IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Formulation And Evaluation Of Activated Charcoal Peel Off Mask

Vaishnavi S. Gawande[1], Dr. Swati P. Deshmukh [2]

Shraddha Institute of Pharmacy, Washim. Assistant Professor Department of Pharmacology.

Abstract:- The human skin, a vital protective barrier, is constantly exposed to environmental pollutants, necessitating effective protection. Facial skincare products, including creams, lotions, and masks, play a pivotal role in safeguarding facial skin integrity. Peel-off masks, a unique dosage form, are gently applied and peeled off after a brief period, serving as remedies for various facial skin concerns such as wrinkles, aging, and acne. However, while literature abounds with formulations for herbal peel-off masks, the incorporation of activated charcoal as a key ingredient remains largely unexplored.

Activated charcoal, renowned for its exceptional adsorbent properties, presents a promising addition to peel-off masks. By harnessing its ability to adsorb dust particles and unclog pores, activated charcoal enhances the efficacy of peel-off masks, particularly in combating environmental pollutants. This paper presents a novel formulation of an Activated Charcoal Peel-Off Mask, accompanied by comprehensive evaluation through various test methods.

The formulation was meticulously crafted and rigorously tested to ensure optimal efficacy and safety. Subsequently, the Activated Charcoal Peel-Off Mask was applied to healthy female volunteers, yielding overwhelmingly positive results. This breakthrough in facial skincare not only offers protection against environmental aggressors but also stimulates metabolism, thanks to its occlusive effect. The inclusion of activated charcoal elevates the value of peel-off masks, providing a holistic solution for maintaining healthy and radiant facial skin.

Keyword:- Activated charcoal, Peel-off mask, Facial skincare, Environmental protection, Formulation, Evaluation, Adsorbent activity, Healthy volunteers.

Introduction:- In the realm of cosmetic skincare treatments, peel-off masks have emerged as a hallmark of luxurious beauty rituals, delivering intensive effects that leave skin feeling refreshed and revitalized. These high-quality powder masks, meticulously developed for use in beauty salons, offer a transformative experience by forming a second-skin-like barrier over the face, neck, and even hands. As the mask gradually solidifies, moisture is trapped within the horny layer, fostering hydration and

promoting the penetration of active substances deep into the skin.

Among the diverse range of peel-off formulations, those based on polyvinyl alcohol (PVA) have garnered attention for their ability to form occlusive films upon drying. Upon removal, these masks not only cleanse and moisturize the skin but also impart a tensor effect, enhancing skin firmness and elasticity. The addition of active substances, including those derived from ampoules, further augments the anti-aging, moisturizing, and toning properties of peel-off masks, resulting in visibly smoother and more radiant skin after just one application.

In addition to their cosmetic benefits, peel-off masks offer therapeutic advantages, serving as an alternative administration route for patients intolerant to oral antibiotics. The convenience, reduced dosing schedule, and patient-friendliness of peel-off masks make them an attractive option for skincare regimens aimed at addressing concerns such as blackheads, dead skin, andwrinkles.

Of particular interest is the incorporation of activated charcoal as a key ingredient in peel-off masks. Renowned for its exceptional adsorption capacity, activated charcoal effectively removes organic and inorganic contaminants, making it a valuable addition to skincare formulations. By absorbing dust particles and unclogging pores, activated charcoal enhances the efficacy of peel-off masks, resulting in a significantly improved skin profile.

This study endeavors to fill a gap in existing literature by formulating and evaluating Activated Charcoal Peel Off Masks. Through comprehensive testing methods, we aim to assess the physical characteristics and efficacy of the formulation, showcasing its potential as a transformative skincare solution. By harnessing the power of activated charcoal, we seek to provide consumers with a superior peel-off mask that delivers exceptional cleansing, moisturizing, and purifying benefits

Material and Method

Ingredients:

1. Polyvinyl Alcohol(PVA)
2. Glycrine
3. Polyethylene gycol(PEG)
4. Polysorbate (tween twenty)
5. Methanol
6. Distilled water
7. Ascorbic acid

Table no.1: Ingredients

Sr.no.	Ingredients	Category	Optimised Concentration(%)
1.	PolyvinylAlcohol (PVA)	Film former	14%
2.	Water	Base	60%
3.	Glycerine	Smoothing agent	3%
4.	Polyethylene gycol	Surfactant	1%
5.	Tween twenty	Polymer	0.5%
6.	Methanol	Solvent	1%
7.	Ascorbic acid		0.1%
8.	Water	Base	0.5%
9.	Activated charcoal	Active ingredient	1%
10.	Turmeric powder		1%
11.	Beet root poweder		1%

Procedure:

The formulation process of the Activated Charcoal Peel-Off Mask involves a meticulously orchestrated series of phases to ensure the optimal integration of key ingredients. Each phaseplays a crucial role in achieving the desired consistency, efficacy, and safety of the final product.

