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OPIOID USE DISORDER SKIN TREATMENT- HALOPERIDOL -22 OINTMENT

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ABSTRACT

Opioid use alter epithelial intestinal barrier disruption, immune system response and all growth. Because of reduction number count of good bacteria could result in weakness tight junctions, leaky gut, bacterial translocation, opioid -induced bowel dysfunction, interleukin-6 binded opioid can dampen host resistance gut infections. Our project was analysed different factors such as long t6ime standardisation assessment, boundary and boundless set up, work place ethics connecting with STD and related disease, dilemma conditions in factory working personality. On the basios of analysing factors, our aim of project was to finding out application of Haloperidol-22 application procedure using 4 cm X 4 cm (16 cm) skin surface. Skin surface was spitting into total of 24 units and application time in period in various disease conditions such as post operative side effects, skin after cancer treatment, radiation treatment, skin side effect, Opioid use disorder(OUD), skin side effect associated with metabolic disease. The methodology procedures were framed to understand formulation procedure 20/80 formulation, ratio proportions and evaluation of formulation using spread ability index by parallel plate method, Cmax and T max values were also included as part of study. stability, flow ability, protein binding efficiency, application days on skin, sugar reaction test, In vitro-vaso constrictive activity of Haloperidol coupled with Lithium carbonate, rate of absorption were analysed by different qualitative test. Receptor binding behaviour, affinity, potency in relate with protein could be tested using folin-ciocateau

reagent. Our formulations explained comparative analysis of internal and external use of Haloperidol drug formulations, impacts on external application in rehabilitalisation drug addiction patients, alcohol -withdrawing patients, Finally Haloperidol -22 ointment as achieved parameter namely especially community response, STD of OUD disease conditions, Social resources, external support networks, resilence scale-likert response (likely/most likely) and self awarness reflection on procedures.

KEYWORDS: OUD skin application, Folin cio-catcheau reagent, Haloperidol-22, metrabolic disease, self-reflection procedures.

INTRODUCTION

Dark psycology has practical implications in various domains and is often associated with specific personality traits and disorders. Recognizing dark psychology isessential prevention and intervention, awarness of manipulative tactis, set boundaries, fixation of informed decisions.[1,3] Our aim of study was focused to manage constructive observations of dark psychology, identification of drug addiction people having skin allergic symptoms and rehabilisation procedure using haloperidol ointment-22 in rectification of druginduced histamine release allergy, alcohol drug withdrawl symptomes.

Butyrophenone class of anti-psychotric agents such as Haloperidol.[4,5] is helpful in dopamine receptor blocking activity in CNS. Para fluoro and chloro phenyl group could increase lipid solubility, penetration and potency due to molecular weight 37. 5 µg/mLpH 3-3. 6, pKa 8. 33. Tertiary amine in piperidine ring enhances receptor interaction, D2 affinity, Hydrogen bonding interactions were increased due to presence of OH group presented at piperidine ring. Three carbon atom linkage responsible for optimal receptor binding distance. Qualitative test, measurement matrix, microbiological test were predicted application of Haloperidol ointment 22 in skin application procedure. Rate of absorption and effectiveness were determined using spreadability test-parallel plate method. Comparative therapeutic application assessment of drug antifungal creams and ointment composition such as clotrimazole and terbinafine, luliconazole, ketoconazole, sertaconazole nitrate, clotrimazole and anti bacterial creams and ointment such as neosporin, polysporin, mupirocin, bacitracin, fucidin were responsible for various skin infections and allergic symptoms treatment but our drug haloperidol 22 ointment is responsible for invitro vaso constrictive activity, opioid use skin disorder, metabolic disease.[6,10]

Prognostic outcones and nominal value towards factors were analysed among 80 participants and evaluated in two groups working and Non working personality under concept of dark psychology. Sampling procedures were implemented among individual from four different workplace including industries, sugar factories, hospital and family members.

METHODOLOGY

A. Preliminary examination of drug using survey questions

Prognostic outcomes

Achieved 30% nominal value in B option. Over and low commitment, shifting hours, troubleshoot problem executed in coupling with C option total of 62% towards long term standardisation.

Achieved 30% nominal value in C option. Political and family scapegoat and were imposed effects boundary set up boundaries in coupling with option A. Two members agree statement of total of 52. 2%. towards boundary/boundless set up network system.

