INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES
[ISSN: 0975-4725; CODEN(USA): IJPS00]
Journal Homepage: https://www.ijpsjournal.com

Research Article

Biological Evaluation of a *Platycladus orientalis* (L) Franco Cold Cream Formulation with Antioxidant and Antimitotic Activities

Ankitha Sidda Naik[1], Rakesh Surappa Anjaneya[2], Madhu Kumar Dogganal Jayappa[3], Shwetha Ullegaddi[4], Deepak Gowda Haradanahalli Sangegowda[5], Shweta Gurunatappa Mudakanahoudra[6], Manasa Dogganal Jayappa*[7]

[1,4,5,6,7] *Department of Studies in Botany, Davangere University, Shivagangothri, Davangere, Karnataka, India, 577007*

[2] *GM Institute of Pharmaceutical Science and Research, Davangere, Karnataka, India.*

[3] *Department of Chemistry, Ambli Dodda Bharamappa First Grade College, Harapanahalli (T), Vijayanagara, Karnataka, India.*

ARTICLE INFO

Published: 2 Apr 2026
Keywords:
Platycladus orientalis; Herbal cold cream; Antioxidant activity; DPPH assay; Antimitotic activity
DOI:
10.5281/zenodo.19388952

ABSTRACT

Platycladus orientalis (L.) Franco is a medicinally important conifer widely used in traditional systems of medicine for the treatment of inflammatory disorders, skin ailments, infections, and tumors. The present study aimed to formulate and evaluate a cold cream incorporating methanolic extract and essential oil of P. orientalis and to assess its physicochemical characteristics, antioxidant potential, and anti-mitotic activity. The formulated cold creams were evaluated for organoleptic properties, homogeneity, pH, spreadability, viscosity, and extrudability, which revealed acceptable physical stability, aesthetic appeal, and suitability for topical application. Antioxidant activity was assessed using the DPPH free radical scavenging assay, where both formulations exhibited moderate antioxidant potential, with the essential oil–based formulation (EOF) showing slightly better activity (IC50 218.473 µg/mL) than the methanol extract–based (MEF) cream with the IC50 of 248.810 µg/mL. Anti-mitotic activity was evaluated using the Allium cepa root tip assay, which demonstrated a significant reduction in mitotic index and increased chromosomal abnormalities in the MEF with mitotic index of 38 ± 1.527%, indicating strong Mito-depressive activity, while the EOF (95 ± 1.527 %) exhibited comparatively lower cytotoxicity. The observed biological activities may be attributed to the presence of phenolic compounds, flavonoids, and terpenoids known to occur in P. orientalis. Overall, the study demonstrates that P. orientalis–based cold cream formulations possess promising antioxidant and anti-mitotic properties along with desirable formulation characteristics,

***Corresponding Author:** Manasa Dogganal Jayappa
Address: *Department of Studies in Botany, Davangere University, Shivagangothri, Davangere, Karnataka, India, 577007*
Email : manasadj310@gmail.com

Relevant conflicts of interest/financial disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

highlighting their potential application in cosmetic and therapeutic topical preparations

INTRODUCTION

Medicinal plants continue to serve as invaluable sources of therapeutic agents, particularly in the development of topical and dermatological formulations. In recent years, growing consumer preference for natural and herbal products has driven extensive research into plant-based creams and ointments, owing to their biocompatibility, multifunctional bioactivity, and reduced risk of adverse effects. Herbal topical formulations enriched with antioxidant and cyto-modulatory phytoconstituents are increasingly explored for managing skin disorders associated with oxidative stress, inflammation, microbial infections, and abnormal cellular proliferation.

P. orientalis, previously known as *Thuja orientalis*, belongs to the family Cupressaceae and is an evergreen conifer of considerable medicinal importance. The plant typically grows as a medium-sized tree or shrub, characterized by flattened, scale-like leaves arranged in fan-shaped sprays and small woody cones. *P. orientalis* is native to East Asia, particularly China and Korea, and is now widely distributed across temperate regions of Asia, Europe, and the Indian subcontinent. In India, it is commonly cultivated in gardens, institutional campuses, and religious places, reflecting both its ornamental and medicinal value (Bisset & Wichtl, 2001).