Phase I: Preparation of Polyvinyl Alcohol Solution

In a beaker, 14% polyvinyl alcohol is added to 60% distilled water at a temperature of 80°C while maintaining constant vigorous stirring. The mixture is then allowed to cool down to 40°C, ensuring uniform dissolution and dispersion of polyvinyl alcohol.

Phase II: Integration of Glycerine and PEG

A mixture of glycerine and polyethylene glycol (PEG) in a 3:1 ratio is added to Phase I at 40°C and thoroughly mixed to achieve homogeneity. This step enhances the moisturizing and emollient properties of the formulation, contributing to its overall efficacy in hydrating the skin.

Phase III: Incorporation of Polysorbate (Tween-Twenty)

0.5% polysorbate (Tween-Twenty) is added to the mixture from Phase II, further enhancing the emulsifying and dispersing capabilities of the formulation. This ensures the uniform distribution of all ingredients and facilitates optimal absorption into the skin.

Phase IV: Addition of Methanol and Ascorbic Acid Solution

1ml of methanol is added to the mixture, followed by the addition of 0.5% distilled water containing 0.1% ascorbic acid. This phase contributes to the preservation of the formulation while providing antioxidant benefits through the inclusion of ascorbic acid.

Phase V: Introduction of Activated Charcoal

Activated charcoal is added to the mixture and stirred well to ensure its uniform dispersion throughout the formulation. This phase imparts the detoxifying and purifying properties of activated charcoal, enhancing the ability of the peel-off mask to absorb impurities and unclogpores.

The final mixture is cooled for a few minutes to achieve the desired consistency and stability before further processing and packaging. Through the meticulous execution of each phase, the Activated Charcoal Peel-Off Mask is formulated to deliver optimal skincare benefits, leaving the skin feeling refreshed, purified, and revitalized.

Evaluation Parameters:

1) Color:

The Activated Charcoal Peel-Off Mask exhibits a deep black color, indicative of its high concentration of activated charcoal. This distinct hue enhances its visual appeal and underscores its purifying and detoxifying properties.

2) Consistency:

The mask boasts a smooth and lightweight consistency, facilitating easy application and even distribution across the skin. Its silky texture glides effortlessly onto the skin, ensuring a comfortable and luxurious skincare experience.

3) Odor:

Remarkably, the Activated Charcoal Peel-Off Mask is completely odorless, providing a refreshing departure from traditional skincare products that may contain strong or artificial fragrances. Its neutral scent ensures a pleasant and non-intrusive application, leaving the skin feeling clean and rejuvenated.

4) Thickness Measurement:

The thickness of the peel-off mask film is meticulously measured using a digimatic vernier caliper, ensuring precision and accuracy. By taking the average of three readings, the thickness is determined to be 0.18mm, reflecting the optimal thickness for effective application and removal.

5) Moisture Content:

To assess the moisture content of the formulated film, a Sartorius moisture analyzer is employed. The mask is subjected to moisture exposure for 72 hours, and the difference in initial and final weight is calculated. This quantitative analysis provides valuable insights into the mask's moisture-retaining

properties, highlighting its ability to hydrate and nourish the skin effectively.

6) Folding Endurance:

The durability of the Activated Charcoal Peel-Off Mask is assessed through manual measurement of folding endurance. A strip of the dried film (3x3 cm) is repeatedly folded at the same place until it breaks. Remarkably, the mask demonstrates exceptional resilience, with a folding endurance of 200 times. This remarkable endurance underscores the mask's robustness and reliability, ensuring a long-lasting and effective skincare experience.

7) pH:

The pH value of the topical peel-off gel is determined using a digital pH meter to ascertain its compatibility with the skin's natural pH balance. One gram of gel is dissolved in 100 ml of distilled water and allowed to equilibrate for two hours. The pH measurements are conducted in triplicate, with the average value determined to be 7.5. This neutral pH ensures that the peel- off mask is gentle and non-irritating, making it suitable for all skin types, including sensitive skin.

8) Spreadability:

The spreadability of the Activated Charcoal Peel-Off Mask is quantitatively evaluated to gauge its ease of application and coverage over the skin surface. With a spreadability value of 1.9±0.4 cm, the mask effortlessly glides across the skin, ensuring uniform distribution and optimal coverage. This exceptional spreadability enhances the user experience, making the applicationprocess smooth and seamless.

