International Journal of Research and Review
Volume 11; Issue: 12; December 2024
Website: www.ijrrjournal.com
Research Paper *E-ISSN: 2349-9788; P-ISSN: 2454-2237*

Formulation and Evaluation of Natural Rice Flour Face Scrub

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DOI: https://doi.org/10.52403/ijrr.20241253

ABSTRACT

In ancient times, cosmetics were derived from natural sources such as plants, minerals, and animals which were used for various purposes including skincare, haircare, and spiritual rituals. Herbal cosmetics are skincare and beauty products that utilize plant-based ingredients such as herbs, roots, flowers, and essential oils to promote health and natural beauty. Herbal cosmetics offer numerous benefits, including improved skin health, reduced inflammation, enhanced natural beauty, and minimal risk of adverse reactions. An herbal face scrub is a gentle exfoliating product that utilizes natural herbs and botanicals to remove dead skin cells, reduce acne, and improve skin tone and texture. The main objective of this study was to formulate and evaluate natural rice flour face scrub. The preparation consists of natural constituents such as unpolished rice flour, shea butter, kokum butter, coconut oil, and vitamin E oil capsules. Different formulations were formulated and evaluated for various parameters such as organoleptic properties, viscosity, spreadability, pH, homogeneity, and washability and were found to be satisfied with all required characterizations. Thus, the prepared formulation of natural rice flour face scrub was effective for healthy, clear, and glowing skin.

KEYWORDS: Herbal scrub, exfoliating, natural constituents.

INTRODUCTION

The history of cosmetics dates back an impressive 7,000 years, with early evidence of cosmetic use found in ancient Africa. The ancient civilizations of Egypt and India are credited with laying the foundations of cosmetology, with the Indus Valley civilization providing some of the earliest recorded evidence of cosmetic products and applications around 2500-1550 B.C. In ancient India, cosmetology was highly advanced, with a wide range of cosmetics and beauty treatments used by both men and women. These practices were often closely tied to the changing seasons and daily rituals, highlighting the importance of beauty and self-care in ancient Indian culture [1].

In ancient India, Cosmetic were a holistic practice that combined physical adornment with spiritual and philosophical significance. Cosmetics were believed to promote not only beauty, but also spiritual merit, endurance, good health, and joyfulness.

One of the earliest recorded references to a beautician can be found in the holy script of Hindus, the Mahabharata. In this ancient text, Draupadi is described as working as a beautician, or 'Sairandhri,' in the service of the queen of Virata during the Pandava's exile period. This reference highlights the important role that beauticians and beauty practitioners have played in human culture

for thousands of years. Furthermore, she is described as carrying a 'prasadhanapetika', a vanity case used to store various beauty substances, personal hygiene items, and decorative objects [2].

Figure No. 1 Ancient cosmetic

The term "cosmetic" originates from the Greek word "Kosmeticos," meaning "to adorn" or "to prepare." Cosmetics are defined as external preparations applied to the body's external surfaces, such as skin, hair, and nails, to achieve various benefits, including coloring, cleansing, softening, and protecting.

Cosmetics are defined as products applied to the human body to achieve cleansing, beautification, attractiveness enhancement, or appearance alteration" [3].

Cosmetics are formulated from a blend of chemical compounds, which can be naturally sourced or synthetically produced. These products serve multiple purposes, including skin care, concealing imperfections, evening out skin tone, and accentuating natural features [4].

Cosmetic products aim to promote healthy, smooth, and beautiful skin and hair. Despite being effective, many products contain harsh synthetic chemicals that can cause skin problems such as irritation, necrosis, corrosion, urticaria, and respiratory issues. Studies have revealed that certain chemicals, including parabens, formaldehyde, toluene, benzene, and phthalates, possess carcinogenic properties. The widespread use of synthetic chemicals in cosmetics, from makeup to hair care products, raises concerns. These chemicals can inhibit skin breathing, harbor bacteria, and cause skin issues.

The skin is the body's largest organ, playing a vital role in immunity, insulation, temperature regulation, sensation, and vitamin production. Damaged skin can lead to scar tissue formation, discoloration, and depigmentation. Human skin pigmentation varies, and skin types range from dry to oily [5].