Ethnomedicinally, *P. orientalis* has a long history of use in Traditional Chinese Medicine, Ayurveda, and indigenous healthcare systems. Different parts of the plant, especially the leaves and cones, have been traditionally employed for treating respiratory disorders, inflammation, microbial infections, wounds, skin diseases, and tumors. Topical applications of *P. orientalis* preparations are widely reported for managing eczema, ulcers, burns, warts, and inflammatory skin conditions, highlighting its relevance for dermatological and cosmetic use (Fabricant & Farnsworth, 2001).

Phytochemical investigations have demonstrated that *P. orientalis* is rich in diverse secondary metabolites, including flavonoids, phenolic acids, tannins, lignans, diterpenes, and essential oils are the predominantly found terpenes in *P. orientalis* are α-pinene, β-pinene, limonene, and thujone. These phytoconstituents are known to contribute to a wide range of pharmacological activities, including antioxidant, anti-inflammatory, antimicrobial, and cytotoxic effects (Heinrich et al., 2012). Recently, Ankitha S et al. (2025) provided a comprehensive phytochemical evaluation of *P. orientalis* using methanol extract and essential oil extracts reporting the presence of phenolics, flavonoids, terpenoids, and other bioactive constituents that support its medicinal and therapeutic potential. The plant is well recognized in traditional medicine for its diverse pharmacological properties, including antimicrobial, anti-inflammatory, antioxidant, anticancer, hepatoprotective, and wound-healing activities (Cui et al., 2021). Their findings further validate the chemical richness of *P. orientalis* and its suitability as a source of functional bioactive for formulation development.

In addition to antioxidant activity, the ability of plant-derived compounds to interfere with cell division has attracted increasing attention, particularly in the context of anticancer and chemo preventive research. The *Allium cepa* root tip assay is a well-established bioassay for evaluating anti-mitotic and cytotoxic effects, as alterations in mitotic index and chromosomal behavior directly reflect disruption of the cell cycle. (Kundu et al., 2016).

Despite extensive reports on the pharmacological activities of *P. orientalis* methanol extracts and essential oils, scientific information on their incorporation into cold cream formulations and the evaluation of their biological activity in formulated form remains limited. Cold creams are widely used semisolid dosage forms that provide moisturizing, protective, and soothing effects, making them suitable carriers for herbal bio actives. Systematic evaluation of formulation parameters is essential to ensure stability, skin compatibility, and consumer acceptability (Amalraj et al., 2017).

Therefore, the present study was undertaken to formulate and evaluate cold cream preparations containing methanolic extract and essential oil of *P. orientalis*. The study focuses on assessing physicochemical characteristics, antioxidant activity using the DPPH assay, and anti-mitotic potential using the *A. cepa* root tip model, thereby scientifically validating the traditional use of *P. orientalis* and exploring its potential application in herbal cosmetic and therapeutic formulations.

2. MATERIALS AND METHODS

2.1 Collection of Plant material

Fresh leaves of *P. orientalis* have been obtained from a cultivated ornamental layout located in Channagiri Taluk, Davangere District, Karnataka, India (14.47° N and 75.98° E). The plant was taxonomically identified and validated by Dr. Haleshi C, Department of Studies in Botany, Davangere University, Davangere. A voucher specimen (ID: HDUD517) was prepared and deposited in the herbarium of the Department of Studies in Botany, Davangere University, for future reference.

2.2 Plant preparation for solvent extraction

Collected *P. orientalis* leaves were washed with distilled water, shade-dried for ten days, and pulverized into a fine powder, which was stored at 4 °C until use. Soxhlet extraction was performed using 25 g of leaf powder and HPLC-grade methanol at a solvent-to-sample ratio of 14:1 (350 mL) for six hours (10–12 cycles). The extract was concentrated at 35 °C, transferred to labeled airtight vials, and stored at 4 °C for further phytochemical analysis (Ankitha et al., 2025).

