ORIGINAL ARTICLE

ScienZTech

INTERNATIONAL JOURNAL OF PHARMACOMETRICS AND INTEGRATED BIOSCIENCES

Published by ScienzTech Publication Journal Home Page: www.scienztech.org/ijpib

Comparison of anti-inflammatory activity of various species of lamiaceae

Deepa N*, Madhivadhani K, Hari M, Prakash N, Lohith S, Prabakaran C

Department of Pharmacy, Saveetha College of Pharmacy, SIMATS, Thandalam, Chennai-600128, Tamil Nadu, India

Article History:

Received on: 12 Oct 2020
Revised on: 01 Nov 2020
Accepted on: 01 Dec 2020
Published on: 11 Mar 2021

Keywords:

Lamiaceae,
anti-inflammatory,
carrageenan,
albino rats

ABSTRACT

The process of inflammation is often triggered by the stimulus from outside sources that usally cause harm to human skin and tissues. It is a response of the body that protects itself from external agents but when it is excess and built up in the body it causes some worsening symptoms. Synthetic drugs usually cause side effects and adverse effects. Herbs are normally known to combat inflammations and fight free radicals. The antioxidants present in the herbs causes the preventive action of the oxidation and causes lowering of the inflammation. There were also investigations performed on the plant to prove the above activities. Among all the plants that are available in nature lamiaceae members, plants like Molucella laevis, Nepeta cataria, Vitex agnus, Origanum dictamnus and Mentha piperata were considered as major medicinal plants with a lot of medical applications. 5 members of lamiaceae were selected to study and compare the anti-inflammatory activity and the data suggests all the plants have better activity and out of all the Mentha extract showed a significantly better activity compared to the standard drug.

*Corresponding Author

Name: Deepa N
Phone: 9841266372
Email: deeparesearch@gmail.com

eISSN: 2455-8842

DOI: https://doi.org/10.26452/ijpib.v6i1.1405

Production and Hosted by

ScienzTech.org

INTRODUCTION

The process of inflammation is often triggered by the stimulus from outside sources that usally cause harm to human skin and tissues. It is a response of the body that protects itself from external agents but when it is excess and built up in the body it causes some worsening symptoms. It usually manifests in different forms like causing pain, redness in the area, swelling of the area and also some elevation of temperature in the site of occurrence of inflammation [1].

While inflammation is occurring in the body, various levels of enzymes are involved in the process and most important of them are oxidative free radicals, they are toxic to humans and disabling other functions of the body in various ways. The free radial migrates to the area of inflammation and triggers the inflammatory responses in the site of inflammation. There are numerous drugs that cause the lowering or prevention of inflammation. These synthetic drugs usually cause side effects and adverse effects. Herbs are normally known to combat inflammations and fight free radicals. The antioxidants present in the herbs causes the preventive action of the oxidation and causes lowering of the inflammation [2, 3]. Scientists performed and published a lot of research and articles in this regard to prove the anti-inflammatory activity of plants and put them into the classification of antipyretics, antioxidants and analgesics.

Among all the plants that are available in nature

lamiaceae members, plants like Molucella laevis, Nepeta cataria, Vitex agnus, Origanum dictamnus and Mentha piperata were considered as major medicinal plants with a lot of medical applications [4–6] . So in this study the above plants were extracted with ethanol and the extracts were compared for the anti-inflammatory activity [7, 8].

METHODS

Plant Processing

The leaves of the plants Molucella laevis, Nepeta cataria, Vitex agnus, Origanum dictamnus and Mentha piperata were collected from a local store and duly authenticated the leaves were dried in an area covered with shade and the humidity is normal as the ambient climate. The plant leaves were dried for about 7 days and are powdered and were stored for the extraction [9]. 50g of the powder was packed and place in a beaker for maceration with 70% alcohol solution in water. This was macerated with occasional stirring in regular intervals of 24hrs. After the prescribed time, the macerates were filtered out and the filtrates were then evaporated to dryness. The percentage yield of the extracts were calculated and reported for EEML, EENC, EEVA, EEOD, EEMP as 13.52, 14.43, 13.85, 15.84, 17.96 % w/w of the samples.

Laboratory animals

The lab animals that were selected for the investigation are albino wistar. They weigh around 150-175g and contained both the sexes in the study. They were bought from a supplier from bengaluru. The animals were kept in plastic cages in the lab for about 10 days to acclimatize for the laboratory conditions. The normal temperature and humidity are maintained in the lab to comfort the rats. The rats were divided into groups randomly and were proceeded for the experiments. They were allowed to have access to water and food freely. The weight gain was recorded for about 7 days and the normal gain rats were selected for the study [10, 11].