Healthy skin is characterized by the absence of skin disorders. As the body's outermost layer, the skin plays a vital role in protecting internal organs and regulating bodily functions. Proper care and nutrition are essential to maintain healthy, fresh, and moisturized skin.

The skin's functions extend beyond aesthetics, as it facilitates various bodily processes and shields the body from external harm. Therefore, practicing good body care is crucial to support the skin's protective role and overall well-being [6].

From a cosmetic perspective, skin types are categorized based on factors such as sebaceous secretion, hydration, and sensitivity. To achieve healthy, radiant skin, it's essential to recognize and address the distinct needs and characteristics of your individual skin type. Genetics primarily determine skin type, but other factors can influence it, and it can change over time.

There are five main types of healthy skin:

1. Normal skin
2. Dry skin
3. Oily skin
4. Combination skin (both oily and dry)
5. Sensitive skin.

Each skin type has its own set of characteristics, which are described below.

Figure No.2 Different types of skin

Normal Skin: Characterized by a balanced texture, neither too dry nor too oily. With its balanced tone and low-maintenance needs, normal skin is frequently envied as the ultimate skin ideal.

Sensitive Skin: Easily reacts to stimuli that normal skin can tolerate. This skin type is extremely fragile and frequently experiences discomfort, including sensations of heat, tightness, redness, or itching. Sensitive skin has a compromised barrier function, making it vulnerable to infections, allergic reactions, and irritation from external substances.

Dry Skin: Typically caused by external factors like weather, low humidity, and hot water. Symptoms include:

- Tightness and roughness
- Ashy grey colour
- Desquamation (flaking)
- Dry skin can manifest through a range of uncomfortable symptoms, including itching, redness, and small cracks.
- Oily Skin: Characterized by:
- The appearance of oily skin is typically marked by noticeable pores, a humid glow, and a bright complexion.
- Hyperactive sebaceous glands are responsible for the excessive fat production characteristic of oily skin.
- Genetics and hormonal fluctuations often play a significant role in determining this condition.
- Most frequently seen in adolescents and young people during their teenage years and twenties.
- Frequently more prone to acne breakouts.
- Combination Skin: Exhibits characteristics of both dry and oily skin due to the uneven distribution of sebaceous and sweat glands. Typically:
- The T-zone, encompassing the forehead, nose, and chin, is commonly associated with oiliness.
- The skin on the cheeks is normal or dry [7].

Modern cosmetology emphasizes rigorous quality control in the manufacturing of cosmetic products, ensuring their appearance and packaging meet high standards. A wide range of cosmetic preparations are available, which can be classified into several categories.

Cosmetic preparations can be categorized in three ways:

According to the Region of Application

1. Skin Care
2. Hair Care
3. Nail Care
4. Oral Care
5. Eye Care

According to Function

1. Emollients: Cold creams, vanishing creams, foundation creams, lotions, and solutions.
2. Cleansing Agents: Creams, shampoos, and rinses.
3. Decorative Cosmetics: Lipsticks, rouges, eyeliner, lacquers, and dressing preparations.
4. Deodorants/Antiperspirants: Sprays, sticks, and mouthwashes.
5. Protective Products: Creams and powders.
6. Luxury and Leisure Products: Salts, powders, oils, and milk.

According to Composition

1. Powder
2. Lotions
3. Emulsions
4. Solutions
5. Suspensions
6. Creams
7. Paste
8. Gels
9. Aerosol
10. Sticks
11. Pencils [3].

Skin issues can be addressed through both natural and modern treatments. Natural care, in particular, utilizes traditional ingredients and methods passed down through generations. These natural ingredients, often in the form of scrubs, help cleanse and treat the skin, removing dirt and dead skin cells.

The process of scrubbing involves massaging the skin to remove impurities, resulting in immediately visible benefits, including:

- Smoother skin
- Firmer skin
- Healthy, glowing skin

The advantages of using traditional cosmetics include:

- A natural, safe, and healthy sensation on the skin
- The use of traditional ingredients that are gentle on the body and skin. [6].

