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STUDY ON QUANTITATIVE ANALYSIS OF TWO IMPORTANT MEDICINAL PLANTS GLORIOSA SUPERBA L. AND CELASTRUS PANICULATUS WILD

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ABSTRACT

Gloriosa superba L. is a highly special plant that belongs to the family Colchicaceae and possesses a wide variety of useful therapeutic properties. It is a herb that lives for many years and grows from a seed or a fleshy rhizome. Bring forth research on the qualitative and quantitative aspects of Gloriosa superba L. Methanol, chloroform, and n-butanol served as the solvents of choice for the qualitative phytochemical research that was conducted. The tuber and leaves extract of Gloriosa superba L. showed the presence of alkaloids, glycosides, tannin, terpenoids, saponins, flavonoids, steroid, and phenols. However, the tuber of Gloriosa superba L. had a higher concentration of phytochemicals than the leaves did. Also, the quantitative studies were performed in the same solvent that was mentioned earlier. The alkaloid content in the tuber of Gloriosa superba L. was found to be 2.921, 2.546, and 3.045 g/ml respectively. The total flavonoids in the tuber were found to be 0.845, 0.641, and 0.978 g/ml respectively. This was then followed by the total content of phenols, which was found to be 1.284, 0.652

Keywords: *qualitative, quantitative, Gloriosa superba L., n-Butanol etc*

INTRODUCTION

Even today, natural products and photochemicals are considered to be among the most significant resources for the production of bioactive molecules. At this time, more than half population of the globe relies on plants as the primary source of treatments, with which they may heal a broad variety of illnesses. In addition, anywhere from 40 to 80 percent of novel medications that have been approved and are now in the process of commercialization are derived from natural sources. Terpenoids, phenols, glycosides, and alkaloids are the four primary categories of secondary metabolites. Terpenoids are the most common kind. The technology of phytochemistry is primarily applied to the production of high-quality medications composed of a wide variety of chemical components, including alkaloids, flavonoids, saponins, phenolics, terpenoids, and tannins, amongst others. In the field of medical research, phytochemicals derived from medicinal plants are attracting an ever-increasing amount of attention. Over-the-counter medications and "Ethical Phytomedicines," which are undeveloped pharmaceuticals that have undergone toxicological and clinical standardisation, are viewed as affordable options for basic healthcare in developing countries. The study of traditional ethnobotanical knowledge and the application of contemporary phytochemical analysis and biological activity research to therapeutic plants have benefited the region in recent years. This has been particularly beneficial to the field in recent years.

Because of this, I choose to focus the current work on the qualitative and quantitative examination of Gloriosa superba L., which is a significant medicinal plant that is a member of the family Colchicaceae. It is

a semi-woody herbaceous climber that branches out and may reach a plant height of roughly 5 metres. It has stunning yellow and red blooms with wavy edges. Among medicinal plants, it is one of the species that is in risk of extinction. Different parts of the plant have a broad variety of applications, particularly in the context of the traditional medicine that is used in tropical areas of Asia and Africa. In traditional medicine, the tuber is employed for the treatment of sprains and bruises, as well as colic, haemorrhoids, chronic ulcers, cancer, nocturnal seminal emissions, leprosy, impotence and other conditions; it is also used to induce labour pains and miscarriage. According to Haroon et alresearch .'s from 2011, using the tuberous root of G. superba that has been cooked in sesame oil and then applied to joints that are painful due to arthritis will help relieve pain. In addition to these applications, it is utilised in the treatment of poisoning, wounds, conditions connected to the skin, fever, piles, inflammation, uterine contractions, blood abnormalities, and overall body toning. Several researchers have found that Gloriosa superba possesses pharmacological effects. Researchers L. Hemaiswarya and colleagues found that tubers extract in methanolic, aqueous, and petroleum ether exhibited antibacterial, antifungal, and mutagenic activities. Researchers Kumarapppan and colleagues found that tubers extract in alcohol exhibited antihaemolytic activities. L. Hemaiswarya and colleagues found that tubers extract in alcohol exhibited antibacterial, antifungal, and mutagenic activities.