2.3 Extraction of essential oil (EO)

Fresh *P. orientalis* leaves were washed, chopped, and subjected to essential oil extraction by hydro-distillation using a Clevenger apparatus. A total of 200 g of fresh leaf material was distilled with 700 mL of distilled water at 85–90 °C for 4 h per cycle, yielding approximately 1 mL of essential oil per cycle (Ankitha et al., 2025). The collected oil was stored in an aluminum container under refrigerated conditions for further analysis.

2.4 Preparation of Cold Cream.

Begin by placing beeswax in a China dish and melting it with Methanol extract and essential oil on a hot plate. Once the beeswax has melted, introduce liquid paraffin to the dish and continue heating the mixture at 70˚C. In a separate 100 ml beaker, dissolve borax in water and heat it at 70˚C. Ensure that both the aqueous and oily solutions are heated to the same temperature (Figure 1A & 1B). Once they reach 70˚C, gradually add the borax solution to the melted beeswax mixture, drop by drop, with continuous stirring. To add fragrance, incorporate a few drops of rose oil into the blend. Keep stirring until the mixture cools and solidifies into a semi-solid form, as shown in Table 1 (Singh et al., 2022).

Table 1: Formulation for the preparation of cold cream.

Sr. No.	Ingredients	Official Formula (50g)	Working Formula (20g)
1	Methanol extract (ME)/ Essential oil (EO)	100mg ME/ 0.9ml EO	40mg
2	Borax	0.5gm	0.25mg
3	Liquid paraffin	30gm	15gm
4	Bee wax	10gm	5gm

2.5 Evaluation Parameters of Cold Cream

The formulated MEF and EOF cold cream was evaluated for its physicochemical quality and performance using standard procedures. These parameters include organoleptic evaluation, appearance and homogeneity, grittiness, pH, spreadability, viscosity, and extrudability. (Amalraj et al., 2017). Organoleptic properties, including color, odor, and texture, were assessed by visual and sensory inspection, while appearance and homogeneity were examined to ensure a smooth, uniform formulation without phase separation. Grittiness was evaluated by rubbing a 1 mL sample between fingertips to confirm the absence of coarse particles. The pH was determined by dissolving 1 g of the cream in 100 mL of distilled water and measuring it using a calibrated digital pH meter to ensure skin compatibility. Spreadability was assessed by placing the formulation between two glass slides under a 50 g load and calculating spreadability using the equation

$$S = (M \times L)/T.$$

Where S is the spreadability (in g·cm/s), M is the mass (in grams), L is the length of the slide (in cm), T is the time (in seconds).

Viscosity was measured using a YAMTO viscometer fitted with spindle no. 4 at 6 rpm, and extrudability was evaluated based on the ease with which the cream could be extruded from a collapsible tube, indicating its suitability for topical application, as described in earlier reports (Jovanović et al., 2025).

3. BIOLOGICAL ACTIVITIES

3.1 Antioxidant activity by DPPH free radical scavenging assay

The radical-scavenging activities of the MEF and EOF cold cream were subjected to DPPH radical assay as described by Blois (1958). Different concentrations (0 to 250 µg/mL) of samples and 2 mL of DPPH (100 µM) was added, made up to 3 mL with methanol and the reaction mixture was incubated in dark for 45 min at room temperature. At the end of incubation period, absorbance was recorded using spectrophotometer (Shimadzu UV-1800, Kyoto, Japan) at 517 nm against the blank. Free radical scavenging capacity of the samples were calculated and expressed in IC_{50} values in comparison with Vit-C as a standard.

3.2 Anti-mitotic activity

The anti-mitotic activity of MEF and EOF cold cream was assessed using the *Allium cepa* root tip assay (Seghal et al., 2006). Distilled water served as the negative control, and methotrexate (10 mg/mL) was used as the positive control. Healthy onion bulbs were surface-sterilized and placed on autoclaved sand under sterile conditions to promote root growth. Once roots developed sufficiently, bulbs were treated with the test samples and control for 24 hrs. Root tips were excised early in the morning, fixed with fixative ethanol and glacial acetic acid (3:1) for about 3hrs, then the tips were washed with 1N HCL to smoothen the tips and then the tips were squashed using acetocarmine stain by gentle heating and

processed for microscopic examination to assess mitotic inhibition.

