

A comprehensive review on Analgesic activity of Some Medicinal plants

Dinesh Kumar¹, Sarala Arumugam², DR. Senthil Kumar S.K³, Dharanisri Kumaran⁴, Dinesh Senthamarai⁵, Dinesh Karthick Mayakkannan⁶, Durai Velu⁷.
^{1,4,5,6,7} Final year students, B.Pharm, Arunai college of pharamacy Tiruvannamalai, Tamil Nadu.

²Associate professor, Department of pharmaceutical chemistry, Arunai college of pharmacy Tiruvannamalai, TamilNadu.

³Principal, Arunai college of pharmacy, Tiruvannamalai, Tamil Nadu.

Submitted: 20-08-2023

Accepted: 31-08-2023

ABSTRACT

Pain is the body's defense and protective mechanism to withdraw from a painful stimulus. The medicinal plants mostly possess antioxidants, diabetes, and cancer, which may increase free radicals and result in pain. Effects of medicinal plants (*Boswellia serrata* Roxb), (*Quercus infectoria*), (*Papaver rhoeas*), (*Cedrus libani*), (*Combretum bauchiense*), (*Amischotholype mollissima*), (*Justicia adhatoda*), (*Dobera glabrea*), (*Spondias venulosa*), (*Flos populi*). The plant extract Find out the analgesic activity Pain is created for different reasons, such as harmful heat, stretching, electrical flow, necrosis, inflammation, laceration, and spasm. This prevention review paper provides the methods used for the isolation of potentially active compounds from some of these medicinal plants in the future.

Keywords: Analgesic, Medicinal plants, Pain sensation.

I. INTRODUCTION

Pain is the body's defense and protective mechanism to withdraw from a painful stimulus. The International Association for the Study of Pain (IASP) has defined pain as unpleasant sensory and emotional experiences associated with actual or potential tissue damage or described in terms of such damage. [1] A number of drugs are available on the market to treat inflammatory and analgesic diseases (NSADs) and opioids. Synthetic substitutes have no doubt taken over, but none of the anti-inflammatory and analgesic drugs available today can be considered ideal because of their toxic effects. There is an extensive search going on for new drugs and molecules with fewer side effects, and there is a lot of scope for herbal medicine in this view. [2], Although pain mainly is considered as a defense mechanism which is created when a

tissue is damaged and caused a person show reaction and remove pain stimulant [3] The medicinal plants mostly possess antioxidants, diabetes, and cancer, which may increase free radicals and result in pain. [4] This paper was aimed at presenting medicinal plants that are used and show promising results for the prevention and treatment of pain and inflammation. This paper not only presents different kinds of pain, mediators of pain, and inflammation but also discusses the pathophysiology of pain. [5]

Effects of medicinal plant extracts on pain

- *Boswelliaserrata* Roxb
- *Quercus infectoria* (Olivier)
- *Papaver rhoeas*
- *Cedrus libani*
- *Combretum bauchiense*
- *Amischotholype mollissima*
- *Justicia adhatoda*
- *Dobera glabrea*
- *Spondias venulosa*
- *Flos populi*

Boswellia serrata Roxb

Boswellia serrata Roxb is known as Unani medicine. The stem exudation of *B. serrata* oleogum resin belongs to the family Burseraceae. [6] The plants, such as dry forestes, are widely distributed in India, Rome, China, Greece, and American civilization. When the medicinal plants are effective remedies for bronchitis, asthma, cough, cardiovascular disease, diarrhea, dysentery, ringworm, boils, fever, etc., the qualitative phytochemical study of plant extracts shows the presence of tannin, pentosans, linalool, holocellulose, -pinene, phenol, both volatile oils, alcohol, and boswellic acid. Then pharmacological

activities for anti-arthritic, anti-inflammatory, anti-asthma, analgesic, hepatoprotective, anti-cancer, hypoglycemic, and anti-hyperlipidemic activities[7-13]

Quercus infectoria (Olivier)

Quercus infectoria (Olivier), from the family Fagaceae, is commonly known as gall oak or dyer's oak. The plants are locally known as manjakani in Malaysia and Indonesia or majuphal in India. [14] When the herbs are medicinal plants, their effective phytochemical constituents are tannin, gallic acid, ellagic acid, and syringic acid [15]. Pharmacologically, it has been documented to possess antioxidant, anti-inflammatory, antimicrobial, and analgesic, and antidiabetic activities. [16]

Papaver rhoeas

Papaver rhoeas is from the family Papaveraceae. It is used for food and exploited to treat several health problems. When the phytochemical constituents are tannins, coumarins, saponins, and terpenoids. The pharmacological properties are anti-struvite, anti-inflammatory, analgesic, antidepressant, and antioxidant. The results of anti-inflammatory activity show maximum inhibition of edema after six hours of carrageenan injection in rats (T6) for all extracts, with an average value of 86.36% for SE at the dose of 200 mg/kg. Regarding the analgesic effect of our plant, the lowest number of abdominal contractions was observed in patients treated with FE at a dose of 400 mg/kg.[17]