Maintaining healthy and radiant skin requires regular cleansing to remove impurities such as dirt, grime, dead cells, and excess secretions. Exfoliation is a vital skincare process that eliminates the top layer of dead skin cells, revealing smoother skin. This can be achieved through two methods:

1. Chemical Exfoliation (using alpha and hydroxy acids)
2. Mechanical Exfoliation (using abrasives)

Regular mechanical exfoliation helps stimulate the skin's natural shedding process, resulting in smoother, healthier-looking skin. Skincare scrub products, also known as skin or body polishers, are a specialized category of cleansing products. These exfoliating cleansers focus on:

- Cleansing
- Conditioning
- Treating the skin

Facial scrubs are unique cleansers that incorporate small particles made from natural ingredients or polymers. These scrubs provide a deep cleansing experience, offering a higher level of skin exfoliation through gentle abrasion with the particles.

Some examples of natural scrub particles include:

- Fruit seeds (e.g., kiwi, cranberry, raspberry)
- Nutshells (e.g., almond, walnut)
- Grains (e.g., brown rice)
- Sandalwood.

A typical face scrub consists of:

1. Exfoliant: Removes dead skin cells and smooths skin texture.
2. Carrier oil or cream: Suspends the exfoliant and moisturizes the skin.
3. Fragrance: Often provided by essential oils, which can promote relaxation and well-being.

Facial scrubs are formulated with mild abrasives that gently remove dead and dying skin cells, revealing brighter, smoother skin [8].

Ideal Properties of a Scrub:

An ideal scrub should possess the following properties:

1. Non-toxic and gentle: Small, gritty particles that are non-irritating and non-sticky.
2. Mild abrasive: Effective in removing dead skin cells without irritating them.
3. Skin benefits: Helps achieve radiant, healthy-looking skin by reducing pores, preventing breakouts and acne, and concealing wrinkles.
4. Skin absorption: Allows for better absorption of skincare products, improves tan, and maintains skin pH.
5. Importance of scrubbing: Removes dead skin cells, promoting healthy skin and preventing skin problems.
6. Additional benefits: Increases blood circulation, leading to healthy, glowing skin [9].

The primary active ingredient used in this formulation is unpolished rice flour, Unpolished rice flour is a prized beauty ingredient, rich in various components beneficial for skin care and cosmetics. Unpolished rice flour is characterized by its unique blend of key components, which include:

1. Phenolic compounds: Effective antioxidants
2. Betaine: Helps in skin lightening by reducing melanin content
3. Allantoin: Moisturizes, reduces irritation, and promotes wound healing
4. Squalene: Its unique combination of emollient, antioxidant, and moisturizing properties makes it an effective ingredient for achieving healthy, radiant skin.
5. Selenium and inositol: Improve skin elasticity.
6. Magnesium and vitamins: Possess cooling and astringent properties

Rice flour also functions as an adhesive, allowing the scrub to stick to the skin and effectively remove dead skin cells [10][11].

MATERIALS AND METHODOLOGY

INGREDIENTS USED [12][13][14][15][16]

Table No.1 List of Ingredients used

INGREDIENTS	SOURCE	PLACE	USES	PICTURES
Unpolished rice flour	Organic rice that has been thoroughly milled	Local market	Exfoliator, Anti-ageing, skin brighter.	
Shea butter	Edible extract from the seed of shea tree	Amazon.in	Relieves dry skin, anti-inflammatory.	
Kokum butter	Fat obtained from the seeds of kokum tree	Amazon.in	Moisturiser, soothes sunburn.	
Vitamin E oil	Vitamin E capsules	Amazon.in	Reduces hyper-pigmentation.	
Coconut oil	Dried solid part of endosperm of coconut	Local market	Hydrates dry and rough skin, anti-microbial.	

Equipments:

Table No. 2 List of equipments

Sl no	Apparatus and Equipments
1	Weighing machine
2	Water bath
3	PH meter
4	Brookfield Viscometer

METHODOLOGY:

Method of preparation of face scrub.

Accurately measure the required ingredients using a digital balance. Next, transfer the weighed shea butter and kokum butter to a clean China dish. Melt the butters in a water bath at a temperature of 70-75°C. Once both types of butter are completely melted, add coconut oil and mix well. Then, gradually incorporate rice flour while stirring occasionally to ensure it mixes thoroughly. After that, add Vitamin E oil to the mixture. Stir vigorously to achieve a homogeneous blend and a creamy texture. Finally, transfer the product into an airtight container and store it at room temperature for further evaluation.