4. RESULTS AND DISCUSSION

4.1 Evaluation Parameters of Cold Cream

The physical and physicochemical properties of the formulated cold cream (MEF and EOF) are summarized in Table 2 and demonstrate satisfactory formulation performance. The MEF cream exhibited a pale-yellow color, whereas the EOF formulation showed a creamy white appearance, indicating uniform dispersion and successful incorporation of the volatile oil. Both formulations possessed a pleasant fragrance with a shiny, creamy, homogeneous, and aesthetically acceptable appearance, while texture evaluation confirmed a smooth and uniform consistency, particularly in the EOF cream. The pH value of 7.22 falls within the acceptable range for topical preparations, suggesting good skin compatibility and minimal irritation potential. The formulation showed good spreadability (78 gcm/s) and high extrudability (85%), reflecting ease of application and efficient release from the container, while the viscosity (51,532.80 cps) indicates suitable consistency, contributing to formulation stability and user acceptability. Similar physicochemical characteristics and topical suitability have been reported for herbal creams formulated using *Thuja* species, including *Thuja occidentalis*, where acceptable pH, spreadability, viscosity, and homogeneity were associated with good skin compatibility and cosmetic acceptability (Kaur et al., 2010; Patel et al., 2013). Additionally, essential oil–based topical formulations of *Thuja* spp. have been shown to enhance sensorial properties and formulation stability without compromising skin safety (Bisset & Wichtl, 2001). Overall, the present findings are consistent with previous studies on *Platycladus*-based topical formulations and support the potential application of the developed cold cream for cosmetic or therapeutic use.

Table 2. The physical and physicochemical parameters of MEF and EOF.

Sr. No.	Evaluation Parameters	Result
1	Colour	Pale yellow for MEF, creamy white for EOF cream.
2	Oduor	Fragrant
3	Texture	Uniform
4	Appearance and Homogenicity	Shiny, creamy, pearly, homogenous
5	Grittiness	No grittiness
6	pH	5.8
7	Spreadability	78gm.cm/sec
8	Viscosity	51532.80cps
9	Extrudability	85%

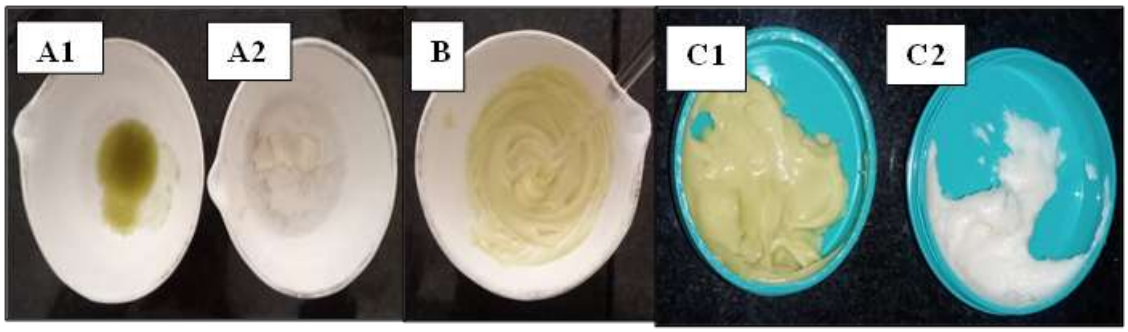


Figure 1:- A1. Water phase, A2. Oil phase: B. Mixing up the oil & water phase: C1. MEF; C2. EOF.

4.2 Antioxidant activity by DPPH free radical scavenging assay.

The antioxidant potential of the formulated cold creams was evaluated using the DPPH free radical scavenging assay, and the results are expressed as IC_{50} values (µg/mL) in Table 3. Both the MEF and the EOF cream demonstrated moderate antioxidant activity, with IC_{50} values of 248.8 µg/mL and 218.5 µg/mL, respectively (Figure 2). The EOF showed slightly better scavenging than the MEF, which may be attributed to the presence of volatile constituents with radical-quenching properties distributed within the lipophilic phase of the cream. This suggests that both the extract and essential oil contribute antioxidant bioactivity, although less potent than standard (Vitamin C).