Cedrus libani

Cedrus libani is a true cedar that is grown in the eastern Mediterranean, Lebanon, and western Syria. [18]. *C. libani* was mentioned 75 times in the Bible (the Old Testament), and its oil was used to embalm the ancient pharaohs of Egypt. In recent years, the antioxidant properties of cedar oil have been demonstrated. [19] moreover *C. libani* was used traditionally to heal wounds and to treat many diseases in humans and animals, both internally and externally [20], when the phytochemical constituents were saponins, carbohydrates, coumarins, glycosides, tannins, flavonoids, and phenol. Then *C. libani* ethanol extract was prepared using 70% ethanol; the maceration process was done at room temperature for 24 h with stirring; the leaves were re-extracted according to the previous method three times; and the solvents were removed by a rotary evaporator at 40°C [21].

Combretum bauchiense

Combretum bauchiense is an African folk plant of the family Combretaceae, and its ethnobotanical uses can be said to be relatively unknown. However, based on previous ethnobotanical studies of related *Combretum* species carried out predominantly in South Africa [22] the uses of *Combretum bauchiense* can be said to range from antidiarrheal, antimicrobial, anti-inflammatory, analgesic, blood coagulant, and anti-cancer. As species of the same genera are known to possess similar pharmacological properties [23]. The results of the qualitative phytochemical screening are adequately presented in Table 3. The preliminary phytochemical analysis carried out showed the presence of saponins, tannins, proteins, carbohydrates, reducing sugars, glycosides, flavonoids, and alkaloids. This was similar to the secondary metabolites discovered by researchers in other *Combretum* species, notably *Combretum micranthum* [24].

Amischotolype mollissima

The perennial erect herb *Amischotolype mollissima* (family Comelinaceae) is a flowering plant with fibrous roots, oblanceolate leaves, and pink flowers. This species is distributed in India, Bangladesh, Singapore, Malaysia, and Indonesia. It occurs in the Chittagong and Sylhet hill tracts of Bangladesh. It is found in wet and evergreen broad-leaved forests [25]. In this study, the phytochemistry and pharmacological activities of *A. mollissima* were investigated through in vitro, in vivo, and in silico studies to determine scientific evidence of its ethnopharmacological uses.

Justicia adhatoda

Adhatoda L. leaf extract (Acanthaceae). The presence of alkaloids, saponins, tannins, phytosterols, phenols, and proteins in the leaf extract of *J. adhatoda* was determined using phytochemical screening. While the identification of different compounds in the leaf extract was carried out by HPLC analysis.[26]

The phytochemical analysis of the leaf extract indicated a positive test for alkaloids, saponins, tannins, phytosterols, phenols, proteins, and amino acids, while the negative test was for carbohydrates, glycosides, flavonoids, and diterpenes. Moreover, among the detected compounds, gallic acid was found in the highest concentration with a 45.42% composition. The extract also revealed promising anti-inflammatory activities in vivo while exhibiting variable

pharmacokinetics and binding affinities towards protein targets using computational tools. [27]

Dobera glabra

Wild plants are considered an alternative source of food for both humans and animals in poor areas. *Dobera glabra* (Forssk.) Poir (Salvadoraceae) is common in the Arabian and African regions [28](Vogt, 1996; Aregawi et al., 2008). It is characterized taxonomically as an evergreen tree (up to 8 m) with alternate thick, skinny leaves, white flowers, and purple fruits with 1–2 flat seeds [29]. According to its region The folk use of *D. glabra* as a technique for prediction of droughts and as an edible food during starvation goes back to its nutritional values of high protein and mineral content [30]. Recently, the flavonoid constituents of *D. glabra* aqueous methanol leaf extract showed antioxidant and genotoxic protection activities [31]

Spondias venulosa

Spondias Venulosa is a plant whose ethnobotanical uses were neither scientifically investigated nor documented, despite the overwhelming use of the leaf extract as an antioxidant, pain relief, anti-inflammatory, and anticancer agent in traditional medicine in Nigeria. Aim of the study: To evaluate the antioxidant, anti-inflammatory, analgesic, and cytotoxic activity of *S. venulosa* leaf extracts on MCF-7/S0.5 and OV7 cancer cell lines and isolate the phyto-constituent responsible for its possible bioactivity. Materials and methods: The antioxidant activity was determined by DPPH and H₂O₂ radical scavenging activities; anti-inflammatory activity was evaluated by carrageenan-induced paw edema in mice; analgesic activity was carried out by acetic acid-induced writhing in mice; and the cytotoxicity activity of the extract was investigated in vitro and in vivo by MTT assay and tumor induction model by trypan blue dye exclusion assay, respectively. Identification and characterization of the bioactive compound present in *S. venulosa* were done using GC-MS, FTIR, 1D, and 2D NMR spectroscopy. [32]

