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Qualitative analysis and extraction of *Euphorbia neriifolia* Linn.

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Abstract

The present paper deals with the extraction and phytochemical studies of Euphorbia neriifolia Linn. A phytochemical analysis process was carried out to test the plant extract for therapeutic substances. Various data have been collected that show the presence of various phytochemicals like carbohydrates, Saponins, Diterpene, Alkaloids, Phenols, Flavonoids, and Tannins. Across the whole world, the majority of persons use medicinal plants and herbs for health purposes. Therefore, thousands of biologically active compounds and drugs have been developed that increase the medicinal properties of plants and herbs. Pharmacological study, modification, drug testing derivatization and research on natural products represent a way for discovering and developing new drugs. The medicinal plant showed a lot of pharmacological activities such as respiratory, anticancer, anti-allergic, and anti-inflammatory. Euphorbia neriifolia belongs to the Euphorbiaceae family. This study on Euphorbia neriifolia was carried out to standardize its components. Various examinations or tests of extraction of plant showed the presence of different phytochemical groups and yield in each extract. This paper aims to present an overview of phytochemical investigation carried out in Euphorbia neriifolia.

Since ancient times, plants, shrubs, and trees have played a very essential role in human lives as well as all living organisms. They produce all the essential things for life. With all these, they have lots of medicinal properties. Medicine that is based on plants has been used all over the world as traditional healthcare for thousands of years[10,17]. They are very safe and have no adverse effects. The remedial plants, *i.e. Rasayana* are those plants or shrubs which each and every part like root, stem, trunk, leaves, seeds, foliage, etc. have been extensively used in the Indian custom (Ayurveda) in the form of kadha, powder, latex for the treatment of different infections[9]. For these reasons, our ancestors

studied the medicinal value of plants for thousands of years and collected all the necessary knowledge and transferred it to the next generation. All the next or new generation will continue this habit of studying the medicinal values of plants as a further source of drugs because herbal or ayurvedic plant medicine has a strong tradition. It can treat different types of diseases or hazardous diseases without showing any adverse effects. The adverse effects or hazardous effects of herbal drugs are very low in human belief, but the collated knowledge on these effects remains poor[2].

Ethno-pharmacology is a study that leads to how an individual gets medicine from plants, shrubs, fungi, animals, and all other remaining naturally present resources[12]. In the current scenario, mainly native people are continuously developing new medicinal drugs from plants or shrubs. Peoples of the whole world use plants as medicine with different names and processes, like allopathy, unani, siddha Ayurveda etc.[9]. The peoples of the whole world almost depend on plants or shrubs for habitat as they have a lot of medicinal properties and medicinal value. Many types of diseases can be treated by medicine prepared from these plants. The roots, the bark, the stems, and the leaves can be used for different diseases. *Euphorbia neriifolia* is one of the medicinal plants of the Euphorbiaceae family and is also known as the spurge tree. It comprises more than 7000 species and 275 genera of flowering plants distributed primarily in the tropical region[6,14]. Further studies on euphorbia neriifolia may prove as a boon for human health and can be used to treat some more diseases. *Euphorbia neriifolia* Linn. (Euphorbiaceae) is available luxuriously in the rocky, dry, hilly, areas of the north, central and south of India[18]. It is a herb with a full of spines, commonly known as the thuhar, sehund, and milk hedge. The leaves of *Euphorbia neriifolia* are 4-5 mm thick and 15-20 cm in length, having white latex[3]. Leaves, stems, and roots of *Euphorbia neriifolia* are used to treat diseases like stomachache, anemia, ulcers, fever, piles, inflammation, enlargement of spleen, abdominal trouble, chronic respiratory trouble, leucoderma, etc.[9]. The leaves of Euphorbia neriifolia are used as aphrodisiacs, diuretics and can treat bronchitis, bleeding piles and ano-rectal fistula[13]. The milky latex of euphorbia neriifolia is used for the treatment of wounds as evidence of an increase in DNA content, tensile strength, and angiogenesis[4]. The juice of a leaf, when treated with some other ingredients can be used as a strong purgative in the enlargement of the liver and spleen, dropsy, general anasarca, leprosy, syphilis, etc.[16] *Euphorbia neriifolia* milky latex is used by the tribal population of Chhattisgarh as an ingredient in an aphrodisiac mixture[6]. The hydro-alcoholic extract of Euphorbia neriifolia contains sugar, flavonoids, triterpenoids, tannins, flavonoids, alkaloids, saponins on preliminary phytochemical analysis. The isolation of several triterpenoids like glut-5-en-3b-ol, glut5 (10) -en-1-one, taraxerol and b-amyrin takes place from powdered plant, leaves and stems of *Euphorbia neriifolia*[1]. In this study, an attempt has been made to evaluate the presence of phytochemicals in different Euphorbia neriifolia plant extracts (chloroform extract, aqueous extract, ethanolic extract, and ethyl acetate extract).