Achieved 30% nominal value in (B) option. Race, character & life-style parameters executed. in coupling with (A) & (C) options, total of 95% towards ethical dilemma condition.[11,14]

Achieved 30% nominal value. Option C, 77% accepted information on Human Papilloma Virus (HPV) infection and HIV against spreadability factors in work place ethics.[15,16] [Fig. 1, 2, 3 & 4].

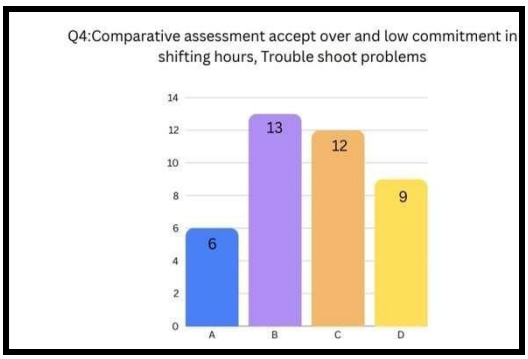


Fig. 1: Comparative assessment survey.

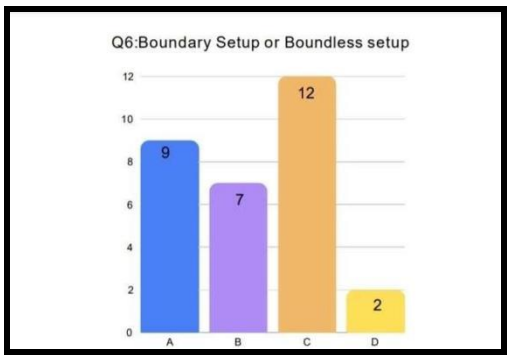
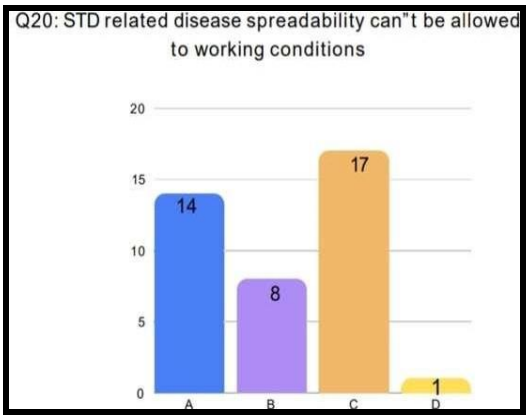


Fig. 2: Boundary/Boundless set up.



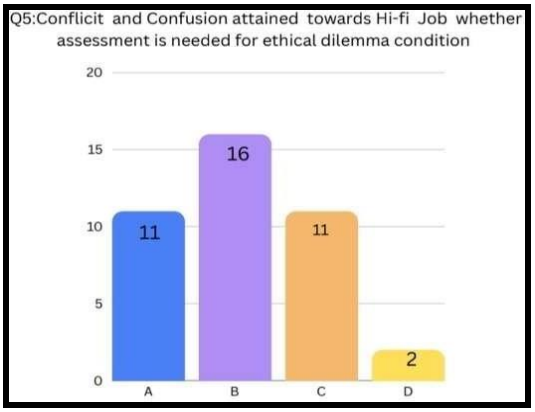


Fig. 3: Assessment Ethical dilemma **Fig. 4: Spreadability disease survey.**

B. METHODOLOGY

Haloperidol ointment -22 was prepared using Trituration method.[17,21]

Step: 1: Implement weight variation formula using 20 tablets. Most repeated numbers x 2+ Non-repeated numbers x18

Step: 2: Found out amount 87. 5 mg using cross verification method.

Step: 3: Selected 8 haloperidol tablets and triturated using a morter and pestle to obtain fine powder. Mixed up with 4 (Four) grams of papain -urea ointment base.[22,23] Performed mixing operation 10 cm x 10 cm to execute uniform incorporation using 15 mints-mixing operation and 20 mints slide drag mixing. Prepared ointment was transfered into weighted petridish, properly labelled for identification and stirred for 24 for furthest qualitative tests. Repeated procedure to prepare four additional batches of ointment.

METHODOLOGY FORMULA

Papain: 4000 mg

Urea: 2. 69 mg

Haloperidol: 1200 mg

Excipients : 960 mg

Papain 4000 mg containing 14053. 69 units of activity.