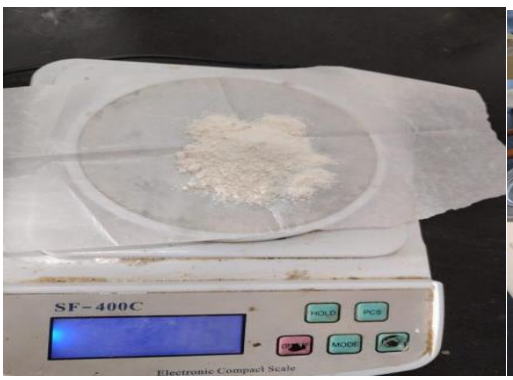


Figure No. 8 Weighing

Figure No. 9 Melting the butter

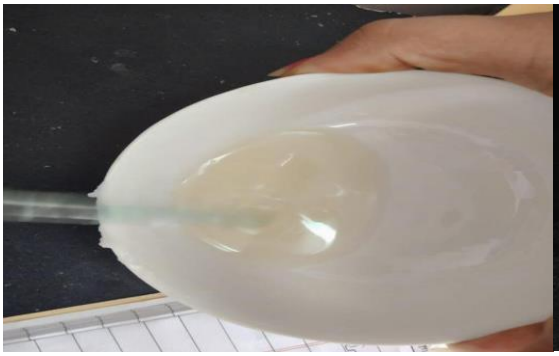


Figure No.10 Mixing

Figure No.11 Packaging

Table No. 3 Different formulations of face scrub

Sl.no	Ingredients	F1	F2	F3	F4	F5	F6
1	Unpolished Rice flour	3g	4g	3g	3g	2g	3g
2	Shea butter	3g	3g	3g	4g	4g	3g
3	Kokum butter	3g	3g	4g	3g	4g	3g
4	Vitamin E oil	3ml	2ml	2ml	2ml	2ml	2ml
5	Coconut oil	3ml	3ml	3ml	3ml	3ml	4ml
	Total Weight	15g	15g	15g	15g	15g	15g

Figure No. 12 Image of prepared formulations

EVALUATION PARAMETERS [17][18]

1. Organoleptic characteristics:

The appearance and colour were observed by visual examination. The odour was examined by smelling it.

2. Viscosity test:

The viscosity of the scrub was measured using Brookfield Viscometer, spindle no- 62 was selected to measure the viscosity. The spindle no- 62 was fixed to the Brookfield's Viscometer. Immerse the spindle inside the beaker containing scrub up to mark. Set the torque of the viscometer to 20 rpm. The viscosity of the scrub was displayed on a digital indicator, and the reading was noted.

Figure No.13 Brookfield's Viscometer

3. PH:

A pH meter is used to measure the alkalinity or acidity of the product. It is important to check the pH to make sure the scrub is within range and match the pH of the skin. The pH of the scrub was determined by using a

systonic digital pH meter. The pH of the formulation was measured using a calibrated digital pH meter. The electrode was immersed in the sample, and the reading was taken at a constant temperature.

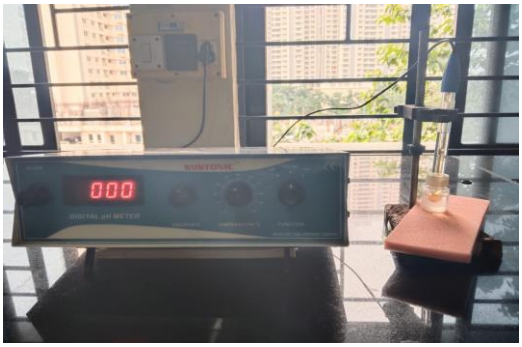


Figure No. 14 pH meter

4. Spreadability:

The spreadability test evaluates the spreading capacity of the scrub. About 1g of scrub was placed between two glass slides, and 100 gm of weight was placed on the slides. After 60 sec the time taken for the scrub to spread on the slide was measured. The result was obtained by applying a specific formula,

$S = \frac{m \times l}{t}$

Where,

S= Spreadability

m=Weight placed on slide

l= Length of glass slide

t= Time taken in sec

Figure No. 15 Spreadability

5. Homogeneity:

The homogeneity of the formulated scrubs was tested by pressing a small quantity of the scrub between the thumb and index finger.

6. Washability:

The washability of the scrub was examined by applying a small quantity of scrub on the skin and wash with water, then noting the result.