While direct reports on antioxidant cream or ointment formulations of *Thuja* species are limited, several related topical formulation studies involving *Thuja* components support the feasibility of incorporating antioxidant phytoconstituents into dermal delivery systems. Notably, Mali et al. (2025) developed a novel emulgel formulation combining quercetin, a well-known antioxidant flavonoid, with *Thuja* oil to enhance topical anti-inflammatory efficacy. Although the primary focus of the study was anti-inflammatory activity, the inclusion of quercetin highlights the antioxidant relevance of the formulation, as quercetin is widely recognized for its strong free-radical scavenging properties. The successful development and evaluation of this *Thuja* oil-based emulgel demonstrate that plant-derived oils can effectively serve as carriers for antioxidant activities, thereby improving topical performance and supporting the rationale for incorporating *Thuja* extracts or essential oils into antioxidant induced dermal formulations.

Table 3: Antioxidant properties of MEF and EOF.

Sr. No	Samples	DPPH IC_{50} (µg/mL)
1	Std	26.426
2	MEF	248.810
3	EOF	218.473

Note:- Std- Standard vitamin C; MEF- Methanol extract formulation; EOF- Essential oil formulation.

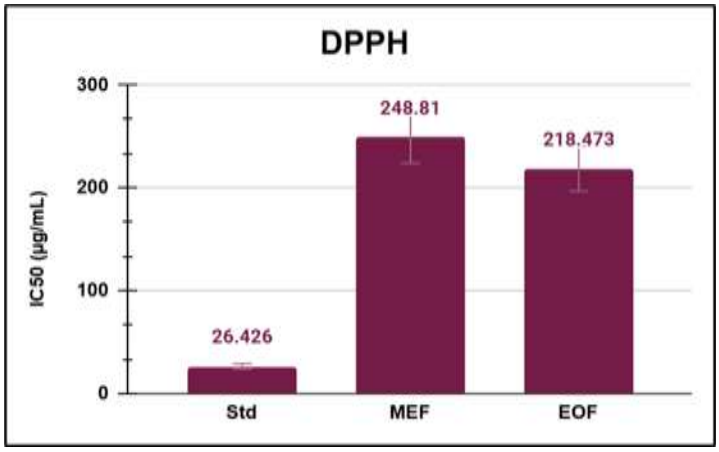


Figure 2:- Bar graph showing the Antioxidant properties of MEF and EOF.

4.3 Anti-mitotic activity.

The anti-mitotic activity of the formulated cold creams was evaluated using the *A. cepa* root tip assay, and the results are presented in Table 4 along with representative microscopic images (Figure 3). In the negative control, a high mitotic index (70%) with clearly distinguishable prophase (P), metaphase (M), anaphase (A), and telophase (T) stages was observed, indicating normal cell division. In contrast, the positive control showed a

marked reduction in the mitotic index (36%), accompanied by an increased number of abnormal cells, confirming the sensitivity of the assay. The MEF cream exhibited a pronounced anti-mitotic effect, with a significant reduction in the number of dividing cells (38 ± 1.527) (Table 4) and a higher frequency of chromosomal abnormalities, suggesting strong inhibition of cell cycle progression. This effect may be attributed to bioactive phytochemicals such as phenolics and flavonoids present in the MEF, which are known to interfere with spindle formation and chromosomal segregation. Conversely, the EOF showed a comparatively higher mitotic index (95 ± 1.527) with fewer abnormalities, indicating milder anti-mitotic activity and better cellular tolerance. Microscopic observations revealed mitotic aberrations such as chromosome stickiness, disturbed metaphase, and abnormal anaphase figures in treated groups, supporting the quantitative findings. Overall, the results suggest that the MEF cream possesses notable anti-mitotic potential, whereas the EOF exhibits comparatively lower cytotoxicity, highlighting their differential biological behavior and potential applicability in therapeutic or cosmetic contexts.

