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A Review on Formulation and Evaluation of Anti-inflammatory and Analgesic Herbal Ointment of Punicagranatum Peel

More Payal S[1], Shinde Swara G[2], Thube Neha D[3], Chitale Prashant A[4], Khaladkar Shraddha M[5]
Students, Samarth Institute of Pharmacy, Belhe, Maharashtra, India[1,2,3,4,5]
Department of Pharmacognosy, Samarth Institute of Pharmacy, Belhe, Maharashtra, India[5]

Abstract: *The present study was aimed to developed formulation on the antiinflamatory, & Analgesic activity of Punicagranatum peels waste. Non steroidal antiinflamatory drugs (NSAIDs) are associated with too much side effects and adverce drug reactions. Constant used ofNSAIDs produces gastrointestinal irritation and another side effects on body organs like liver and kidneys. Antiinflamatory, & Analgesic activity of Punicagranatum peel extract was previously reported on different experimental models. Generally pomegranate peels are waste material obtained from many pomegranate processing industries. Thesepeels consists important polyphenols, flavonoids & β-sitosterol as a active chemical constituents which is useful in the inflammation. Inflamation are associate with pain, readness & swelling. Flavonoids shows antioxidant activity with indirect inhibition of inflammatory markers such as tumor necrosis factor alpha. Analgesic activity of punicagranatum peels are useful in the management of pain. Ointment formulation of punicagranatum peel shows a good result in all the evaluation test parameters such as General appearance, Consistency, pH, Spreadability, Extrudability, Diffusion study, Non virritancy test, & Stability study etc.*

Keywords: Punicagranatum, Herbal Ointment, Antiinflamatory, Anal, β gesic-Sitosterol, etc

I. INTRODUCTION

In the last few years there has been rapid growth in the field of herbal medicine and these drug gaining popularity both in developing & developed countries due to their natural origin and less side effects. Therefore used of herbal medicine is essential for to overcome the problem of adverse drug reactions. The genus punica consists at the present time of two species, the one under consideration and punicaprotopunica. The pomegranate, is one of the oldest known edible fruits. Punicagranatum has been used for long time as a therapeutic agent for the treatment of inflammatory diseases. The aqueous-ethanolic extracts of fruit rind, flower, and leaves of Punicagranatum have shows antiinflammatory activity. The pomegranate peels consider as a waste material, this peels contained active chemical constituents such as tannins, flavonoids β-Sitosterol responsible for antiinflamatory activity.

1.1 Biological Sources

a) Botanical Name: Punicagranatum
b) Family Name: Puniacaceae
c) Common Name: Pomegranate, Anar
d)Part Used: Seeds, flowers, peels, roots etc.

1.2 Common Name:

a) Hindi: Anar
b) English : Pomegranate
c) Latin: Punicagranatum
d) Sanskrit : Dadimah
e) Marathi : Dalimba

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Figure: Punicagranatum Fruit **Figure:** Punicagranatum peel **Figure:** Punicagranatum peel Powder

II. MATERIALS AND METHODS

Materials: Fresh Fruits of punicagranatum was collected from local market of Buldana, Maharashtra and transported to laboratory, authenticated from Center for Biodiversity Jijamata Mahavidyalaya, Buldana, Maharashtra. This authentication is done by Dr. S. V. Ambekar Sir. The fruits were washed with tap water, rinsed well and dried at room for about 10min in open air. The peel from the fruit was removed carefully by knife and sun-dried. The dried material was properly ground into powder. This powder material was seperated according to particle size with the help of sieves no; #44,#60,#80,#85 to obtained different batches for further Preformulation Study.

Excipients

Cholesterol, Petroleum Jelly, Cetyl alcohol, White soft paraffin etc. obtained from Research Lab Akola.

III. METHOD

3.1 Preformulation Study

A. General Appearance

Physical examination like Colour, Odor, Taste is done by visual Inspection.

b) Bulk Density: It refer to packing of particles in powder sample. Bulk density is used to determine the amount of powder sample that occupies the volume in g/ml. Weighed quantity of powder sample was transferred into 100ml measuring cylinder. The volume occupied by powder material was measured. Bulk density was calculated by using formula.