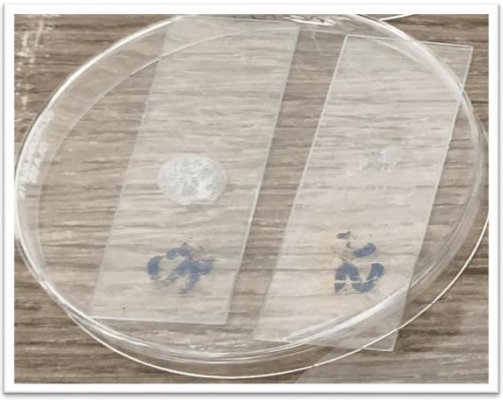
Step: 4: Performed parallel plate method-spreadability test using six number having 7. 4 cm-7. 5cm length, 2. 4cm-2. 5cm breadth, 5. 38-6. 29 g weight. Placed empty slide on sample loaded slide -2 and calculate rate of absorption at each minute. Found out absorption minute after transfering sample 2 to 1. Repeated procedure at 24 hrs and 48 hrs. Spreadability index S1: 15. 158, S2 : 17. 630 average SI: 16. 39 mints. Rechecked rate of absorption using formula.[24,26]

Invitro-spreadability test

$$\frac{\text{S=M (sample load slide) -L (Length of slide)} \times \text{Preparation times} \times \text{conversion time}}{\text{T (Time in mints)}}$$

Step: 5: Weigh 600mg of Lithium carbonate (2 tablet) and transfer into a clean mortar and grind thoroughly with a pestle until a fine, uniform powder is obtained. Weigh 6mg of Haloperidol accurately weighed Add it gradually to the powdered lithium carbonate in slide. Use a spatula to slide or drag the ointment across a distance of 10×10cm and maintain the spreading motion for exactly15minutes mixing and 20 minutes to evaluate spreadability characteristics.

Invitro-Spreadability index test Invitro -vasoconstrictive activity



C. ANALYTICAL EXAMINATION

1. WATER TEST

Water test was represented. Ethanol mixing with the drug showed precipitate formation.

2. RHEOLOGICAL PROPERTIES[27,28]

Ointment has taken in China dish after spreadability test complete. Placed sample containing China dish in preheated sand bath. Examined stability of ointment at two different temperature 45 and 60 degree Celsius, Using a sand bath for 3 minutes, the sample was observed. Stability was achieved.

3. UNIFORM THICKNESS[29,34]

24HOURS

Weight of Empty Slide with Sample Weight(S1)=5. 69g

S1	5. 67	5. 64	5. 65	5. 64	5. 63	5. 65	5. 65
S2	5. 82	5. 82	5. 80	5. 80	5. 80	5. 80	5. 80

48HOURS

Weight of Empty Slide with Sample (S1)=5. 68g

S1	5. 66	5. 64	5. 65	5. 64	5. 65	5. 65
S2	6. 26	6. 25	6. 26	6. 25	6. 26	6. 27

Total ten sets of samples were analysed using microscopic slide sets of 50 number and calculated spreadbility test average value as 16. 39 mins.

4. QUALITATIVE TEST

TEST NAME	PROCEDURE	INFERENCE
1. BIURET TEST[35-36]	Mixed sample with CuSO4, NaOH and Biuret Reagent	Appearance of Pale Blue colour
	Mixed sample with CuSO4, NaOH and Biuret Reagent	Appearance of Bluish green colour
2. NINHYDRIN TEST[37,38]	Mixed Sample with Fructose, Egg Albumin and Ninhydrin sulphate crystals	Initially Yellow precipitate, after 2min Purple colour appears
	Mixed Sample with Fructose, Egg Albumin, Ninhydrin sulphate crystals and CaCO3	Yellow colour changes to dark purple colour
	Mixed Sample with Sample, Egg albumin, Ninhydrin sulphate crystals and CaCO3	Pale violet colour appears
3. ALCOHOL REACTION TEST	Mixed Sample with Fructose, Ninhydrin sulphate and Alcohol (1-5ml)	Initially addition of 1ml of alcohol Ash colour after addition of 2ml of alcohol Black colour again add 2ml of alcohol blackish purple fading produce bluish ash colour
4. ALCOHOL FADING TEST	Mixed Sample with Fructose, Ninhydrin sulphate, CaCO3 and 2ml of alcohol	Fading of Violet colour
5. FOLIN CIOCALTEAU TEST[39,41]	Mixed Sample with Fructose, Ninhydrin sulphate crystals, Egg Albumin and Folin ciocalteau reagent	Intially Purple colour After addition of Folin Ciocalteau Reagent yellowish green lumps produced after 5minutes it changes to Dark Greenish purple colour
	Mixed Sample with Ninhydrinsulphate crystals, Egg albumin and Folin ciocalteau reagent	Initially pinkish green to green colour
	Mixed Sample with Fructose, Ninhydrin sulphate crystals, alcohol and 8ml of Folin ciocalteau reagent	Fading of violet colour
6. CONSISTENCY TEST	Mixed Sample with Fructose, Egg albumin, Ninhydrin crystals and Half spatula addition of	it gives Gel like consistency

