a definite ratio of all the ingredients mentioned in table no.1 (Fig. No.1). the required ingredients were passed through the sieve No. 100. Then all the ingredients were mixed geometrically and formulated face pack was packed [47].

Preparation of polyherbal face pack for application the required amount of prepared herbal face pack powder in a bowl and add rose water and make smooth paste.

1. The smooth paste of the prepared face pack was applied on the skin.
2. Allow it for 30-40 Min and finally wash with cold water
3. Allow it for 30-40 minutes minutes and finally wash with cold water.

Table 1. Formulation of polyherbal formulation (F1-F4) 100 gm each formulation

No.	Name of the ingredients (in powder form)	Quantity of ingredients for 100 gm			
		F_1	F_2	F_3	F_4
1	Neem	3	3.5	3.2	3.7
2	Turmeric	5	5	5.8	5.3
3	Multani mitti	20	22	18	15
4	Gram flour	20	15	22	10
5	Rice flour	10	4	3.5	3
6	Orange peel	17	18	15	20
7	Rose petals	5	6	10	8
8	Sandal wood	15	10	11	13
9	Aloe vera	5	8	7	10

Figure 1. Polyherbal face pack formulation (F1-F4)

2.3 Methods of Evaluation [48-49]

The prepared polyherbal face packs were evaluated by:

2.3.1 Organoleptic Evaluation of face pack by checking the colour, odour, appearance and texture.

2.3.2 Physical-chemical evaluation:

2.3.2.1 Determination of Moisture Content

Weigh about 2 gm of polyherbal face pack into a porcelain dish and dry at 100°C-105°C by keeping in hot air oven, cooled in desiccator and weighed. Then estimate the loss weight on drying.

2.3.2.2 Total Ash

2 g of polyherbal face pack in a previously ignited and tared silica crucible. Face pack was spread in and even layer in crucible and kept in maffle furnace and ignite it by gradually increasing the heat to 550°C until the sample become completely absence of carbon. Cool in a desiccator and weigh. Then total ash content was calculated in mg per gram

2.3.2.3 Acid–Insoluble Ash

The total ash was transferred to beaker and add 25 ml of dilute hydrochloric acid. Then filter the solution through ashless filter paper to collect insoluble matter. The filter paper containing insoluble matter was transferred to the crucible and dried and ignite to get constant weight. The residue remains were kept in desiccator and weighed. Calculate the content of acid-insoluble of acid-insoluble ash in mg per g of air-dried material.

2.3.2.4 Water-Soluble Ash

The total ash was boiled for 5 min with 25 ml of water in beaker. Insoluble matter was collected on ash less filter paper and ignited for 15 min at temperature not exceeding 450 °C. The difference in the weight of the ash and weight of the insoluble matter represents the water-soluble ash. The percentage of water-soluble ash in mg per gram was calculated with reference to the dried face pack.

2.3.3. Rheological Evaluation

The flow property of the formulated polyherbal face pack (F1-F4) were evaluated by performing Bulk density, tapped density and angle of repose by funnel method.

2.3.3.1 Bulk Density

Required amount of the polyherbal face pack powder was added to 50 ml measuring cylinder. Then the cylinder dropped onto a hard wood surface from a height of 1 inch. Then the volume of the powder in the cylinder was measured. The Bulk Density is calculated by using the below given formula.

Bulk Density = Volume/Mass

2.3.3.2 Tapped Density

The initial volume of polyherbal face pack powder in measuring cylinder was observed and then tape the cylinder mechanically and volume or mass was measured. It was expressed in grams per cubic centimetre (g/cm3).

Tapped density = Mass of powder/Tapped volume

2.3.3.3 Angle of Repose

The angle of repose was determined by the fixed funnel method. Through the funnel polyherbal face pack was poured until the tip of the funnel was just touched by the apex of the conical heap.

Angle of Repose (θ) = Tan (h/r)

Where angle of repose θ is h- height of the heap and r- radius of the base.

2.3.3.4 Hausner's ratio and Carr's index

Hausner's ration and Carr's index has been used as an indirect method for determining the flowability of polyherbal face pack powder formulations.

Hausner's ratio = Tapped density/ Bulk density

Carr's Index = (Tapped Density - Bulk Density)/Tapped Density X 100

3. Results and Discussion

3.1 Organoleptic Evaluation:

The prepared polyherbal face packs (F1-F4) underwent organoleptic evaluation based on Table 2. These formulations exhibited a slight yellowish color, pleasant odor, and overall acceptability, which are desirable characteristics for cosmetic products. The texture of all formulations was consistently fine and smooth, contributing to their sensory appeal and ease of application.