Bulk Density= mass of powder/Bulk Volume of Powder.

c) Tapped density: Weighed accurate quantity of powder sample was transfer into a graduated measuring cylinder. Volume occupied by Powder was noted down. Then cylinder was subjected to 100-3taps in tap density apparatus. Tapped density was calculated by using formula;

Tapped Density = Mass of powder / Tapped Volume.

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d) Carr's Index (Compressibility): The compressibility index and Hausner's ratio was measures the property of powder to be compressed. The packing ability of powder material was evaluated from change in volume, which is due to rearrangement of packing occurring during tapping. It was indicated as Carr's compressibility index was calculated by following formula.

Carr's index = [Tapped Density - Bulk Density]/Tapped Density ×100

e) Hausner s' Ratio: It is measurement of frictional resistance of powder. The ideal range should be 1.2-1.5. It was determined by the ratio of tapped density and bulk density.

Hausner's = Tapped Density/Bulk Density

f) Angle of Repose (θ): It is defined as the maximum angle that can be obtained between the free standing of powder heap and horizontal plane, which is determined by the equation.

Angle of repose (θ) =

Where, θ = Angle of repose.
h = Height of powder heap.
r = Radius of the powder cone.

g) Flow Rate: Weighed accurate quantity of powder sample . Place a cotton plug at the neck of a clean and dry funnel of stem diameter 1-2.5cm. Place powder sample in the funnel. Remove plug from the neck & Record the total time required for all the powder to flow. Calculate flow rate by using formula.

Flow rate = weight of powder / Time Required to Flow

h) Water Soluble Extractive: Useful for the evaluation of a crude drug. Give idea about the nature of the chemical constituents present in a crude drug. Weigh about 5gm of the coarsely powdered drug and transfer it to a dry 250ml conical flask. Filla 100ml graduated flask with water and transfer into conical flask. Cork the flask and set aside for 24 hours, shaking frequently. Filter into a 50ml cylinder. When sufficient filtrate hascollected, transfer 25ml of thefiltrate toa weigh thin porcelain dish. Evaporate to dryness on a water- bath and complete the drying in an oven at 1050C for 6 hours. Cool and weigh immediately. Calculate the percentage w/w of extractive with reference to the air dried drug.

Calculation:

a) Weight of empty porcelain dish =.....(X).....gm
b) Weight of porcelain dish with residue =.....(Y).....gm
c) Weight of residue = ...(X –Y).....gm.

W.S.E.(%) =wt of residue ×100×100/wt of drug taken × volume of filtrate(25 ml).

i) Alcohol Soluble Extractive : Same as water soluble extractives only water is replace with alcohol

j) Moisture contents: Weigh 1.5g of sample in a porcelain dish containing 6-8cm diameter and 2-4cm depth in it. Dry the sample in an oven at 1050 C. cool & weigh. Calculate the moisture contents by using formula.

(K) Total Ash Value: Used to determine quality and purity of crude drug and to establish the identity of it. Weigh 2gm of powder drug into the crucible. Ignite sample on burner (flame) until all the carbon is burned off. Cool it and weigh the ash. Calculate the percentage of total ash with references to the air dried sample of crude drug.

a) Weight of the empty dish = x
b) Weight of the drug taken = y
c) Weight of the dish with ash = z
d) Weight of the ash = (z - x)

Total Ash = 100(Z-X)/Y

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l) Antimicrobial test: Antimicrobial test Perform against Escherichia coli & Staphylococcus aureus culture medium. Weigh accurately all the ingredients & prepared nutrient brouth and agar medium. Used nutrient brouth for sub-culturing of phathogen (freshly prepared bacterialculture).Take petri plate and test tube wash it properly with tap water & autoclave it (at 1210C 15lb pressure for 15-30minute). Prepared aceptic area in aceptic room. Dilute the testing sample in test tube in a range of 10-1 10-2, & 10-3respectively. Transfer the agar medium in Petri plate in aceptic condition allowed it cool & solidify. Then transfer the microbial culture which is required (E.coli & S.aureus) with the help of sterile disposable syringe. Shake it properly 2-3 times for proper mixing. Then transfer the sample which is diluted with the help of disc or boher plate technique. Then incubate the plate for 24-48hours in Incubator. Calculate the zone of inhibition by comparing with standard.

m) Preparation of Ointment: Preparation of 20g of Ointment Base: All the Ingredients was mixed and heated gently with stirring then cooled. Then extract of punicagranatum peel was added respectively in 20gm of Base.Then clove oil is added as a penetration enhancer in 20gm of Base. Mixed it properly by using ointment slab. Then transfer it into suitable container.

