Luteolin extraction method from *Eclipta alba*(L.)

Dr. Resmi Vijayan, Second year pg scholar, Dr. Sara Moncy Oommen,Professor

Department of Dravyaguna vijnana, Govt. Ayurveda College Tripunithura,Kerala University of Health Sciences , Ernakulam, Kerala

Abstract

Eclipta alba(L.) is an endangered medicinal plant belongs to Asteraceae family. The research works on *Eclipta alba*(L.) shows that it has significant effect of neuroprotection. Luteolin, an active component of the plant, helps in minimizing the cognitive and memory deficits formed due to cholinergic dysfunction. Luteolin is a glycosylated flavonoid compound. The present study is an attempt to develop new method to separate the bioactive compound Luteolin from *Eclipta alba* (L.) by using modern extraction methods and analytical techniques. An efficient microwave-assisted closed vessel extraction technique will be employed in simultaneous extraction of luteolin. Quantitative estimation of Luteolin can be done using High performance liquid chromatography.

Key words; Eclipta alba, Luteolin, Microwave assisted extraction,High performance liquid chromatography

Discussion

Eclipta alba is an ethnomedicinal herb.Natural products from medicinal plants, either as pure compounds or as standardized extracts, provide unlimited opportunities for new drug leads because of the unmatched availability of chemical diversity. Neurodegenerative disease is an umbrella term for a range of conditions which primarily affect the neurons in the human brain. The research studies on *Eclipta alba*(L.) shows that the plant shows effect on formation of acetyl choline and inhibition of oxidative stress. Luteolin is the main compound helps in minimizing cholinergic dysfunction.The prevalence and incidence of neurodegenerative disorders rise dramatically with age. So, there is an urgent need of the preventive measures. *Eclipta alba* (L.) is a promising drug in this regard. The general, extraction procedures include maceration, digestion, decoction, infusion, percolation, Soxhlet extraction, superficial extraction, ultrasound-assisted, and microwave-assisted extractions. Microwave for extraction of constituents from plant material has shown tremendous research interest and potential. Conventional techniques for the extraction of active constituents are time and solvent consuming, thermally unsafe and the analysis of numerous constituents in plant material is limited by the extraction step.

Introduction

Eclipta alba(L.) is an ethnomedicinal erect or prostrate annual herb of Asteraceae family. According to Ayurvedic traditional system of medicine drug possess the rasayana property. *Eclipta alba* (L.) contains wide range of active principles which includes coumestans, alkaloids, flavonoids, glycosides, triterpenoids. The leaves contain stigmasterol, β terthienylmethanol, wedelolactone, dimethyl wedelolactone, ,demethylwedelolactone-7-glucoside etc. The research works on *Eclipta alba* (L.) shows that the drug possess significant neuro protection, and also suggests that the plant shows learning and memory modulating properties. Luteolin, an active component of the plant, helps in minimizing the cognitive and memory deficits formed due to cholinergic dysfunction. It also can control the neuronal tissue degeneration obtained as the result of stress perturbations. The present study is an attempt to develop new method to separate the bioactive compound Luteolin from *Eclipta alba* (L.) by using modern extraction methods and analytical techniques. Microwave-assisted extraction is an extraction technique that offers high reproducibility, short extraction time, simple manipulation, and low solvent consumption, temperature, and energy input . MAE utilizes the energy of microwaves to cause dipole rotation of molecules. In the process of MAE, the solvent is rapidly heating and the cell wall of the plant material is quickly destroyed, accelerating the dissolution and extraction of components. . Quantitative estimation of Luteolin can be done using High performance liquid chromatography

Materials and methods

The plant for the extraction procedure *Eclipta alba*(L.) should be collected and authentified and leaves are taken and shade dried, the dried powder of the drug is used for the microwave assisted extraction of the compounds. In the extraction technique, the choice of an appropriate solvent is very important for obtaining optimal extraction yields. The solvent can be used for the extraction are methanol, ethanol, petroleum ether etc. Thus the solvent composition but also the solvent to feed ratio must be carefully selected to optimize extraction yield and extraction time. In the case of plant sample extraction, the effect of microwave energy is strongly dependent on the nature of both the solvent and the matrix. Most of the time, the solvent selected has a high dielectric constant, so that it strongly absorbs the microwave energy. However, in some cases, only the sample matrix may be heated, so that the solutes are released in a cold solvent; this is particularly useful to prevent the degradation of thermolabile compounds. Microwave energy is a non-ionizing radiation that covers a magnitude scale from 300 MHz to 300 GHz. Microwave closed vessel extraction systems can be used for the extraction of luteolin from *Eclipta alba* (L.). The obtained extract is further quantified by using HPLC method.