The EOF showed better antioxidant activity (IC_{50} = 218.47 µg/mL) than the MEF cream (IC_{50} = 248.81 µg/mL). However, the MEF exhibited stronger antimitotic activity, as indicated by a lower mitotic index (38%), compared to the EOF (95%). This suggests that antioxidant and antimitotic activities are not directly proportional, and different bioactive constituents may contribute independently to these effects. The observed difference can be justified by the fact that antioxidant activity and antimitotic activity arise from different mechanisms. Although the EOF showed better free-radical scavenging ability, the MEF likely contains polar bioactive compounds (such as phenolics or flavonoids) that are more effectively interfere with the cell cycle and spindle formation, leading to a lower mitotic index. Therefore, a formulation with moderate antioxidant capacity can still exhibit strong antimitotic effects**,** indicating that these two biological activities are related but not strictly dependent on each other**.**

Future investigations should focus on detailed phytochemical profiling and isolation of active constituents responsible for the observed antioxidant and anti-mitotic effects, along with mechanistic studies to elucidate their molecular targets. *In vivo* dermatological safety assessments, including skin irritation, sensitization, and long-term toxicity studies, are essential to establish clinical applicability. Additionally, optimizing formulation strategies such as nano-emulsions, emulgels, or vesicular delivery systems may enhance bioavailability and therapeutic efficacy. Comparative studies with marketed formulations and extended biological evaluations, including anti-inflammatory, wound healing, and anticancer-related assays, could further broaden the application potential of *P. orientalis*–based cold cream in cosmetic, cosmeceutical, and pharmaceutical domains.

Table 4:- Anti-mitotic activity of MEF and EOF.

Sample name	Total no. of cells	No. of non-dividing cells	P	M	A	T	Abnormalities	Total dividing cells	Mitotic index (%)
Negative control	100	14	25	14	20	19	8	78	70%
Positive control (Methotrexate tablet)	100	44	30	-	4	2	20	56	36%
MEF	100	-	-	-	-	-	38	38	38 ± 1.527
EOF	100	5	14	16	20	25	20	95	95 ± 1.527

Note:- The symbol "-'' shows no activity; P- Prophase, M- Metaphase, A- Anaphase, T- Telophase. MEF- Methanol extract formulation; EOF- Essential oil formulation.

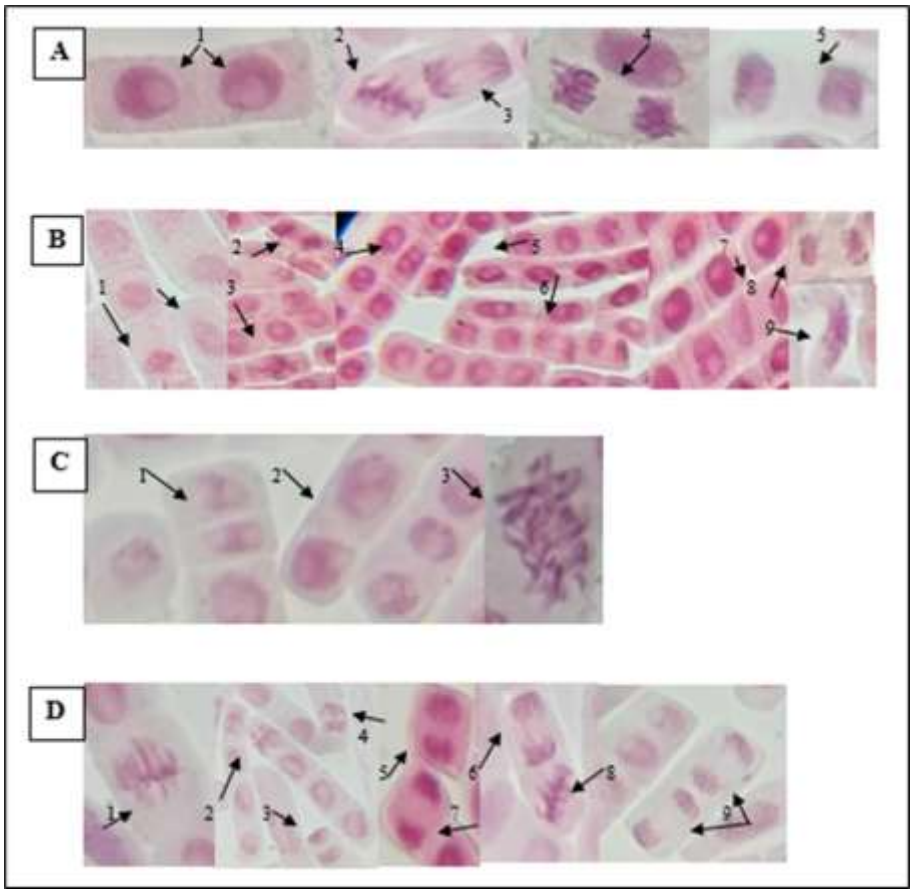


Figure 3:- **Antimitotic effect of cold cream formulation on *A. cepa* root tip.**