OBJECTIVES

1. To study two important medicinal plants gloriosa superba l. and celastrus paniculatus wild
2. To study quantitative analysis

Material and Methods

Collection of Plant parts

The Gogababa Tekkadi location on the Dr. Babasaheb Ambedkar Marathwada university campus in Aurangabad, Maharashtra state, India was the source of the plant component collections for the Gloriosa superba L. species. Plant component tuber and leaves were washed with running water to remove dirt dust, after which they were dried in the shade before being ground into a fine powder and stored in an airtight bottle. Standard floras such as Cook 1907, Dhore 2005, Naik 1989, and Yadav and Sardesai 2002 were utilised in order to determine the identities of the plant components.

Gloriosa superbaL Plant	**Tuber of Gloriosa superba L.**
	

Fig 1

Preparation of Plant Part Extract

With the use of a Soxhlet apparatus, an extract of methanol, chloroform, and n-butanol was made. A thimble containing thirty grammes of powdered representation of each plant component was then positioned within the Soxhlet apparatus's testing chamber. In the flask, there was 300 ml of solvent, and the temperature was kept at 55.0 degrees Celsius for the next three days. The extracts were further filtered using Whatman filter paper No. 1. At temperatures ranging from 40-50 degrees Celsius, a rotary evaporator was used to evaporate the solvent. The powder that was collected was weighed before being dissolved in a 10% solution of dimethyl sulfoxide (DMSO). The assessment of phytochemicals, both qualitatively and quantitatively, was carried out using the extracts.

Qualitative analysis of Gloriosa superba L. plant parts

The qualitative screening test was carried out to determine the presence of the secondary metabolites listed below: alkaloid, terpenoids, glycosides, saponins, steroid, tannin, flavonoids and phenols (Harborne, 1973; Sofowara, 1978). (2005).

Alkaloids test

The plant extract was dried by evaporation, and the dried residue was heated to a high temperature in a water bath containing 2% hydrochloric acid. After cooling, the liquid was filtered before being treated with a few drops of Mayer's reagent. Turbidity or yellow precipitation development may indicate the presence of alkaloid.

Glycosides

Compounds known as glycosides are those that, when hydrolyzed, result in the formation of one or more sugars known as glycones as well as another product that is not a sugar (Glycone or Genine). The extract solution in glacial acetic acid is diluted with a few drops of ferric chloride and concentrated sulfuric acid. The mixture is then examined for a blue-green tint in the top layer and a reddish-brown colouring at the intersection of two layers.

Terpenoids and steroids

In order to process four milligrammes of extract, 0.5 millilitres of acetic anhydride and 0.5 millilitres of chloroform were used. After that, a concentrated solution of sulfuric acid was progressively added, after which a greenish-blue colour was detected for steroids and a reddish-violet colour was observed for terpenoids.

Flavonoids

After treating the extract solution with 1.5 ml of a solution containing 50% methanol, the total volume of the treatment was 4 ml. The solution was heated, and magnesium metal was afterwards added to it. Following the addition of five to six drops of strong hydrochloric acid to this solution, the flavonoids turned a reddish colour, while the flavones turned an orange colour.

Saponins

In a test tube, 0.5 grammes of extracts were put in with 5 millilitres of distilled water. The solution was vigorously agitated and checked for a steady and persistent froth throughout the process. After vigorous shaking, the foam was combined with three drops of olive oil, and then the mixture was examined to see whether or not it had formed an emulsion.

Phenols

The extract, which weighs 50 milligrammes, is mixed with 5 ml of water that has been distilled. This is then given a few drops of a neutral, 5% ferric chloride solution. The dark green colour of phenolic compounds can be used to determine their existence.

Tannins

One millilitre of water and one to two drops of a solution containing ferric chloride were added to half a millilitre of extract solution. Gallic tannins were seen to have a colour similar to blue, whereas catecholic tannins had a colour similar to a dark green.