Plant material collection :

Euphiorbia neriifolia linn. Arial parts such as stems and leaves were collected in the month of March 2021 from the suburban area of Bhopal. The collected parts of the plant were in active condition and green. These active parts of plants that are used for research are properly washed in water and then quenched in distilled water. Then the subject is allowed to dry at room temperature in a shaded place. The leaves and stem are then cut into small pieces and dried for 8-10 days in a shaded area without being contaminated. It must take care the material does not come out in direct sunlight exposure. Completely dried and fresh leaves and stem pieces of the plant Euphorbia neriifolia were examined microscopically and macroscopically. The standardization of *Euphorbia neriifolia* Arial parts was determined on the basis of suggested parameters by ayurvedic pharmacopeia of India and World Health Organization guidelines. The shaded dried materials are then grinded into powder with the help of an electronic grinder. The powder is ground into coarse particles. The powder of plant material was dried and stored in an airtight container in some dark place at room temperature for extraction and phytochemical analysis. This powder is used every time for the extraction and phytochemical analysis.

Defatting of material :

Defatting of material is a process of removal of dust, dirt, oil, fat and other foreign material from plant material so that we can get the appropriate material for the process. The defatting of materials is absolutely necessary because these foreign materials can affect the result. For defatting, we keep plant material i.e. coarse powder of the Euphorbia neriifolia plant in petroleum ether for 24 hours at room temperature. After a period of 1 day, the plant material filtered with the help of spatula, funnel and filter paper[7] so that the impurities that dissolved in petroleum ether separated from the required material. Spread the filtered material uniformly on paper to dry and then keep tight in a container. No moisture is contained as it is completely dried.

Chemical Reagent :

A chemical reagent is a compound or substance added to a product to cause a chemical reaction. For phytochemical analysis, we used some chemical reagents. They are hydrochloric acid (HCl), Picric acid $C_6H_3N_3O_7$, Fehling solution A, Fehling solution B, Ferric chloride ($FeCl_3$) , Lead acetate $Pb(C_2H_3O_2)_2$, Gelatin solution, Copper acetate $Cu(CH_3COO)_2$.

Extraction of plant material :

The process of separation of active plant materials from inactive plant material by the use of an appropriate solvent and standard extraction method is known as extraction of plant material. For extraction of plant material here, we use the Soxhlation method with the help of Soxhlet apparatus. In this Soxhlation method we use four solvents. They are chloroform ($CHCl_3$), ethyl acetate ($C_4H_8O_2$), Ethanol (C_2H_5OH), and water (H_2O). We select these solvent on the basis of their polarity. The polarity of chloroform is least amongst these and the polarity of water is higher than all. The macerated mixture

obtained from Soxhlet apparatus was filtered, allowed to evaporate, and stored at 4°C in an air-tight jar. This extract of plant material was used for further study[15].

Extraction of material in Soxhlet apparatus with solvents :

Euphorbia neriifolia Linn. Plant material was extracted using the Soxhlation method. Here different solvents like petroleum ether, chloroform, ethyl acetate, ethanol, and water were used. Detailed phytochemical testing was performed to identify the presence or absence of different phytoconstituents.

Presence of Alkaloid :

The extract of plant material was treated with 4 drops of hydrochloric acid (HCl) and shaken for some time as the extract mixed completely with HCl, then 5 to 6 drops of Picric acid were added. The yellow precipitate was formed. This formation of yellow precipitate shows the presence of alkaloids.

Presence of Carbohydrates :

The extract of plant material was treated with 4 drops of hydrochloric acid (HCl) and 4 drops of Sodium Hydroxide (NaOH) and shaken well and then heated it with the flame heat, after that 3 drops of Fehling solution A and 3 drop of Fehling solution B were added. The red precipitate was formed. This formation of yellow precipitate may show the presence of carbohydrates.