A- negative control;- Normal mitotic phases in negative control. 1- Prophase, 2- Metaphase, 3- Anaphase, 4- Early telophase, 5- Telophase.

B-positive control;- Chromosomal and nuclear abnormalities in positive control. 1-Polyploid prophase, 2-Telophase, 3- Sticky chromosome, 4 & 5- Nuclear lesions, 7- Decondensed anaphase, 6 & 8- Multipolar anaphase, 9- Polyploid metaphase.

C- MEF;- 1 & 2 - Nuclear lesions, 3- Disrupted metaphase.

D-EOF;- 1, 2, 8- Disrupted metaphase, 3 – Decondensed anaphase, 4- Polyploidy anaphase, 5- Telophase, 6, 7, 9- Anaphase.

CONCLUSION

The present study successfully developed and evaluated a cold cream formulation incorporating MEF and EOF of *Platycladus orientalis* (L.) Franco, demonstrating its potential as a bioactive topical formulation. Both MEF and EOF revealed desirable physical and physicochemical characteristics, including acceptable appearance, homogeneity, smooth texture, suitable pH, good spreadability, high extrudability, and appropriate viscosity, indicating formulation stability, skin compatibility, and user acceptability. Antioxidant activity assessed by the DPPH free radical scavenging assay showed that both MEF (IC_{50} of 248.810 µg/mL) and EOF cold creams possessed moderate antioxidant potential (IC_{50} of 218.473

µg/mL), with the EOF exhibiting comparatively better activity, suggesting the contribution of lipophilic antioxidant constituents. Furthermore, anti-mitotic activity evaluated using the *Allium cepa* root tip assay demonstrated a significant reduction in mitotic index and increased chromosomal abnormalities in the MEF (MI of 38± 1.527%), indicating pronounced Mito-depressive effects, while the EOF (MI of 95 ± 1.527%) showed comparatively milder activity, reflecting differential biological behavior of the incorporated phytoconstituents. Overall, the findings support the therapeutic relevance of *P. orientalis* bio-actives in topical applications and validate the developed cold cream as a promising herbal formulation with antioxidant and anti-mitotic properties.

ETHICAL STATEMENT: Not applicable

CONFLICT OF INTEREST: The authors declare that they have no known competing financial or personal interests.

CONSENT FOR PUBLICATION: Not applicable.

AVAILABILITY OF SUPPORTING DATA: The data is made available on request to the corresponding authors.

FUNDING: This study did not receive any specific funding

AUTHORS CONTRIBUTION

Ankitha S:- Writing– review & editing, Writing– original draft, Project administration, Methodology, Investigation, Conceptualization. **Shwetha Ullegaddi, Shweta GM, Deepak Gowda HS :-** Writing- review & editing. **Manasa DJ** :- Supervision, Investigation. **Rakesh AS, Madhu Kumar DJ;-**Investigation, Writing-review & editing.

ACKNOWLEDGEMENTS

The authors are thankful to the Department of Botany Davangere University, Davangere for providing necessary laboratory facilities to conduct the experiment.