Quantitative analysis of Gloriosa superba L. plant parts

the process of making plant extracts for alkaloids' quantitative analysis The intended outcome was achieved by quickly combining together 20 millilitres of n-butanol with 5 grammes of powdered plant material. The liquid was transferred to a container meant to hold the reagent. The slurry spent the whole night being kept at ambient temperature. After that, it was centrifuged for ten minutes at a speed of 6000 revolutions per minute, and n-butanol was used to increase the volume of the supernatant to 50 millilitres.

Estimation of total alkaloids by titrimetric methodsused by Plummer, 2013 and Debnath et al. 2015. Titrimetric techniques were utilised to determine the total alkaloids in the plant sample by using the supernatant that was obtained from the plant. A separating funnel with a capacity of 100 ml was used to collect 10 ml of the supernatant. After adding 10 ml of 0.1 (N) HCl, the mixture was vigorously agitated for two to three minutes. As a consequence of this, alkaloids become more soluble. The upper layer is composed of n-butanol, while the lower layer is composed of alkaloids that have been neutralised using 0.1 (N) hydrochloric acid. A part of 10 ml HCL was placed in a beaker, and then two to three drops of methyl red were added to it. This caused the solution to take on a colour that was somewhat reddish. The contents of the beaker were titrated against 0.1 (N) sodium hydroxide until the colour changed from bright red to a yellowish-white. It was possible to pinpoint the location of neutralisation. The exact same process was carried out three times. The total quantity of alkaloids was determined by taking into consideration the equivalent, which is as follows: 1 ml 0.1N HCl ≡ 0.0162 g alkaloid

Estimation of Total Phenolic Content

The technique developed by Dewanto et al., 2002 and Jothi et al., 2019 was adapted and used to determine the total phenol content of G. Superba L. An aliquot of the diluted extract was used to create the different concentrations of 10 mg, 20 mg, 40 mg, 60 mg, 80 mg, and 100 mg, and each one was added to 0.25 ml of Folin Ciocalteu reagent. The mixture was brought to its final volume of 3 ml with the addition of distilled

water, and it was then vigorously shaken. The solution was heated and maintained in a dark room before being read at 760 nm against a blank that had been previously prepared. It was reported as milligrammes of gallic acid equivalents per gramme of dry weight for the total phenol content of the plant sections. There was a total of three separate analyses performed on the entire sample.

Estimation Total Flavonoid Content

The total flavonoid content of the G. Superba L was determined using the aluminium chloride colorimetric method. whole plant extract by M.M. Mervat et al. in 2009 and Jothi et al. in 2019. The total volume was brought up to 3 millilitres by adding methanol until it reached the desired level. A total of 0.5 millilitres of plant component extract was used, with the concentrations being 10, 20, 40, 60, 80, and 100 milligrammes each. The test solution was then vigorously agitated as 0.1 millilitre of 10% aluminium chloride, 0.1 millilitre of potassium acetate, and 2.8 millilitres of distilled water were continuously added. After 30 minutes had passed for each of the incubation times, the absorbance was measured at 415 nm. The method for calculating the flavonoid content of the samples used for testing was developed, and the findings were represented as the equivalent of quercetin (QE) per gramme of sample. Three separate tests were performed on the full sample to ensure accuracy.

RESULTS

Table 1: Qualitative analysis of Gloriosa superba L. Tuber and leaves

Sr. No.	Phytochemical	Plant extract of tuber			Plant extract of Leaves		
		Methanol	Chloroform	n-Butanol	Methanol	Chloro-form	n-Butanol
1	Alkaloids	++	++	++	++	+	+
2	Glycosides	++	+	++	+	+	+
3	Terpenoids	+	++	+	+	+	+
4	Steroids	++	+	++	++	+	+
5	Flavonoids	++	++	++	++	+	+
6	Saponins	++	++	++	+	++	++
7	Phenols	++	+	++	++	+	-
8	Tannins	++	++	++	-	+	-