Table no.2: Spread ability of the Peel-off gel

Parameters	Spread ability	Weight (g)	Length (cm)	Time (sec)
Placebo Peel-off Gel	1.9	1	2.5	11

9)Thermodynamic Stability Studies: Thermodynamic stability studies serve as a critical assessment of the Activated Charcoal Peel-Off Mask's resilience to extreme temperature variations, ensuring its efficacy and integrity under challenging conditions. In this experiment, the prepared peel-off gel undergoes rigorous stress testing through six cycles between refrigerator temperature (4°C) and accelerated temperature (40°C), with each storage period lasting not less than 24 hours

10) Erythema and Edema Scoring Method for Skin Reaction: To assess the potential for skin irritation or inflammation, an erythema and edema scoring method is employed. This method involves carefully evaluating the skin's response to the application of the Activated Charcoal Peel-Off Mask and assigning scores based on the presence and severity of erythema(redness) and edema (swelling).

11) Erythema and Edema Scoring Method for Skin Reaction: Upon examination of the skin surface following application of the peel-off mask, no instances of edema or erythema are observed. The absence of both edema and erythema indicates that the peel-off mask does not induce any adverse reactions or irritation on the skin. Consequently, a score of zero is assigned in both cases, reaffirming the mask's safety and compatibility with the skin.

Table.3: Erythema and edema scoring method for skin reaction

Sr . no	Skin Reaction	Score
	(A) Erythema and Eschar formation	
1	No erythema	0
2	Very slight erythema	1
3	Well defined erythema	2
4	Moderate to severe erythema	3
5	Severe erythema causing redness to eschar formation	4
	(B) Edema formation	
1	No edema	0
2	Very slight edema (barely perceptible)	1
3	Slight edema (edges of area well raised)	2
4	Moderate edema(raised approx. 1 mm)	3
5	Severe edema (raised more than 1 mm and extending beyond area of exposure)	4

12) Skin Irritation Study:

Ensuring the safety and compatibility of the Activated Charcoal Peel-Off Mask with the skin is paramount to its efficacy and acceptance among users. To assess its potential for causing skin irritation or sensitization, a comprehensive skin irritation study is conducted using the Draize modified scoring technique.

In this study, the formulated peel-off gel is meticulously applied to the skin, and any signs of irritation or sensitization are carefully monitored and evaluated. The Draize modified scoring technique allows for the systematic assessment of various parameters, including erythema (redness), edema (swelling), and any other observable reactions on the skin surface.

By subjecting the peel-off gel to rigorous skin irritation testing, we aim to ascertain its safety profile and suitability for topical application. Any adverse reactions or irritations observed during the study would warrant further investigation and potentially render the formulation unsuitable for use on the skin.

Table 4: Evaluation of Primary Skin Irritation Index (PII)

Evaluations	Score
Non irritant	0.0
Negligible irritant	0.1-0.4
Slight irritant	0.41-1.9
Moderate irritant	2.0-4.9
Severe irritant	5.0-8.0

The score was found to be 0.0. Thus the formulation was found to non-irritant.

13) Peel Test:

A critical aspect of assessing the efficacy and user experience of the Activated Charcoal Peel- Off Mask is the peel test. In this test, the peel-off gel is evenly applied to the skin surface and allowed to dry for 15 minutes. Subsequently, the peel is gently removed from the skin surface, and observations are made regarding its ease of removal and integrity.

Remarkably, the peel is effortlessly removed from the skin surface without breaking or causing discomfort to the user. This smooth and seamless removal process underscores the excellent adhesion and film-forming properties of the peel-off gel. Furthermore, the absence of any residual residue or tackiness on the skin post-removal signifies the mask's thorough cleansing and purifying action. The successful completion of the peel test reaffirms the Activated Charcoal Peel-Off Mask's efficacy in providing a satisfying and user-friendly skincare experience. Its ability to adhere to and peel off from the skin surface with ease not only enhances user convenience but also ensures thorough application and maximum absorption ofactive ingredients, resulting in visibly rejuvenated and revitalized skin.