Anti-inflammatory activity induced by carrageenan

The rats were divided into 7groups with 6 animals in each group. They were named as control, standard, EEML, EENC, EEVA, EEOD, EEMP groups and were administered with standard doses of control vehicle and standard drug indomethacin at 5mg/kg suspended in sodium CMC solution to make the concentration of 5%w/v. the extracts groups were administered with extract at dose of 100mg/kg body weight of the rats. The extracts also were suspended in the sodium CMC solution at a concentration of 10%w/v and administered into the rats orally.

The animals were induced with inflammation by carrageenan via intraperitoneal injections. Carrageenan was suspended in saline solution at a concentration of 1%w/v and were injected into the peritoneal cavity at a dose of 0.1ml. the solution was injected into the peritoneal cavity in the hind paw of right side of the rat. The paw volumes were measured before the start of the experiment and after the administration of the carrageenan. The paw volumes were measured at regular intervals of time like 1hr, 2hr, 3hr, 4hr and 5 hrs [12, 13]. The % inhibition of the rise in the paw edema was determined by using following equation:

% inhibition of edema= [1- (VT/VC)] x 100, where VT - volume in the extract treated group and VC - volume in control animal group.

RESULTS & DISCUSSION

In this study the members of lamiaceae were investigated for the anti-inflammatory activity in carrageenan induced inflammation method. The results were tabulated in the Table 1. The results in the table shows that all the lamiaceae members selected for the study possess anti-inflammatory activity. This was comparatively significant with the standard drug. Out of the extracts that were tested the extract from the plant Mentha showed the best percentage of inhibition. This is explained due to the presence of the active chemical constituents in the extract. This also proves that there is interference of other chemical constituents in the plant that is responsible for greater activity. Figure 1 Shows,

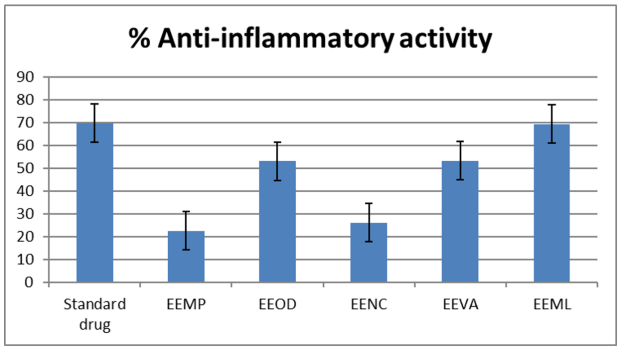

Figure 1: Anti-inflammatory activity of various extracts

Most of the lamiaceae members were known to contain chemical constituents like volatile oils which are responsible for the analgesic properties and alkaloids and trace glycosides that might be responsible for the activity. The activity of the plant extracts was arranged in ascending order as follows EEMP, EEOD, EENC, EEVA and EEML. The

Table 1: Anti-inflammatory activity of the members of lamiaceae

Group	Volume of the paw (ml) Volume of the paw (ml)					%
	1hr	2hr	3hr	4hr	5hr	activity
Control	0.194± 0.0053	0.523± 0.0072	0.547± 0.0084	0.712± 0.0267	0.978± 0.0289	-
Standard drug	0.365± 0.0071	0.476± 0.0069	0.478± 0.0093*	0.497± 0.0275*	0.562± 0.0262	69.63
EEMP	0.298± 0.0056	0.399± 0.028	0.387± 0.0127*	0.641± 0.0063*	0.514± 0.0099*	22.45
EEOD	0.270± 0.0084	0.416± 0.0081	0.498± 0.0067*	0.578± 0.0123*	0.671± 0.0072	52.94
EENC	0.205± 0.0075	0.390± 0.036	0.512± 0.0298*	0.610± 0.0094*	0.712± 0.0103*	26.07
EEVA	0.318± 0.0093	0.35± 0.0037	0.401± 0.0089	0.473± 0.0132*	0.587± 0.0081	53.12
EEML	0.284± 0.0068	0.48± 0.0073	0.535± 0.0126*	0.592± 0.0275*	0.424± 0.0213	69.28

activity was similar compared with standard drug indomethacin for group 5 with mentha extracts. It also showed a better activity compared with other extracts too.