	CaCO3	
	Mixed Sample with Sample Fructose, Egg albumin, Ninhydrin crystals, one spatula addition of CaCO3 and 5ml of Ethanol	Its produce semisolid consistency with precipitation
7. FOLIN CIOCALTEAU TEST	Mixed Sample with fructose, ninhydrin sulphate Crystals, CaCO3 (1 spatula) +alcohol (1ml) and Folin ciocalteau reagent	Bluish ash colour

5. WATER ABNSORPTION TEST

Small amount of sample taken in a clean watch glass add 5ml water and mixed with stirrer. Ointment Slightly Soluble due to Papain-Urea base drug remains insoluble.

6. EXTRUDABILITY / COMPRESSION TEST

No outcome of medicament without force and compression. 500 mg ointment was placed at the centre hole of a glass container. Outcome of medicament with force applied by a spatula and tapping mechanically using 500 mg ointment placed at the centre hole of the glass container.

7. DIFFUSION TEST (FLOWABILITY TEST)

In this test prepared ointment pour into container with hole to check diffusability of sample ointment from container. Diffusion can be checked by continuous tapping. Nearly 15 tapping without force compression for sample (M1, M2, M3). The sample ointment diffuse from container hole.

8. CONTENT UNIFORMITY TEST

Performed test measurements using ten replicate timings. Standard error value obtained within 2%.

D) RESULTS AND DISCUSSION

Haloperidol Ointment – 22, 6g by ointment containing 1. 2 g of haloperidol active ingredients, brand name is having phenyl piperidinyl-butyrophenone pharmacophore molecules which could result in treatment of OUD (Opioid Use Disorder), skin side effects as well as metabolic disease, skin disease.

Relative concept is mapped with chemical reactivity. Folin–Ciocalteu reagent observed chemical reactivity on 66th day. Green colour was indicated, showing binding efficiency of haloperidol in albumin combination without addition of fructose. In reaction, membrane interaction with Ninhydrin using collagen is analysed for binding efficiency.

Haloperidol Ointment – 22 g is useful in treatment of drug rehabilitation, skin disease, OUD, skin effects, metabolic disease, skin effects, poor skin disease, post-operative cancer treatment.

Haloperidol Ointment – 22 g were tested by wt. variation test, AI tools algorithm using F-test and parallel plate method. Haloperidol 1. 2 g active ingredient was tested as 98. 5 mg by implementing 101. 25 mg most expected numbers 120 mg × 2, 0. 090 × 2, 0. 080 × 1 and 0. 110 mg × 1 among 8 selected tablets, and doses were verified using the formula implemented using least numbers. 0. 080 mg is the lowest number, and 0. 120 mg is the highest number. , Tablet label claim = 1. 5 mg, % Deviation = ±1. 5

Parallel plate method was tested using microscopic slide. In-vitro vasoconstrictive activity of Haloperidol Ointment –22 g having average 9. 53 minutes rate of absorption by implementing slide-drug 15. 158 minutes in 10 cm × 10 cm square units with help of empty slide weight 5. 6 cm length 7. 4 cm and width 2. 4 cm. Standard haloperidol rate of absorption 7. 063 minutes. F-test value (Parallel Plate Method): 99. 198% Deviation: 0. 82%.

Uniform thickness, consistency, pH and smoothness were measured with base and checked by 12: 40 ratio of 1: 13. 33. Active ingredients: Haloperidol and papain urea debridement ointment base. 1200: 5990. 69 mg (AI : AI + base + excipients) Ratio proportion Haloperidol 20/80 formula: Ratio proportion: 240 : 3200 mg (1 : 13. 33) AI: Ointment base.