Presence of Saponins :

The extract of plant materials was diluted with distilled water and shaken for 15 minutes. Formation of a 1c.m. layer of foam indicates the presence of phenols.

Presence of Phenols :

The extract was treated with 3 to 4 drops of Ferric chloride to form a blushing black colour that indicates the presence of phenols.

Presence of Flavonoids :

The extract was treated with a few drops of Lead Acetate solution. The formation of yellow precipitates shows the presence of flavonoids.

Presence of Tannins :

The extract was treated with 1% Gelatin solution and a few drops of NaCl. The formation of white precipitate indicates the presence of tannins.

Presence of Diterpene :

The extract was treated with 3 to 4 drops of Copper Acetate solution. The formation of an emerald green colour indicates the presence of Diterpene.

Presence of Xanthoproteins :

The extract was treated with concentrated nitric acid. The formation of a yellow colour indicates the presence of Xanthoproteins.

Extraction with Chloroform- When the extract of plant material is treated with Chloroform which has a polarity index of 4.1 through the Soxhlation method, a greenish

Table-1. Preliminary phyto-profile of extract of *Euphorbia neriifolia* in different solvents

Solvent	Polarity	Extraction Index	Colour	Constituency	Percentage Yield
C	4.1	Soxhlation	Green	Sticky	3.16 %
EA	4.4	Soxhlation	Green	Sticky	0.74 %
E	5.3	Soxhlation	Brown	Dry	14.94 %
AQ	9.1	Soxhlation	Brown	Dry	27.71%

C- Chloroform, EA- Ethyl Acetate, E- Ethanolic, AQ-Aqueous.

Table-2. Pytochemical analysis.

Pytochemicals	Solvents				
	Petroleum ether	Chloroform	Ethyl acetate	Ethanol	Water
Alkaloid	-	-	-	-	-
Carbohydrates	-	-	+	+	+
Saponins	-	-	-	+	+
Phenols	-	-	-	-	-
Flavonoids	-	+	+	+	+
Diterpene	-	+	-	+	+
Xenthoproteins	-	-	+	+	+
Tannins	-	-	-	-	+

Here (+) sign indicate the presence of phytoconstituent and (-) sign indicate the Absence of Phytoconstituent like Alkaloid, Carbohydrates, Saponins, Phenols, Flavonoids, Diterpene, Xanthoproteins, and Tannins.

colour extract is obtained. This obtained extract was sticky in nature and had a yield of 3.16%.

Extraction with Ethyl Acetate- As a result of extraction with ethyl acetate of polarity index 4.4, a greenish colored extract was obtained which was sticky in nature. The percentage yield of this obtained extract was 0.74.

Extraction with Ethanol- A dry extract of brown colour was found having a percentage yield of 14.94% when the extract was treated with the solvent ethanol.

Extraction with Aqueous solvent- The aqueous solvent has very high polarity. When the extract of plant material is treated with this solvent, a brown coloured extract, dry in nature, has a yield of 27.71%.

In study of the Qualitative examination or phytochemical investigation of Euphorbia neriifolia Linn. Extracts, it contains different phytoconstituents. For example, carbohydrates are present in Ethyl acetate extracts, Ethanol extracts, and water extracts. Petroleum ether extract does not have any phytoconstituents.

Positive results of Saponins are present in ethanol and water extract. Phenols are absent in all solvents. Flavonoids are absent in Petroleum ether, but they are present in Chloroform, Ethyl acetate, Ethanol, and Water extract. Diterpene is absent in Petroleum ether and Ethyl acetate but present in Chloroform, Ethanol and Water extracts. Xanthoproteins are absent in Petroleum Ether and Chloroform but present in Ethyl Acetate, Ethanol, Water extract. Tannins are present only in water extract.

The present study showed that *Euphorbia neriifolia* Linn. has a wide array of phytochemical constituents with high concentration, which possess a number of medicinal properties. *Euphorbia neriifolia* is one of the best genus of the family Euphorbiaceae because it is of great importance as a medicinal plant. On the basis of this study it has been proved that *Euphorbia neriifolia* is a the rapeutically important plant. Further studies are required to evaluate and understand a clear image depicting this plants utilization against diseases.

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