RESULT

1. Organoleptic test:

The organoleptic properties were evaluated at room temperature.

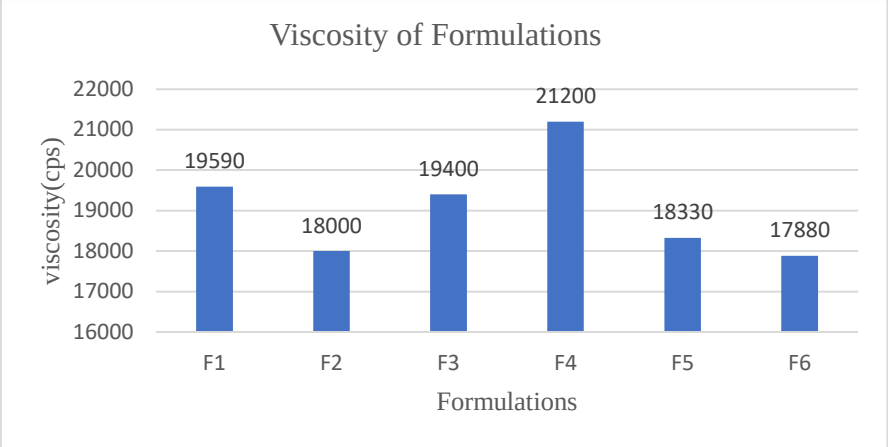
- Colour: Visual inspection revealed a brownish-white face scrub.
- Odour: Characteristic odor.
- State: Semisolid state of scrub.

2. Viscosity:

The viscosity of the formulated scrubs was evaluated under Brookfield's viscometer, and the results obtained were recorded.

Table No. 4 Viscosity of formulations

Formulation	Viscosity (cps)
F1	19590
F2	18000
F3	19400
F4	21210
F5	18330
F6	17880

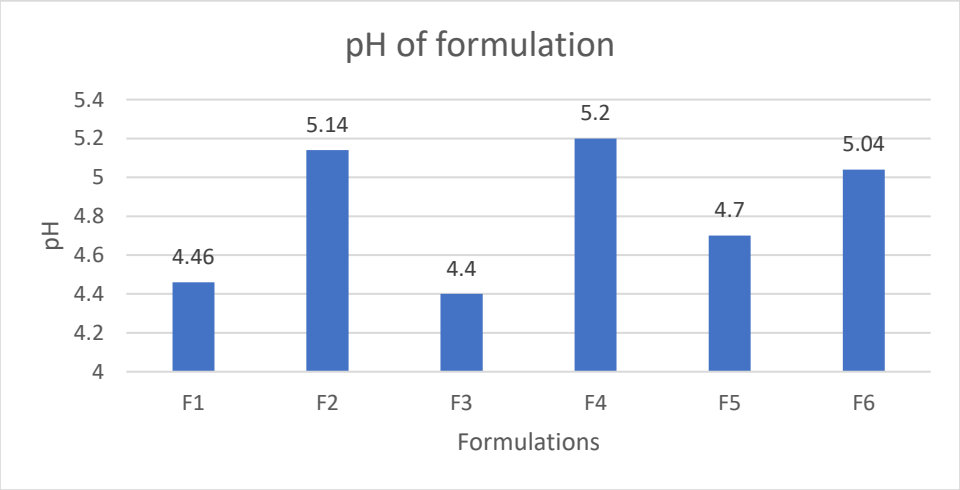


3. pH test:

The pH of the formulated scrubs was evaluated by using a calibrated digital pH meter and the readings were recorded.