3.2 Physicochemical Evaluation

Polyherbal face packs (F1-F4) were assessed for various physicochemical parameters, as detailed in Table 3. The pH of all polyherbal formulations was determined to be neutral, ensuring compatibility with skin and minimal risk of irritation. Additionally, the ash values and moisture content were found to be within acceptable limits, indicating good stability and quality control during formulation.

3.3 Rheological Evaluation

The formulated polyherbal face packs underwent rheological evaluation to characterize their flow properties, as presented in Table 4. Parameters such as angle of repose, bulk density, tapped density, Hausner's ratio, and Carr's index were measured. The findings indicated that all polyherbal formulations exhibited free-flowing properties, which are essential for easy application and uniform distribution on the skin.

In summary, the organoleptic evaluation confirmed the sensory attributes of the polyherbal face packs, while the physicochemical evaluation ensured their stability and skin compatibility. The rheological evaluation demonstrated that the formulations possess favorable flow properties, enhancing their usability and effectiveness as cosmetic products. These comprehensive evaluations support the suitability of the polyherbal face packs (F1-F4) for cosmetic use, highlighting their potential for promoting skin health and appearance.

Table 2. Organoleptic evaluation

No.	Parameters	Observation			
		F1	F2	F3	F4
1	Bulk density	0.39 g/ml	0.4 g/ml	0.38 g/ml	0.38 g/ml
2	Tapped density	0.66 g/ml	0.62 g/ml	0.64 g/ml	0.58 g/ml
3	Angle of repose	43.37	45	41.75	42.8
4	Haussner's ration	1.69	1.58	1.68	1.52
5	Carr's Index	40.9%	33.9%	40.79%	36.2%

Table 3. Physicochemical evaluation

No.	Evaluation parameters	Observation			
		F1	F2	F3	F4
1	Colour	Slightly yellowish	Slightly yellowish	Slightly yellowish	Slightly yellowish
2	Odour	Pleasant	Pleasant	Pleasant	Pleasant
3	Appearance	Free flowing powder	Free flowing powder	Free flowing powder	Free flowing powder
4	Texture	Fine	Fine	Fine	Fine
5	Smoothness	Smooth	Smooth	Smooth	Smooth

Table 4. Rheological evaluation

No.	Parameters	Observation			
		F1	F2	F3	F4
1	pH	7.19	7.13	7.26	7.59
2	Loss on drying	0.19 %	0.17 %	0.18 %	0.15 %
3	Ash content				
	a. Total ash value	4.4 %	4.3 %	4.1 %	4.2 %
	b. Water Soluble ash value	2.5 %	2.3 %	2.6 %	2.1 %
	c. Acid insoluble ash value	1.4 %	1.2 %	1.0 %	1.2 %

4. Conclusion

In conclusion, the polyherbal face packs (F1-F4) developed in this study have undergone thorough evaluation across organoleptic, physicochemical, and rheological parameters. Organoleptically, these formulations exhibited desirable characteristics such as a slight yellowish color, pleasant odour, and fine, smooth texture, making them appealing for cosmetic applications. Prepared Polyherbal face pack contains secondary metabolites like tannins, flavonoid, phenolic compounds, amino acids, vitamins etc., are well benefited in providing smoothness, glowing and prevent damage of skin from ultraviolet rays and restore the natural glow of the skin. Herbal face pack are acceptable for its nontoxic effects or few side effects and economical.

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References

[1] https://organiko.in/blogs/new-blog/ancient-egyptian-beauty-secret-in-india.

[2] Thanya Promsor. Development of Herbal Facial Mask Cream from Suan Sunandha Palace Facial Beauty. International Journal of Advances in Science Engineering and Technology. 2017;5(1):23-26.

[3] Sabmanee C. “Research Development Production and Verify Herbal Extract”, Research Institute of Science and Technology, Thailand, 2006.

[4] *Karen J. Carlson (1996). The Harvard Guide to Women's Health. Harvard University Press. p. 574.*

[5] Okereke JN, Udebuani AC, Ezeji EU, Obasi KO, Nnoli MC. Possible health implications associated with cosmetics: A review. Sci J Public Health 2015; 3:58-3.

[6] Lupo MP. Antioxidants and vitamins in cosmetics. Clin Dermatol 2001; 19:467-73.

[7] Sowmya KV, Darsika CX, Grace F, Shanmuganathan S. Formulation and evaluation of poly-herbal face wash gel. World J Pharm Pharm Sci 2015; 4:585-8.