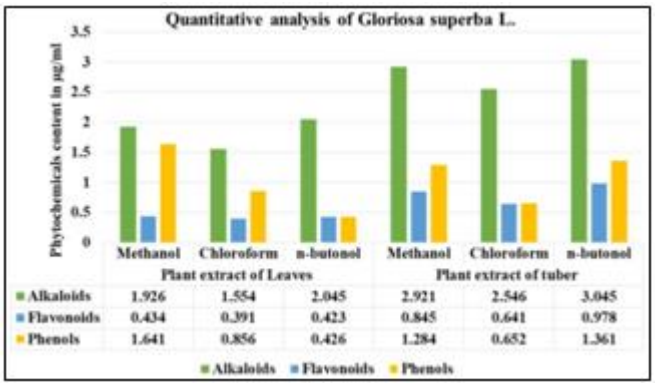

Fig 2: Quantitative analysis of Gloriosa superba L. plant parts,(leaves and tuber µg/ml)

Results of triplicates for different concentration of plant extract

Methanol, chloroform, and n-butanol served as the solvents of choice for the qualitative phytochemical research that was conducted. The tuber and leaves extract of Gloriosa superba L. show the presence of alkaloid, , terpenoids, tannin, glycosides, flavonoids, steroid, saponins and phenols; however, the intensity of phytochemicals in the tuber is significantly higher than that of the leaves, as shown in table no.1 by a factor of two, and tannin is not present in the methanolic or n-butanol extract of the leaves. Also, the quantitative studies were performed in the same solvent that was mentioned earlier. The alkaloid content in the tuber of Gloriosa superba L. was found to be 2.921, 2.546, and 3.045 g/ml respectively. The total flavonoids in the tuber were found to be 0.845, 0.641, and 0.978 g/ml respectively. This was then followed by the total content of phenols, which was found to be 1.284, 0.652

In the methanol, the total content of alkaloids, flavonoids, and phenols was as follows: 1.926, 0.434, and 1.641 g/ml respectively; in the chloroform; 1.554, 0.391, and 0.856 g/ml respectively; and finally, in the n-butanol leaves extract of Gloriosa superba L.; 2.045, 0.423, and 0.426 g/ml respectively.

CONCLUSION

Gloriosa superba L. is an extremely abundant source of phytochemicals, alkaloids, terpenoids, glycosides, flavonoids, saponins, tannin, steroids, and phenols. Following the methanolic extract of the tuber of Gloriosa superba L, its extraction in n-butanol reveals the maximum intensity and content of photochemical activity, followed by the fact that it exhibits antibacterial properties. Polyphenols and phenols are two examples of secondary metabolites that have been identified as functioning as natural antioxidants. These findings were published by Sagbo et al. in 2005 and Jothi. in 2019. Gloriosa superba was shown to be an alkaloid plant by Jothi (2019) and Trease et al. (1983), and it is known to contain alkaloid components such as colchicine and gloriosine, both of which are often utilised in the pharmaceutical formulation of drugs. According to Noroozi et al. (1998) and Al-Humaid et al. (2010), flavonoids are ketonic chemicals that can cause anti-inflammatory action and block the oxygen molecules' enzyme-dependent pro-inflammatory activity. Al-Humaid et al., 2010, and Noroozi et al., 1998 both made the discovery of flavonoids. In addition, flavonoids have a potent anti-inflammatory effect due to the fact that they prevent the production of prostaglandin. Higher plants include flavonoids, which are inextricably linked to cardiovascular disorders and antioxidant potentials that have the ability to cure cancer sickness. According to research published in 2000 and 2017 by Pietta and T. Sivakumar, flavonoids and antioxidants originate from the same plant sources as vitamins A, C, and E.

Further identification, purification and characterization of the active compounds of the Gloriosa superba L. plant would be our emphasis in future research. This is because the Gloriosa superba L. plant contains a variety of phytochemical compounds that are beneficial.

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