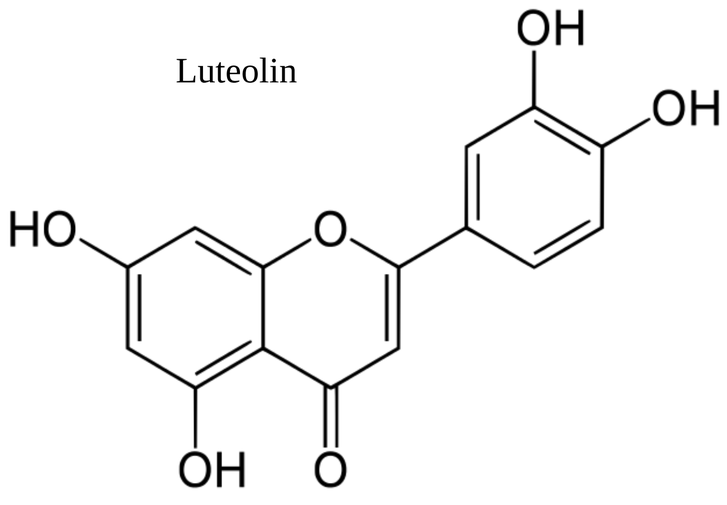
Eclipta alba (L.)

Closed vessel microwave assisted extraction machine

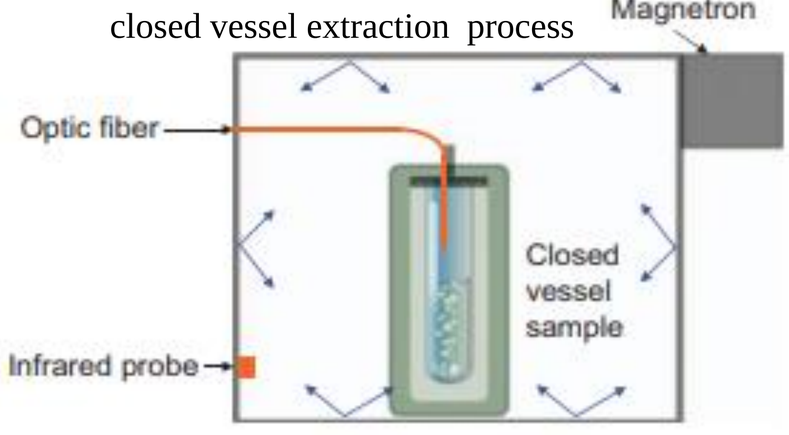
Results

The extract prepared by using microwave assisted extraction method yields greater amount of phyto constituents than any other extraction methods. The maximum quantity of all the compounds in the *Eclipta alba* (L.)will be obtained by this method. In the present study for developing the method for the extraction of Luteolin, closed microwave assisted extraction process using the solvents methanol, ethanol and petroleum ether. Quantification of the compound Luteolin can be done by using High performance liquid chromatography. *Eclipta alba* is rich in anti oxidants. Luteolin (3,4,5,7-tetrahydroxy flavone) is a flavonoid Luteolin has different health benefits such as, anti-inflammatory, anti-oxidant, improve heart function, neurological impairments, anti-cancer and many more. This mthod is ideal for the extraction of Luteolin.

Luteolin



Schematic view of microwave closed vessel extraction process



Conclusion

Microwave assisted extraction offers main advantages compared to conventional extraction methods. The first advantage comes from the volumetric heating of the sample, leading to a reduction in extraction time and to a reduction in solvent consumption . Moreover, MAE shows evident advantages with strong penetration force and high selectivity. Thus it is an efficient method giving an extraction yield similar or higher to conventional extraction methods for several compounds and plant matrices.

References

1.H.M. vidyasree,S.Malathi,R.Rajan,Sheela devi,Neuroprotective role of Eclipta alba on acute and chronic unpredictable stress induced behavioural ,biochemical,and neurotransmitter alteration in wistar male albino rat brain Ijpsr(2018)volume9,issue6,DOI10.13040/IJPSR>0975-8232.9(6).2244-57sept-oct2018,)

2,Emilie Destandu,Thomas Maichel,Claire Elfakir Micro wave assisted extraction DOI 1039/79849737579-00013

3. Chopra RN., Nayar SL, Chopra IC, Glossary of Indian Medicinal plants. C.S.I.R, New Delhi, 1955

4.Guenne S, Ouattara N, Noufou O, Ciobica A, Hilou A, ´ Kiendrebeogo M (2019) Phytochemistry and neuroprotective effects of Eclipta Alba (L.). J Complement Integr Med 1, /j/jcim.2019.17.issue-1/jcim-2019-0026/jcim-2019-0.026.xml