3.2 Formulation Designing.

Table 1: Formulation of Herbal Ointment

Sr. No.	Ingredients	Formulation
	(In gm) Concentration	25%
01	Punicagranatum peel	03
02	Clove oil (ml)	02
03	Base material	q.s.
	Total	25gm

Table 2: Formulation of Ointment Base.

Sr. No	Ingredients (gm)	Quality Taken
01	Cholesterol	1 gm
02	Petroleum Jelly	1 gm
03	Cetyl alcohol	1 gm
04	White soft paraffin	17 gm
	Total	20 gm

IV. EVALUATION OF FORMULATION

Prepared punicagranatum Ointment were evaluated for the following evaluation parameters.

a) Color & Odor: Color and odor were examined by Visual Inspection.

b) Consistancy: Smooth and no greetiness is observed.

C) pH: pH of Herbal ointment was determined by using a digital pH meter. The solution of ointment was prepared by using 100 ml of distilled water and set aside for 2 hrs, pH was determined.

d) Spreadability: The spreadability was determined by placing sample between two glass slides which was compressed to uniform thickness by applying definite weight for definite time period . The time required to separate the two slides was measured as spreadability. Less time taken for separation of two slides shows better spreadability calculated by using formula.

$S = M \times L/T$

S = Spreadability

M = Weight applied to slides

L = Length of glass slides

T = Time taken to separate the slides.

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e) Extrudability: The ointment was filled in collapsible tube. The extrudability was determined in terms of weight of ointment required to extrude 0.5 cm ribbon of ointment in 10 second.

f) Diffusion Study: The diffusion study was carried by preparing agar nutrient

g) L.O.D: LOD was determined by placing the formulation in china dish and dried for the temperature 105 C in hot air oven.

h) Solubility: Soluble in boiling medium by using boher method. The hole is created on agar medium by using open mouth ampule and ointment place in it. The time taken by ointment to get diffused through was noted.(after 60 min). water, miscible with alcohol & ether.

i) Washability: Ointment was applied to the skin then washability with water was checked.

j) Non Irritancy: Prepared formulation was applied to the skin of human being and observed the effect.

k) Stability study: Physical stability of the prepared herbal ointment was carried out for 3 month at various temperature conditions like 2˚C, 25˚C, 37˚C.

V. RESULT AND DISCUSSION

5.1. Preformulation Study of Powder Sample.

Sr .No	Parameter	Sieve no:#44	Sieve no :#60	Sieve no :#80	Sieve no :#85
01	Colour	Brown	Brown	Brown	Brown
02	Bulk Density (gm/ml)	0.645	0.565	0.476	0.454
03	Tapped Density (gm/ml)	0.772	0.649	0.638	0.556
04	Carr's Index(%)	16.45	12.5	25.39	18.34
05	Hausner's ratio	1.196	1.14	1.34	1.22
06	Porosity	25	16.66	23.80	19.04
07	Angle of repose	33°42″	29°98″	26°56″	31°29″
08	Moisture Content	10	09	10	20
09	Flow Rate(gm/sec)	0.78	0.66	0.44	0.33
10	Ash value(NMT4%)	0.32	0.32	0.32	0.32
11	Water soluble Extractive (NLT35%)	45.6	45.6	45.6	45.6
12	Alcohol Soluble Extractive (20%)	49.6	49.6	49.6	49.6
13	Antimicrobial Test	+Ve	+Ve	+Ve	+Ve

From above preformulation data powder from Sieve no:#60 shows acceptable angle of repose, Bulk density, Tapped density, Carr's index and Hausner's ratio, Flow rate, Moisture contents. The batch shows good data as compared with other batches. Therefore it was conclude that the Powder from Sieve no:#60 consider as a optimized batch.

5.2. Evaluation of Formulation

Table 4: Evaluation of Formulation.