Flos populi

Flos populi is an important traditional Chinese medicine prepared from the male inflorescence of *Populus tomentosa* Carr. or *Populus canadensis* Moench (Salicaceae family). *Flos populi* contains glycosides, cardiogenic glycosides, flavanoids, and phenols. Traditionally, it is employed for

detoxication and the relief of fever. In the Compendium of Materia Medica, extracts of Chinese white poplar bark were used to cure dysentery. Currently, *Flos populi* is mainly used for the treatment of various inflammatory diseases and diarrhea in East Asian countries [33].

II. CONCLUSION

Pain is created for different reasons, such as harmful heat, stretching, electrical flow, necrosis, inflammation, laceration, and spasm. When pain is also caused by a wide variety of diseases, surgical interventions, and trauma. Degenerative diseases like rheumatoid arthritis and polymyalgia rheumatica, as well as heart, asthma, cancer, and inflammatory bowel diseases, are also associated with inflammatory processes and pain. Medical plants have been suggested as reliable remedies for the prevention and treatment of related conditions. This prevention review paper provides the methods used for the isolation of potentially active compounds from some of these medicinal plants in the future.

REFERENCES

- [1]. IASP Sub-committee on Taxonomy Pain terms: a list with definitions and notes on usage Pain. 1980;8:249-52.
- [2]. Patkar Atul N, Desai Nilesh V, Ranage Akkatai A, and Kalekar Kamalakar S A review of *Aegle marmelos*: a potential medicinal tree International Research Journal of Pharmacy. 2012;3(8):86–91.
- [3]. Baradaran A, Madihi Y, Merrikhi A, Rafieian-Kopaei M, Nasri H. Serum lipoprotein (a) in diabetic patients with various renal function not yet on dialysis. Pak J Med Sci 2013;29(Suppl 1): 354- 357.
- [4]. Rafieian-Kopaei M, Ghobadi S, Nasri H. The protective effect of garlic extract on diabetic nephropathy. Journal of Isfahan Medical School 2013; 31(248): 1267-1269.
- [5]. Raj PP. Toxonomy and classification of pain. In: Kreitler S, Beltrutti D, Lamberto A, Niv D, editors. The handbook of chronic pain. New York: Nova Biomedical Books; 2007, p. 41-56
- [6]. Kokate CK, Purohit AP, Gokhale SB. ‘ pharmacognosy,’ Nirali prakashan, pune.2001;412-413
- [7]. Shao Y, Ho CT, Chin CK, Badmaev V, Ma W, Huang MT. Inhibitory activity of Boswellic acids from *Boswellia serrata*