CONCLUSION

There are ethnopharmacological claims of the plants belonging to lamiaceae to exhibit the anti-inflammatory activity and analgesic activities. There were also investigations performed on the plant to prove the above activities. 5 members of lamiaceae were selected to study and compare the anti-inflammatory activity and the data suggests all the plants have better activity and out of all the Mentha extract showed a significantly better activity compared to the standard drug. Furthermore a detailed study needs to be performed to prove exact mechanism of action of the plants and also to establish the exact chemical constituents that are responsible for the difference in activities.

FUNDING SUPPORT

The authors declare that they have no funding support for this study.

ACKNOWLEDGEMENT

The authors are thankful to all who have extended their constant support for the completion of the work.

Conflict of Interest

The authors declare that they have no conflict of interest for this study.

REFERENCES

[1] Lee DY, Choo BK, Yoon T. Anti-inflammatory effects of Asparagus cochinchinensis extract in acute and chronic cutaneous inflammation. Journal of Ethnopharmacology. 2009;121(1):28–34.

[2] Jain PS, Bari SB. Anti-inflammatory Activity of Abelmoschus manihot Extracts. International Journal of Pharmacology. 2010;6(4):505–509. Available from: 10.3923/ijp.2010.505.509.

[3] Akindele AJ, Adeyemi OO. Antiinflammatory activity of the aqueous leaf extract of Byrsocarpus coccineus. Fitoterapia. 2007;78(1):25–28. Available from: 10.1016/j.fitote.2006.09.002.

[4] Li H, Deng Z, Liu R, Loewen S, Tsao R. Bioaccessibility, in vitro antioxidant activities and in vivo anti-inflammatory activities of a purple tomato (Solanum lycopersicum L.). Food Chemistry. 2014;159:353–360. Available from: 10.1016/j.foodchem.2014.03.023.

[5] GA, Subramanianb N, Gururaja P, Pazhanic M, Karunanithid V, Ravichandran. Evaluation of Anti-inflammatory Activity of Methanolic Extract of Solanum nigrum (Solanaceae). Iranian Journal of Pharmaceutical Sciences. 2009;5(3):151–156.

[6] Emmanuel S, Ignacimuthu S, Perumalsamy R, Amalraj T. Antiinflammatory activity of

Solanum trilobatum. Fitoterapia. 2006;77(7-8):611–612. Available from: 10.1016/j.fitote.2006.09.009.

[7] Piana M, Camponogara C, Boligon AA, Oliveira SM. Solanum paranenseExtracts and Solanine Present Anti-Inflammatory Activity in an Acute Skin Inflammation Model in Mice. Evidence-Based Complementary and Alternative Medicine. 2017;2017:1–8. Available from: 10.1155/2017/4295680.

[8] Vladimir-Knezevic S, Blazekovic B, Kindl M, Vladic J, Lower-Nedza AD, Brantner AH. Acetylcholinesterase inhibitory, antioxidant and phytochemical properties of selected medicinal plants of the lamiaceae family. 2014;Available from: https://doi.org/10.3390/molecules19010767.

[9] Ghorbanpour M, Hadian J, Hatami M, Salehi-Arjomand H, Aliahmadi A. Comparison of chemical compounds and antioxidant and antibacterial properties of various Satureja species growing wild in Iran. Journal of Medicinal Plants. 2016;.

[10] Bihari CG, K NBSJP, K PS, E. Phytochemical investigation and screening for anthelmintic activity of leafy extracts of various Ocimum (Tulsi) species. Journal of Pharmacy Research. 2015;.

[11] Salimikia I, Monsef-Esfahani HR, Gohari AR, Salek M. Phytochemical Analysis and Antioxidant Activity of Salvia chloroleuca Aerial Extracts. Iranian Red Crescent Medical Journal. 2016;18(8). Available from: 10.5812/ircmj.24836.

[12] Sonboli A. Biological activity of various extracts and phenolic content of Micromeria persica and M. hedgei. Research Journal of Pharmacognosy. 2015;.

[13] Bihari BCG, Manaswini P, & Tripathy Sujit Sangram Keshari, Kumar. Phytochemical investigation & evaluation for antidiabetic activity of leafy extracts of various Ocimum (Tulsi) species by alloxan induced diabetic model. Journal of Pharmacy Research. 2011;.

ABOUT AUTHORS

Deepa N

Principal, Department of Pharmacy, Saveetha College of Pharmacy, SIMATS, Thandalam, Chennai, Tamil Nadu, India.

Cite this article: N Deepa, K Madhivadhani, M Hari, N Prakash, S Lohith, C Prabakaran. **Comparison of anti-inflammatory activity of various species of lamiaceae**. Int. J Pharm. Int. Biosci. 2021; 6(1): 10-13.