Sr. No	Parameter	Formulation
1	Colour	Yellowish brown
2	Odour	Characteristics
3	Consistency	Smooth
4	PH	5.4
5	Spreadability(gm)	7
6	Extrudability(gm)	0.3

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7	Diffusion study	0.6
8	L.O.D	25%
9	Boiling Point	Freely soluble
10	Washability	Good
11	Non Irritancy	Non Irritancy
12	Stability	Stable

From the above evaluation parameters it can be concluded that overall batches the F3 batch show all parameter in acceptable limit. Therefore it is consider as a good formulation.

VII. CONCLUSION

The Punicagranatum peel powder were used to formulate antiinflamatory and analgesic herbal ointment & evaluated for physical parameters. Preformulation study and Physical Parameter exposed that all the values were within acceptable limit. The herbal ointment useful for a antiinflamatory and analgesic activity. From the above evaluation parameters it can be concluded that overall batches the F3 batch show all parameter in acceptable limit. Therefore it is consider as a good formulation.

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IX. CONFLICT OF INTEREST

Authors have declared that no competing interests exist and are fully responsible for all experimental works and the content of this article.

REFERENCES

[1]. Debjit Bhowmik, Harish Gopinath, Pragati Kumar, S. Duraivel, Aravind. G, K. P. Sampath Kumar "Medicinal uses of punicagranatum and its health benefit"

[2]. Extract on Different Experimental Models of Acute Inflamation" International Journal of Experimental Pharmacologym 2017; 21-27.

[3]. Shubhangi E. Sawant, Monali D. Tajane "Formulation and evaluation of herbal ointment containing Neem and Turmeric extract" Journal of Scientific and Innovative Research,2016; 5(4): 149-151.

[4]. Journal of pharmacognocy & phytochemistry, no.8192, 2013; 1(5): 28-35. Vinod D. Rangari "Pharmacognocy and Phytochemistry" volume IInd second edition Career publication, 265-267.

[5]. "The Ayurvedic Pharmacopoeia of India" first edition part-I volume-II page no; 31to33.

[6]. Dr. K. R. Khandelwal and Dr. Vrunda Sethi "Practical Pharmacognosy Techniques and Experiments" Nirali Prakashan Printed by Yogiraj Printers Page no; 23.1-23.11.

[7]. Ahmed Abdul Sabour and Ahmed Bader "Study of Antiinflamatory & Analgesic Activities of Pomegranate seed Arils

[8]. Nitin Nema, et.al; "In Vivo Topical Wound Healing Activity of Punica Granatum Peel Extract on Rats" American Journal of Phytomedicine and Clinical Therapeutics, 2013; 195-200.

[9]. Nalla Arvinda and Chinnala Krishna Mohan "Formulation and Evaluation of Herbal Ointment For Antimicrobial Activity" World Journal of Pharmaceutical and Medical Research, 2017; 3(7): 113-117.

[10]. Sekar Mahendran & Nurashikin Abdul Rashid "Formulation, Evaluation and Antibacterial Properties of Herbal Ointment Containing Methanolic Extract of Clinacanthus nutans Leaves" International Journal of Pharmaceutical and Clinical Research, 2016; 8(8): 1170-1174.

IJARSCT
ISSN (Online) 2581-9429
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[11]. Narendra Naik D, Bastipati Suresh, Mohana Priyanka P, Geethanjali B, Karanam Yamini, Ramesh Malothu "Formulation and Evaluation of Herbal Ointment Consisting Sida Spinosa Leaves Extract" Journal of pharmaceutical biology, 2012; 2(2): 40-42.

[12]. Richa Saxena, Richa Sharma, Bankim Chandra Nandy, "Chromatographic determination of phenolic profile from punicagranatum fruit peel" International Research Journal of pharmacy, 2017; 8(1): 61-65.

[13]. K. Subashini Research Artical "Review of Phytochemical Screening for Pomegranate peel extract using crude, aqueous, ethanol and chloroform" International Journal of Engineering Science and computing, 2016; 6(4): 3329-3332.

[14]. Sangeetha R. and Jayaprakash A. Research Article "phytochemical screening of punicagranatum linn. Peel extracts" Journal of Academia and Industrial Research,Octomber, 2015; 4: 160-162.

[15]. Sachin A Nitave, Vishin Ashish Patil Study of "Antibacterial & Antifungal activity of punicagranatum peel and its phytochemicals screening", World Journal Of Pharmaceutical Research, 2014; 3(10): 505-512.