Formula was derived as follows:
Papain: 4000 mg ≈ 14053. 69 units
Urea: 2. 69 mg
Haloperidol: 1200 mg
Excipients: 98. 5 × 8 = 788 mg
Total: 5990. 69 mg

Finally, 6 g ointment containing 1. 2 g of haloperidol active ingredients. The drug passes the following qualitative tests.

1)Water Test

Water test was represented. Ointment showed slightly soluble behaviour. Ethanol mixing with the drug showed precipitate formation.

2)Rheological Properties

Rheological properties were checked using the stability test at two different temperatures (45°C and 60°C). Using a sand bath for 3 minutes, the sample was observed. Stable.

3)Uniform Thickness

$$S=M-L/T$$

Spreadability value was achieved in 10 cm × 10 cm area (square units) that could result in average rate of absorption 7. 063 ± 0. 81, 7 minutes.

4) Qualitative test

I)Protein interaction occurs using $CuSO_4$, NaOH and Biuret reagent with sample showing bluish-green colour. Protein interaction occurs using fructose, egg white and ninhydrin reagent with sample, showing yellow coloured precipitate, which turns into purple colour after 2 minutes. Protein interaction occurs using $CuSO_4$, alcohol and NaOH with sample, showing pale blue colour.

II)Amino Acid Interaction

Amino acid interaction happened using ninhydrin reagent, which was mixed with albumin and fructose and confirmed by water testing via liquid status. Coagulation was observed on addition of alcohol.

5)Water Absorption Test

No water absorption takes place after addition of:

1 mL water into one inch ointment having 0. 010 g sample.

10 mL of water into 0. 100 g (100 mg) ointment can result in no water absorption. The water number was confirmed. Sample having sufficient flowability as well as diffusion was controlled and was confirmed at 24 hours.

6)Extrudability / Compression Test

No outcome of medicament without force and compression. 500 mg ointment was placed at the centre hole of a glass container. Outcome of medicament with force applied by a spatula

and tapping mechanically using 500 mg ointment placed at the centre hole of the glass container. Trial confirmed diffusion happens in a controlled manner.

7)Flowability Test

Flowability factor was confirmed by fructose 500 mg sample. Haloperidol Ointment – 22 g was placed at the centre hole of a glass container and checked for flow of ointment from the orifice. Diameter: 4. 8 cm.

Final Measurement

Measurement Matrix Cmax = 0. 66 mg Tmax = 0. 79 mg

$$\text{Measurement Matrix} = \frac{0.66 \times 100}{0.79}$$

Interaction Binding efficiency = 83. 54%

Deviation = 100 − 83. 54= 16. 46%

Active space occupied on skin application: 20. 05 active space, activity timing: 15. 15 minutes. Void space surrounding on skin: 18. 13.

SUMMARY AND CONCLUSION

Haloperidol-22 ointment was prepared using haloperidol 1200 mg, urea 2. 69 mg, excipients 788 mg, and papain 4000 mg, giving a total weight of 5990. 69 mg, equivalent to approximately 6 g of ointment in the ratio 1: 13. 33, having 240 mg : 3200 mg haloperidol and ointment base. Qualitative tests such as water test, rheological test, spreadability test, Biuret test, Ninhydrin test, and diffusion test were performed and complied with standard requirements. Measurement matrix using AI tools was achieved as 83. 54%, which could result in in-vitro vasoconstriction activity. Prognostic outcome before selection of sample was redefined by conducting survey among 80 participants from four different categories such as Sugar factory, Hospital, Family member using four different contextual settings. The assessment focused on the cognitive and psychomotor domains. Participants' responses were analysed using a structured approach to identify coherent response patterns. The results indicated that Type I (Likely/Most Likely)likert scale responses were predominant, particularly for Questions 4, 5, 7, and 20.

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AUTHORS' CONTRIBUTIONS

Sengamalam Ravindran: Data curation, data analysis, drafting, writing, and formatting. Conceptualization, draft correction and editing, and suggestions for improvements.

CONFLICT OF INTERESTS

The authors declared no conflict of interests.