REFERENCES

1. Bisset, N. G., & Wichtl, M. (2001). Herbal Drugs and Phytopharmaceuticals. Stuttgart: Medpharm Scientific Publishers.
2. Fabricant DS, Farnsworth NR (2001) The value of plants used in traditional medicine for drug discovery. Environmental Health Perspectives 109(Suppl 1):69–75. https://doi.org/10.1289/ehp.01109s169
3. Heinrich M, Barnes J, Gibbons S, Williamson EM (2012) Fundamentals of pharmacognosy and phytotherapy. 2nd edn. Churchill Livingstone, London
4. Ankitha S., Ullegaddi S., Shweta G.M., Gowda H.S.D., Madhu Kumar D.J. & Manasa D.J. (2026) Exploring the phytochemical wealth of Platycladus orientalis (L.) Franco through solvent-based and essential oil extracts. Journal of Pharmacognosy and Phytochemistry, 15(1), pp.56–65. DOI: https://doi.org/10.22271/phyto.2026.v15.i1a.15705
5. Singleton VL, Orthofer R, Lamuela-Raventós RM. Analysis of total phenols and other oxidation substrates and antioxidants by means of Folin–Ciocalteu reagent. In: Methods in enzymology. Vol. 299. Cambridge (MA): Academic Press; 1999. p. 152–78.
6. Singh SP, Misra A, Kumar B, Adhikari D, Srivastava S, Barik SK. Identification of potential cultivation areas for centelloside-specific elite chemotypes of Centella asiatica (L.) using ecological niche modeling. Ind. Crops. Prod. 2022; 188:115657.

https://doi.org/10.1016/j.indcrop.2022.115657

7. Cui, B., Deng, P., Tian, L., Wang, Q., Zhang, S., & Zhao, Z. (2021). Genetic evaluation of ancient Platycladus orientalis L. (Cupressaceae) in the middle reaches of the Yellow River using nuclear microsatellite markers. Forests, 12(12), 1616
8. L.M. Kundu, S. Ray, Caryologia, 70 (2016) 7-14
9. Amalraj A, Pius A, Gopi S, Gopi S. Biological activities of curcuminoids, other biomolecules from turmeric and their derivatives–A review. J. Tradit. Complement. Med. 2017;7(2):205-33. https://doi.org/10.1016/j.jtcme.2016.05.005
10. Jovanović J, Jović M, Trifković J, Smiljanić K, Gašić U, Krstić Ristivojević M, Ristivojević P. Green Extraction of Bioactives from Curcuma longa Using Natural Deep Eutectic Solvents: Unlocking Antioxidative, Antimicrobial, Antidiabetic, and Skin Depigmentation Potentials. Plants. 2025;14(2):163
11. Blois, M. S. (1958). Antioxidant determinations by the use of a stable free radical. Nature, 181(4617), 1199-1200. https://doi.org/10.1038/1811199a0
12. Sehgal R, Roy S, Kumar VL (2006) Evaluation of cytotoxic potential of latex of Calotropis procera and podophyllotoxin in Allium cepa root model. Biocell 30(1):9–13
13. Kaur, L. P., Garg, R., & Gupta, G. D. (2010). Development and evaluation of topical herbal gel containing Thuja occidentalis. International Journal of Pharmaceutical Sciences Review and Research, 5(3), 1–6.
14. Patel, R. P., Patel, G., & Baria, A. H. (2013). Formulation and evaluation of polyherbal cream containing medicinal plant extracts including Thuja species. Journal of Pharmaceutical and Scientific Innovation, 2(2), 32–36.
15. Bisset NG, Wichtl M. Herbal Drugs and Phytopharmaceuticals: A Handbook for Practice on a Scientific Basis. Stuttgart: Medpharm Scientific Publishers; 2001.
16. Mali AJ, Kakade S, Khardekar A, Ganeshpurkar A, Kumari A. Development of a novel emulgel comprising quercetin-loaded transferosomes and Thuja oil for enhanced anti-inflammatory efficacy. Next Nanotechnology. 2025;8:100246. DOI: 10.1016/j.nxnano.2025.100246.

HOW TO CITE: Ankitha Sidda Naik, Rakesh Surappa Anjaneya, Madhu Kumar Dogganal Jayappa, Shwetha Ullegaddi, Deepak Gowda Haradanahalli Sangegowda, Shweta Gurunatappa Mudakanahoudra, Manasa Dogganal Jayappa, Biological Evaluation of a Platycladus orientalis (L) Franco Cold Cream Formulation with Antioxidant and Antimitotic Activities, Int. J. of Pharm. Sci., 2026, Vol 4, Issue 4, 330-339. https://doi.org/10.5281/zenodo.19388952