[8] Millikan LE. Cosmetology, cosmetics, cosmeceuticals: Definitions and regulations. Clin Dermatol. 2001; 19:371-4.

[9] Rubia C.G. Correa, Rosane M. Peralta, Charles WI Haminiuk, Giselle Maria Maciel, Adelar Bracht, Isabel CFR Ferreira. New Phytochemicals as potential human anti-aging compounds: reality, promise and challenges. Critical Reviews in food Sciences and Nutrition 2018; 58(6): 942-957.

[10] https://www.healthline.com/health/beauty-skin-care/multani-mitti-for-face#benefits

[11] Amalraj A, Piusb A, Gopib S, Gopia S. Biological activities of curcuminoids, other biomolecules from turmeric and their derivatives—A review. J Tradit Complement Med. 2016

[12] https://www.kiehls.com/skincare-advice/turmeric-skin-benefits.html

[13] Ammon HPT, Wahl MA. Pharmacology of *Curcuma longa*. Planta Med. 1990; 57:1–7. doi: 10.1055/s-2006-960004.

[14] Dixit VP, Jain P, Joshi SC. Hypolipidaemic effects of *Curcuma longa* L. and *Nardostachys jatamansi*, DC in triton-induced hyperlipidaemic rats. Indian J Physiol Pharmacol. 1988; 32:299–304.

[15] Huang MT, Lou YR, Ma W, Newmark HL, Reuhl KR, Conney AH. Inhibitory effects of dietary curcumin on forestomach, duodenal, and colon carcinogenesis in mice. Cancer Res. 1994; 54:5841–5847.

[16] Panahi Y, Saadat A, Beiraghdar F, Nouzari SMH, Jalalian HR, Sahebkar A. Antioxidant effects of bioavailability-enhanced curcuminoids in patients with solid tumors: a randomized double-blind placebo-controlled trial. J Funct Foods. 2014; 6:615–622. doi: 10.1016/j.jff.2013.12.008.

[17] Rao CV, Rivenson A, Simi B, Reddy BS. Chemoprevention of colon carcinogenesis by dietary curcumin, a naturally occurring plant phenolic compound. Cancer Res. 1995; 55:259–266.

[18] Ajay Kumar, Amit Kishore Singh, Manish Singh Kaushik, Surabhi Kirti Mishra, Pratima Raj, P.K Singh, K.D. Pandey. Interaction of turmeric (*Curcuma longa* L.) with beneficial microbes: a review. 3 Biotech.7 (6):357;2017.

[19] Akihisa, T.; Takahashi, A.; Kikuchi, T.; Takagi, M.; Watanabe, K.; Fukatsu, M.; Fujita, Y.; Banno, N.; Tokuda, H.; Yasukawa, K. The melanogenesis-inhibitory, anti-inflammatory, and chemopreventive effects of limonoids in n-hexane extract of Azadirachta indica A. Juss. (Neem) Seeds. J. Oleo Sci. **2011**, 60, 53–59.

[20] Mohammad A. Alzohairy. Review article Therapeutics Role of *Azadirachta indica* (Neem) and their active constituents in disease prevention and treatment. Evid. Based Complement Alternat. Med. 2016: 1-13

[21] Rahmani A. H., Alzohairy M. A., Khan M. A., Aly S. M. Therapeutic implications of black seed and its constituent thymoquinone in the prevention of cancer through inactivation and activation of molecular pathways. *Evidence-Based Complementary and Alternative Medicine*. 2014; 1-13.

[22] Ilango K., Maharajan G., Narasimhan S. Anti-nociceptive and anti-inflammatory activities of *Azadirachta indica* fruit skin extract and its isolated constituent azadiradione. *Natural Product Research*. 2013;27(16):1463–1467.

[23] Akter R, Mahabub-Uz-Zaman M, Rahman MS, Khatun MA, Abdullah M, Ahmed NU, Islam F. Comparative studies on antidiabetic effect with phytochemical screening of *Azadirachta indicia* and *Andrographis paniculata*. *IOSR Journal of Pharmacy and Biological Sciences*. 2013;5(2):122–128.

[24] Devmurari VP, Jivani N P. Hepatoprotective activity of methanolic and aqueous extracts of *Azadirchata indica* leaves. *International Journal of PharmTech Research*. 2010;2(2):1037–1040.

[25] https://www.vogue.in/content/skin-care-alphabet-sandalwood-benefits-for-face-skin-tan-ayurvedic-skincare-ingredient.

[26] Atherton P. Aloe vera revisited. Br J Phytother. 1998; 4:76–83.