REFERENCE

1. Gault JM, Cascella N et, al. (Ethical considerations of deep brain stimulation for treatment refractory schizophrenia: surveying stakeholders), BMC Psychiatry., 2025; 25: 796.
2. Glenn w currier, (The Controversy over “Chemical Restraint” in Acute Care Psychiatry), Journal of Psychiatric Practice., 2003; 9(1): 59-70,
3. Annick barbaud, Lene Heise Garvey et. al, (Updated EAACI Statement on Drug Hypersensitivity Skin Testing: Methodology and Non-Irritative Concentrations)., 2026.
4. Giannini AJ, Underwood NA. Acute (ketamine intoxication treated by haloperidol: a preliminary study). American Journal of Therapeutics., 2000; 7(6): 389–391.
5. Haloperidol. The American Society of Health-System Pharmacists. Archived from the original on 2 January 2015. Retrieved 2 January 2015.
6. Benfield JR. (The lung cancer dilemma). Chest, 1991; 100(2): 510-1.
7. Robert R Luedtae, Evelyn pereza et. al. Neuroprotective effects of high affinity sigma 1 receptorselective compounds, Brain Res., 2012 ; 1441: 17–26.
8. Cendan CM, Pujalte JM, Formalin-induced pain isreduced in sigma(1) receptor knockout mice. Eur. J. Pharmacol, 2005; 21: 73–74.
9. Antonini V, Marrazzo A. Anti-amnesic and neuroprotective actions of the sigma-1 receptor agonist (−)-MR22 inrats with selective cholinergic lesion and amyloid infusion. J. Alzheimers Dis., 2011; 24: 569–586.
10. Murphy TH, Miyamoto M. Glutamate toxicity in a neuronal cell lineinvolves inhibition of cystine transport leading to oxidative stress. Neuron, 1989; 2: 1547–1558.
11. Gottlieb AB, Evans R et al. Infliximab induction therapy for patients with severe plaque-type psoriasis: a randomized, double-blind, placebo-controlled trial, J Am Acad Dermatol. 2004; 51(4): 534-542.

12. Gudjonsson JE, Karason A et. al, HLA-Cw6-positive and HLA-Cw6-negative patients with Psoriasis vulgaris have distinct clinical features, J Invest Dermatol., 2002; 118(2): 362-365.
13. Gottlieb AB, Evans R et. al. (Infliximab induction therapy for patients with severe plaque-type psoriasis: a randomized, double-blind, placebo-controlled trial). J Am Acad Dermatol., 2004; 51(4): 534-542.
14. Gudjonsson JE, Karason A et. al. (HLA-Cw6-positive and HLA-Cw6-negative patients with Psoriasis vulgaris have distinct clinical features). J Invest Dermatol., 2002; 118(2): 362-365.
15. Chernata T, (Personal boundaries: Definition, role, and impact on mental health. Personality and Environmental Issues). Personality and Environmental Issues, 2024; 3(1): 24-30.
16. Njoku Chimezie, (Teacher's personality traits and their teaching effectiveness: important factors for student's success). European journal of research reflection in educational sciences, 2020; 8(3): 164-157.
17. Mitchel REJ, Chaiken IM et. al, (The complete amino acid sequence of papain). Journal of Biological Chemistry, 1970; 245(14): 3485–3492.
18. Mrunali P. Patle, A Comperhensive review on pharmaceutical ointment, IJCRT., 2023; 11(8).
19. Ajay S. Dongarwar1, Shubham A. Parihar et. al. (Formulation and evaluation of herbal ointment by using dyerophytum indicum extract). wjpmr, 2024; 10(9): 117-121.
20. Harshada V Patil, Rituja G. (A Review Literature On Herbal Ointment). IJCRT, 2023; 11(5): 1519-1528.
21. Pandey A, Jagtap JV. (Formulation and evaluation of anti-bacterial and anti-fungal activity of herbal ointment containing Aloe vera, Azadirachta indica and Curcuma longa). Journal of Chemical and Pharmaceutical Research, 2010; 2(3): 182-86.
22. Yungi Man, Chengcheng Liu. (Review of Ointment Formulations in Modern Pharmaceutics). Scientific Journal of Technology., 2022.
23. Marko Novinec al. (Papain-like peptidase: Structure, Function and evolution). Biomol concepts, 2013; 4(3): 287-308.
24. Piquero-Casals J, Morgado-Carrasco D et. al, (Urea in Dermatology: A Review of its Emollient, Moisturizing, Keratolytic, Skin Barrier Enhancing and Antimicrobial Properties). Dermatology and Therapy (Heidelberg), 2021; 11: 1905–1915.