Table No. 5 PH of formulations

Formulation	pH
F1	4.46
F2	5.14
F3	4.4
F4	5.2
F5	4.7
F6	5.04

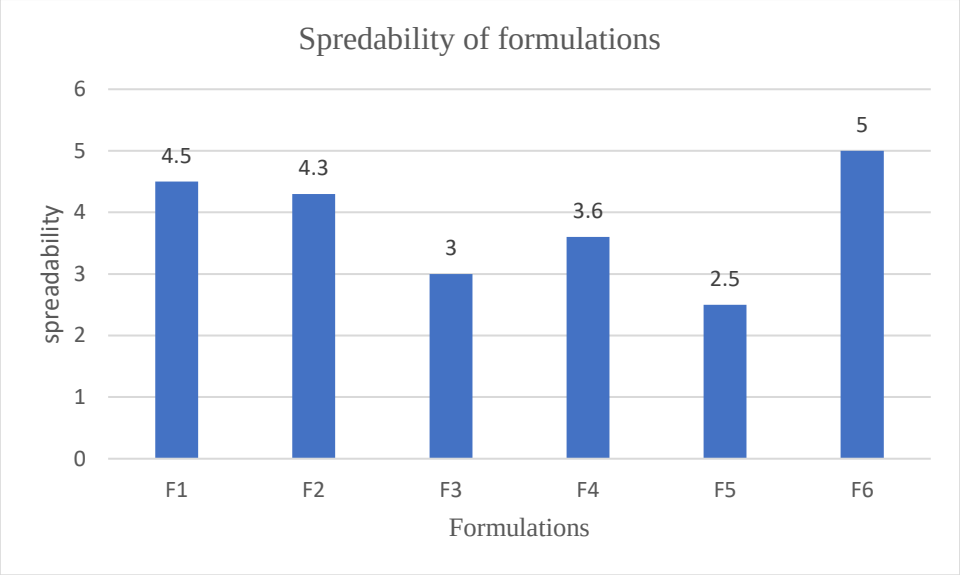


4. Spreadability:

The spreadability of the formulated scrubs were evaluated at room temperature. The results of spreadability for each scrub formulation was found to be as follows.

Table No. 6 Spreadability of formulations

Formulations	Spreadability (g.cm/sec)
F1	4.5
F2	4.3
F3	3
F4	3.6
F5	2.5
F6	5



5. Homogeneity:

The homogeneity of the formulated scrubs was tested by pressing a small quantity of the scrub between the thumb and index finger and the result was found with good and smooth consistency.

6. Washability:

The washability of the formulated scrubs was tested by applying a small quantity of scrub on the skin and washed with water and found that the scrubs were easily washable.

DISCUSSION

In this study, the natural rice flour face scrub was formulated and evaluated. The scrub consists of unpolished rice flour, shea butter, kokum butter, coconut oil, and vitamin E which has exfoliating activity, relieves dry skin, cleanses dirt particles, reduces dark spots, and moisturizes the skin respectively. Rice flour is a natural exfoliating agent which removes dead cells when rubbed onto the skin.

Different formulations F1 to F6 were prepared and tested for various evaluation parameters such as color, odor, texture, pH, spreadability, washability, and homogeneity. The color of the product was found to be a brownish-white color with a characteristic odor. The pH of the product was determined to be 5 and the consistency of the product was satisfactory with small gritty particles.

The formulation F6 was found to be very effective when compared to other five formulations. F6 exhibited a viscosity of 17880 cps and it was easily spreadable with 5g.cm/sec spreadability. Also, the scrub was easily washable with normal water. Thus, the developed formulation can be used as an effective scrub to achieve healthy and glowing skin.

CONCLUSION

In this study, the aim was to formulate a face scrub that is effective and stable using natural ingredients. Six formulations were prepared and compared with various parameters like color, odor, pH, spreadability, homogeneity, and washability.

The organoleptic properties of the formulated face scrub were acceptable i.e. there was no pungent odor. The viscosity and pH of the F6 were within the expected range and the spreadability value showed that the product was easily spreadable. F6 showed good consistency with no oil separation, no agglomeration of the particles, with good homogeneity, and was easily washable with normal water. Therefore, formulation F6 showed desirable results and was most effective compared to the other five formulations i.e. F1, F2, F3, F4, and F5.

Thus, to conclude, rice flour can be successfully formulated as a rice flour face scrub with other natural ingredients. Based

on the evaluation results, the formulated rice flour face scrub can be effectively used to improve the quality of the skin and help in achieving beautiful skin.

Declaration by Authors

Ethical Approval: Approved
Acknowledgement: None
Source of Funding: None
Conflict of Interest: No conflicts of interest declared.

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How to cite this article: Harshitha R, Harshitha P, Bindu N, Poojitha K J, Shreedevi N, Shubhashini J. Formulation and evaluation of natural rice flour face scrub. *International Journal of Research and Review*. 2024; 11(12): 484-493. DOI: *https://doi.org/10.52403/ijrr.20241253*

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