

# Comparison of Different Solvent and Extraction Methods for Isolation of Flavonoids Compound from Leaves of *Clerodendrum infortunatum* Linn.

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## ABSTRACT

*Clerodendrum infortunatum* Linn leaves of the verbinaceae family and contains biologically active substances. The aim of the current research was to determine best methods for extraction in different solvents and evaluation of different extraction methods for best of flavonoid compounds. *Clerodendrum infortunatum* Linn leaves was extracted with four different solvents. Extraction of the plant material with various organic solvents in increasing order of polarity with the help of petroleum ether (60°C-80°C), chloroform, acetone and methanol solvents to the find out the percentage (%) yield of all the extracts. Thin layer chromatography study of each extract to know the number of components present in them. Extration of flavonoid rich fraction with the help of (80%) ethanol (NR Fransworth) by using different extraction methods then comparative study of percentage yield of total flavonoids like Maceration, hot continuous percolation (Soxhlet extraction), microwave assisted extraction and ultrasonic extraction (extraction using ultrasonic waves) and collect the fraction using column chromatography and Identification of isolated compound with the help of UV spectroscopy either quercetin, Rutin or any other suitable flavonoid marker.

**Keywords:** *Clerodendrum infortunatum* Linn; Microwave assisted extraction; Soxhlet extraction; Maceration; Flavonoids

## DESCRIPTION

*Clerodendrum infortunatum* Linn leaves of the Verbinaceae Family and contains biologically active substances. The aim of the current study was to determine best methods for extraction in different solvents and evaluation of different extraction methods for best of flavonoid compounds. *Clerodendrum infortunatum* Linn leaves was extracted with four different solvents. Extraction of the plant material with various organic solvents in increasing order of polarity with the help of petroleum ether (60°-80°), chloroform, acetone and methanol solvents to the find out the percentage (%) yield of all the extracts. Thin layer chromatography study of each extract to know the number of components present in them. Extration of flavonoid rich fraction with the help of (80%) ethanol (NR Fransworth) by using different extraction methods then comparative study of percentage yield of total flavonoids like Maceration, hot continuous percolation (Soxhlet extraction), microwave assisted extraction and ultrasonic extraction (extraction

using ultrasonic waves) and collect the fraction using column chromatography and Identification of isolated compound with the help of UV spectroscopy either quercetin, rutin or any other suitable flavonoid marker.

Several species of leaves of *Clerodendrum infortunatum* Linn have been traditionally used over the centuries and their antioxidant and hepatoprotective potential has already been demonstrated. Various parts of the plant are used by the tribes in colic, scorpion stings, snakebites, tumors and some skin diseases [1]. The leaves are slightly bitter but heal inflammation, skin diseases and are good against smallpox, treatment of bronchitis, asthma, febrile diseases of inflammation of the blood, burning sensation and epilepsy. The plant contains triterpenes, steroids and mainly it contains flavonoids. Antioxidant, antimalarial, antimicrobial, deworming and analgesic activity *Clerodendrum infortunatum* Linn well known for its traditional uses in various parts of the world, is commonly known as saraswaty leaf and other names

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are Bhant in Hindi, Bhagri in Sanskrit, Khanduchakka in Marathi and Bhatghetu in Bangali.

### Microwave-Assisted Extraction (MAE)

MAE may be a technique that mixes microwave and ancient solvent extraction. In MAE, the extraction happens as results of changes within the cell structure caused by magnetic waves. It is been projected that the extraction acceleration determined in MAE could also be because of the warmth and mass transfer gradients operating in the same direction. Exploitation microwaves for heating the solvents and plant tissues will increase the mechanics of extraction and various blessings are so obtained over traditional solvent extraction, together with shorter in the extraction of assorted compounds from natural sources.

### Soxhlet extraction

Completely different elements those are utilized in Soxhlet extraction are thimble, water cooling system, and reservoir, bypass tube, siphon tube and condenser. we'll take needed quantity of solid material of leaves confine thimble that is loaded into Soxhlet vessel having flask containing extractor solvent [2]. Solvent vapour moves up to the column and floods into the chamber housing the thimble of solid. Some part of non-volatile compounds dissolves in solvent. Method repeats repeatedly till we tend to get desired focused compounds in flask. Method has been done at boiling temperature of solvent and extraction has been drained 100 ml plant product for 3.5 hours.

### Ultrasonic extraction method

Sonication is that the act of applying sound energy to agitate particles during a sample, for varied functions comparable to the extraction of multiple compounds from plants [3]. In audible frequencies is (>20 kHz) are typically used, resulting in the method additionally being called ultra-sonication or vibration extraction method

### Maceration

During this process solid ingredients are placed in closed instrumentation with full of the solvent and allowed to face for minimum of 3 days (3-7) days with frequent agitation, till soluble matter is dissolved. The mixture is then strained through sieves/nets the also the combined liquids clarified.

The leaves of *Clerodendrum infortunatum* Linn were collected, dried and authenticated. The dried parts were pulverized to make coarse materials which were used for experimental work.

Total one kg of plant material was accurately weighed and according to the plan of work the leaves of the *Clerodendrum infortunatum* Linn defatted with petroleum ether. The defatted marc was then refluxed with 80% ethanol for 12 hours. The ethanolic extract was then subjected for evaluation [4]. The preliminary phytochemical screening showed that the leave extract showed the positive test in Molisch test, Shinoda test, Alkali test, Lead acetate test and salkowski test. Rf value of leave extract was calculated using various mobile phase like Ethyl acetate: formic acid: glacial acetic acid: Water (100:11:11:26), Toluene: ethyl acetate: formic acid (50:40:10), Chloroform: Toluene: Ether: Acetic acid (60:60:15:5) extraction of the plant with various organic solvents in increasing order of polarity with the help of various solvents were performed and the percentage yield was calculated [5]. The preliminary phytochemical study of the extract of different solvent was done and also the Rf value was calculated by using thin layer chromatography. The comparative study of the leave extract with the standard of Quercetin was performed and the Rf value was calculated.

The column chromatography of the 80% ethanolic extract over silica gel afforded various compounds (fractions) which were identified as flavonoids, long chain of fatty acids, sterols, etc. The TLC studies, UV spectroscopic study were also carried out on fractions and both these studies confirmed that the flavonoids, steroids and fatty acids [6]. The extraction of plant material with various organic solvents in increasing order of polarity was identify the more percentage yield was found to be petroleum ether. The extraction of plant material with different extraction methods. The Soxhlet extraction was more percentage yield was found by compare to the other extraction methods.

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