[27] Shelton M. Aloe vera, its chemical and therapeutic properties. Int J Dermatol. 1991; 30:679–83.

[28] Atherton P. The essential Aloe vera: The actions and the evidence. 2nd ed 1997.

[29] Hutter JA, Salmon M, Stavinoha WB, Satsangi N, Williams RF, Streeper RT, et al. Anti-inflammatory C-glucosyl chromone from Aloe barbadensis. J Nat Prod. 1996; 59:541–3.

[30] Ishii Y, Tanizawa H, Takino Y. Studies of aloe. V: Mechanism of cathartic effect. Biol Pharm Bull. 1994; 17:651–3.

[31] Kim HS, Lee BM. Inhibition of benzo [a] pyrene-DNA adduct formation by aloe barbadensis Miller. Carcinogenesis. 1997; 18:771–6.

[32] West DP, Zhu YF. Evaluation of Aloe vera gel gloves in the treatment of dry skin associated with occupational exposure. Am J Infect Control. 2003; 31:40–2.

[33] Amar Surjushe, Resham Vasani, Saple DG. Aloe Vera: A Short Review. Indian J Dermatol. 2008;53(4):163-166

[34] https://www.femina.in/beauty/benefits-of-gram-flour-for-skin-84681.html

[35] https://pgshop.in/blog/11-amazing-skin-benefits-of-besan-3-simple-besan-face-packs-for-fair-skin/

[36] https://www.bellchem.com/news/rice-flour-uses-in-skin-care-products

[37] Piebiep Goufo, Henrique Trindade. Rice antioxidants: phenolic acids, flavonoids, anthocyanins, proanthocyanidins, tocopherols, tocotrienols, c-oryzanol, and phytic acid. Food Science & Nutrition, 2014; 2(2): 75– 104

[38] Ochir S, Ishii K, Park B, Komatsu K, Namba T. "Botanical origin of Mei-gui Hua (petal of a *Rosa* species)," Journal of Natural Medicines, 2010;64(4):409–416.

[39] Nowak R, Olech M, Pecio L, *Kicel A, Katarzyna W, Krzysztof G, Karolina P, Piotr P, Artur W., "Cyto*toxic, antioxidant, antimicrobial properties and chemical composition of rose petals," Journal of the Science of Food and Agriculture, vol. 94, no. 3, pp. 560–567, 2014.

[40] Cendrowski, I. Ścibisz, M. Kieliszek, J. Kolniak-Ostek, and M. Mitek, "UPLC-PDA-Q/TOF-MS profile of polyphenolic compounds of liqueurs from Rose petals (Rosa rugosa)," *Molecules*, 2017;22(11); 1832.

[41] https://mesmara.com/2019/08/31/uses-and-benefits-of-rose-petal-powder/

[42] Concepción Sánchez-Moreno, M Pilar Cano, Begoña de Ancos, Lucía Plaza, Begoña Olmedilla, Fernando Granado, Antonio Martín. Effect of orange juice intake on vitamin C concentrations and biomarkers of antioxidant status in humans, Am J Clin Nutr. 2003;78(3):454-60.

[43] https://skinkraft.com/blogs/articles/fruits-to-eat-for-glowing-skin

[44] Wijiastuti L. Antibacterial Activity of Sweet Orange Fruit Peel (*Citrus sinensis* (L) Osbeck) Against *Staphylococcos aureus, Escherichia coli* multi resistant and BSLT (In Bahasa Indonesia). Skripsi. Fakultas Farmasi, Universitas Muhammadiyah Surakarta, 2011.

[45] Hegazy AE, Ibrahium MI. Antioxidant activities of orange peel extracts. World Appl Sci J. 2012;18(5):684–8.

[46] Gil-Izquierdo A, Gil MI, Ferreres F, Tomas-Barberan FA. *In vitro* availability of flavonoids and other phenolics in orange juice. J Agric Food Chem. 2001;49(2):1035–41.

[47] Doha H, Abou Baker, Bassant MM, Ibrahim, Yasmin Abdel Latif, Nabila S, Hassan, Emad M, Hassan, Souad El Gengaihi. Biochemical and Pharmacological prospects of *Citrus sinensis* peel. Heliyon; 2022; 8:1-14.

[48] Farheen B, Mohammad I. Design and Development of Unani Face Pack for Skincare. European J Pharm Med Res 2016; 3(12): 627-632.

[49] Saxena PR, Pal Y, Wal P. 2017. In-House Preparation and Standardization of Herbal Face Pack. The Open Dermatology Journal, 11:72-80.