- against human leukemia HL-60 cells in culture. *Planta Medica*. 1998; 64: 328-331.
- [8]. Singh GB, Atal CK. Pharmacology of an extract of salai guggal ex-Boswellia serrata, a new non steroidal anti-inflammatory agent. *Agent and Actions*. 1986; 18: 407-412.
- [9]. Sharma ML, Bani S, Singh GB. Anti-arthritic activity of Boswellic acids in BSA induced arthritis. *Int. J. of Immunopharmacol*. 1989; 11: 647-652.
- [10]. Gupta I, Gupta V, Gupta S, Purohit A, Ludtke R, Safayhi H, Ammon HPT. Effect of Boswellia serrata gum resin in patient with bronchial asthma: Results of a double blind, placebo controlled 6 week clinical study. *Euro. J. of Med. Res*. 1998; 3: 511-514.
- [11]. Chopra RN, Nayar SL, Chopra JC. Glossary of Indian medicinal plants, published by Council of Scientific and Industrial Research, New Delhi. 1956; 39.
- [12]. Gupta I, Parihar A, Malhotra P, Gupta S, Ludtke A, Safayhi H, Ammon HPT. Ammon. Effects of gum resin of Boswellia serrata in patients with chronic colitis. *Planta Medica* 2001; 67: 391-395.
- [13]. Pandey RS, Singh BK, Tripathi YB. Extract of gum resin of Boswellia serrata inhibits LPS induced nitric oxide production in rat macrophages along with hypolipidemic property. *Indian J. of Exp. Biol*. 2005; 43: 509-516.
- [14]. Z. Muhamad and A. M. Mustafa, *Traditional Malay Medicinal Plants*, Penerbit Fajar Bakti, Kuala Lumpur, Malaysia, 1994.
- [15]. A. Vermani, "Screening of Quercus infectoria gall extracts as anti-bacterial agents against dental pathogens," *Indian Journal of Dental Research*, vol. 20, no. 3, pp. 337-339, 2009.
- [16]. T. K. Lim, *Edible Medicinal and Non-Edible Medicinal Plants*, vol. 4, Springer, Amsterdam, The Netherlands, 2012.
- [17]. Papaver rhoeas L. stem and flower extracts: Anti-struvite, anti-inflammatory, analgesic, and antidepressant activities
- [18]. Y. Kurt, M. Kaçar, K. Isik, Traditional tar production from Cedrus libani A. Rich on the Taurus Mountains in southern Turkey, *Econ. Bot*. 62 (2008) 615-620.
- [19]. A Saab, F. Harb, W. Koenig, Essential oils components in heart wood of Cedrus libani and Cedrus Atlantica from Lebanon, *Minerva Biot* (2005) 17, 200517159- 161.
- [20]. Y. Kurt, M. Kaçar, K. Isik, Traditional tar production from Cedrus libani A. Rich on the Taurus Mountains in southern Turkey, *Econ. Bot*. 62 (2008) 615-620.
- [21]. M.Y. Abajy, Investigation the protective effect of Nigella sativa against cyclophosphamide induced genotoxicity in rats, *Res. J. Aleppo Univ*. 1 (8) (2020) 138.
- [22]. Fyhrquist, P., Mwasumbi, L., Hægström, C.A., Vuorela, H., Hiltunen, R., Vuorela, P., 2002. Ethnobotanical and antimicrobial investigation on some species of Terminalia and Combretum (Combretaceae) growing in Tanzania. *J. Ethnopharmacol*. 79 (2), 169-177.
- [23]. Fyhrquist, P., Mwasumbi, L., Hægström, C.A., Vuorela, H., Hiltunen, R., Vuorela, P., 2002. Ethnobotanical and antimicrobial investigation on some species of Terminalia and Combretum (Combretaceae) growing in Tanzania. *J. Ethnopharmacol*. 79 (2), 169-177.
- [24]. Abdullahi, M., Anuka, J., Yaro, A., Musa, A., 2014. Analgesic and antiinflammatory effects of aqueous leaf extract of Combretum micranthum G. Don (Combretaceae). *Bayero J. Pure Appl. Sci*. 7 (2), 78-82.
- [25]. Naghizadeh, B., Mansouri, M.T., Ghorbanzadeh, B., 2016. Ellagic acid enhances the antinociceptive action of carbamazepine in the acetic acid writhing test with mice. *Pharm. Bio*. 54 (1), 157-161.
- [26]. C. Luo, L. Zou, H. Sun, J. Peng, C. Gao, L. Bao, R. Ji, Y. Jin, S. Sun, A review of the anti-inflammatory effects of rosmarinic acid on inflammatory diseases, *Front. Pharmacol*. 11 (2020) 153.
- [27]. Z. Azza, M. Oudghiri, In vivo anti-inflammatory and antiarthritic activities of Table aqueous extracts from Thymelaea hirsuta, *Pharmacogn. Res*. 7 (2) (2015) 213-216.
- [28]. Vogt, K., 1996. *A Field Worker's Guide to the Identification, Propagation and Uses of Common Trees and Shrubs of Dryland Sudan*. SOS Sahel.
- [29]. Teklehaymanot, T., Giday, M., 2010. Ethnobotanical study of wild edible plants of Kara and Kwegu semi-pastoralist

- people in lower Omo river valley, Debub Omo zone, SNNPR, Ethiopia. *J. Ethnobiol. Ethnomed.* 6 (1), 23
- [30]. Tsegaye, D., Balehgn, M., Gebrehiwot, K., Haile, M., Gebresamuel, G., Aynekulu, E., 2007. The role of garsa (*Dobera glabra*) for household food security at times of food shortage in Aba'ala Wereda, North Afar: ecological adaptation and socio-economic value: a study from Ethiopia. DCG Rep.
- [31]. Elkhateeb, A., Abdel Latif, R.R., Marzouk, M.M., Hussein, S.R., Kassem, M.E., Khalil, W.K., El-Ansari, M.A., 2017. Flavonoid constituents of *Dobera glabra* leaves: amelioration impact against CCl₄-induced changes in the genetic materials in male rats. *Pharm.Biol.* 55 (1), 139–145.
- [32]. Antioxidant, anti-inflammatory, analgesic and in vitro-in vivo cytotoxicity effects of *Spondias Venulosa* (Engl.) Engl. leaf extracts on MCF-7/S0.5 and OV7 cancer cell lines article
- [33]. Du and Xue, 1996; Wang and Wang, 1999; Yang, 1987