25. Sandyk R, Hurwitz MD. (Toxic irreversible encephalopathy induced by lithium carbonate and haloperidol. A report of 2 cases). South African Medical Journal, 1983; 64(22): 875–876.
26. Tompsett, S. L. (Determination of lithium, strontium, barium and gold by atomic absorption spectrophotometry). Proceedings of the Association of Clinical Biochemists, 1968; 5: 125.
27. Margret A A, Dhayabaran V V. (Nanoparticulated polymeric composites enfolding lithium carbonate as brain drug in persuading depression: An in vivo study). Progress in Biomaterials, 2017; 6: 165–173.
28. Anurova MN, Bakhrushina EO. (Justification of the rheological optimum in the development of semisolid forms. Dental gels). Drug. Dev. Regist., 2017; 2: 124-8.
29. Barnes HA. (A brief history of the yield stress). Appl. Rheol, 1999; 9; 262–266.
30. ISO 13299: 2003; Sensory Analysis—Methodology—General Guidance for Establishing a Sensory Profile. ISO: Geneva, Switzerland, 2003.
31. ASTM E1490-11; Standard Guide for Two Sensory Descriptive Analysis Approaches for Skin Creams and Lotions. ASTMInternational West: Conshohocken, PA, USA, 2011.
    ISO 8586-1: 1993; Sensory Analysis—General Guidance for the Selection, Training and Monitoring of Assessors—Part 1: Selected Assessors. ISO: Geneva, Switzerland, 1993.
32. Shubhangi E Sawant, Monali D Tajane. (Formulation and evolution of herbal ointmentcontaing neem and turmeric extract), Journal of scientific and innovative research, 2016; 5(4): 149-151.
33. Dubey NK, Mishra SB. (Graphene conjugated usnic acid nano-formulation for the treatment of topical fungal infection), Int. J Pharm. Pharm. Sci., 2020; 47-53.
34. Papadopoulou A, Green RJ. (Interaction of flavonoids with bovine serum albumin: a fluorescence quenching study). J. Agr. Food Chem., 2005; 53: 158-163.
35. Gerardo Janairo, Marianne Linley Sy et. al. (Determination of the Sensitivity Range of Biuret Test forUndergraduate Biochemistry Experiments). e -Journal of Science & Technology (e-JST, 2004. 77-83.
36. Robinson H, Hogden, C. (The Biuret Reaction in the Determination of Serum Proteins. I. A Study of the Conditions Necessary for the Production of a Stable Color which bears a Quantitative Relationship to the Protein). J. Biol. Chem., 135: 707-725.
37. Munteanu I. G. Apetrei C. (Analytical Methods Used inDetermining Antioxidant Activity: A Review). Int. J. Mol. Sci., 2021; 22(7): 3380.

38. Amelie charlotte staus, Carolin fuchs. The Ninhydrin Reaction Revisited: Optimisation andApplication for Quantification of Free Amino Acids. Molecules, 2024; 29: 3262.
39. Kang S, Kim D. (Antioxidant properties and cytotoxic effects of fractions from glasswort(Salicornia herbacea) seed extracts on human intestinal cells). Food Sci. Biotechnol, 2011; 20: 115-122.
40. Ainsworth EA, Gillespie KM. Estimation of total phenolic content and other oxidation substrates in plant tissues using folin-ciocalteu reagent. Nat. Protoc, 2007; 2: 875-877.
41. Maria Perez, Ines Dominguez-Lopez, Rosa M. (The Chemistry Behind the Folin−Ciocalteu Method for the Estimation of (Poly)phenol Content in Food: Total Phenolic Intake ina Mediterranean Dietary Pattern). Journal of Agricultural and Food Chemistry, 2023; 71: 17543-17553.
42. Elham Y AI Barghouthy, Saaja Hamed et. al. (Comparative Evaluation of Spreadability Measurement Methods for Topical Semisolid Formulations/A Scoping Review). Gels, 2025; 11: 1006.
43. Yi Jing Qi, key Zhang. An in vitro transdermal delivery study of methimazoleand hydrocortisone from a compound methicillin ointment [J] Journal of Pharmaceutical Sciences, 1996; (03): 148-150.
44. Yu, Chao A et. al. (A review of ointment preparation and content determination [J] Guangdong chemicalindustry) 2017; 44(16): 174-175.