Figure no. 1:Formulated film on humanskin (Peeling property)

14) Stability testing of the formulation

Stability Testing was done at various temperatures of 10˚C,20˚C,30˚C,40˚C,50˚C,60˚C The visual testing was done at each temperature. The formulation was found to be stable and good till 40˚C.The formulation was found to be unstable at 50˚C and 60˚C

Table No.5: Stability testing of the formulation

Sr.No	Temperature	Physical Appearance	pH
1	10˚C	Good	6.8
2	20˚C	Good	6.8
3	30˚C	Good	6.8
4	40˚C	Good	6.8
5	50˚C	More viscous	6.3
6	60˚C	Solidified	6.0

Conclusion

The formulation of the Activated Charcoal Peel-Off Mask has achieved its intended objectives with promising outcomes. Through meticulous formulation and evaluation, several key findings have emerged, affirming the efficacy and safety of the peel-off mask for skincare applications. Firstly, the peel-off mask exhibits excellent spreadability, ensuring uniform coverage and ease of application on the skin. This attribute enhances user experience and facilitates thorough distribution of active ingredients for optimal skincare benefits. Furthermore, the formulation demonstrates impressive peel-off properties, effectively removing impurities and dead skin cells from the skin surface without causing irritation or adverse reactions. The absence of erythema and edema, as indicated by the scoring test on healthy female volunteers, underscores the mask's gentle and non-irritating nature. Moreover, the peel-off mask is found to effectively enlarge pores and enhance skin cleansing by eliminating accumulated debris and promoting pore unclogging. Importantly, this pore- enlarging effect is transient, with pores returning to their normal size within an hour of treatment. This phenomenon helps to maintain skin moisture and nutrient retention, contributing to overall skin health and vitality. Additionally, stability studies confirm the formulation's robustness and resilience, withstanding temperature variations and retaining its efficacy up to 40°C. This stability profile ensures product integrity and longevity, instilling confidence in users regarding its reliability and effectiveness. In conclusion, the Activated Charcoal Peel-Off Mask emerges as a promising skincare solution, offering not only effective pore cleansing and skin rejuvenation but also ensuring safety and stability. These findings validate its potential as a valuable addition to skincare regimens, providing users with a refreshing and revitalizing skincare experience.

References

1. Sonali Jayronia* Design and development of peel-off mask gel formulation of tretinoin for acne vulgaris, World Journal of Pharmacy and Pharmaceutical Science Volume 5, Issue 11, 928-938

2. Priya abraham, formulation and evaluation of herbal exfoliate film containing cyphomanrda betaceae&phaseolus mungo, Int Journal Pharm bio sci 2013; 4(3): 838 – 853.

3. Baby, A. R.; Zague, V.; Maciel, C.P.M.; Kaneko, T. M.; Consiglieri, V. O.; Velasco, M. V. R. Development of cosmetic mask formulations. Rev. Bras. Cienc. Farm., 2004,40, (l.1),159-161.

4. Baumann, L. S.; Lazarus, M. C. The Use of Cosmeceuticals Moisturizers. Dermatol. Ther.,2001, 14(3), P.200-207.

5. Denaverre, M. Face Masks. In: Denaverre, M. The Chemistry And Manufacture of Cosmetics. 2.Ed. Orlando: Continental Press, 1975. (3).421-441.

6. G.J. Mcdougall, The Physical Nature And Manufacture Of Activated Carbon, J. S.Afr. Inst. Min. Metal.,91(4).1991,109-120.

7. M. V. R. Velasco, R. P. Vieira, A. R. Fernandes, M. F. Dario, C. A. S. O. Pinto, C. A. Pedriali, T. M. Kaneko And A. R. Baby,; Short-Term Clinical Of Peel-Off Facial Mask Moisturizers;International Journal Of Cosmetic Science, 2014,36, 355-360.

8. Baby, A.R., Zague, V., Maciel, C.P.M., Kaneko, T.M., Consiglieri, V.O. And Velasco, M.V.R. Development Of Cosmetic Mask Formulations. Rev. Bras. Cienc. Farm. 40, 2004,159-161.

9. Wilkinson, J.B. And Moore, R.J. Face Packs And Masks. In: Harry's Cosmetology(Wilkinson, J.B. And Moore, R.J., Ed.),Longman Group, London , 1982, 276–284.

10. Dr. Temt Laboratories,; Purifying Detox Mask -Peel Off Shaker Mask, 1-2.

11. Robert Potwara, The Abcs Of Activated Carbon, Activated Carbon Properties DetermineFiltration Performance, 15-16

12. El-Halwagi , Eden , Ponce-Ortega; Optimisation And Development Of The Peel-Off Gel Formulation For The Decontamination Of Radiological Contaminants From Skin ;164- 184

13. Bickmore H. Milady's 'Peel off mask: A Comprehensive Manual.Thomson publishers.1995;10-11.

14. Indian Standard. Face Masks Specification. 2ndRevision IS 55204:2004:1-4.