



PHYTOCHEMICAL CHARACTERIZATION OF *CUCUMIS SATIVUS* LINN LEAVES

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Article Received on 13/02/2016

Article Revised on 04/03/2016

Article Accepted on 25/03/2016

ABSTRACT

Ethno medicine is the oldest method of curing diseases and infections. Various plants have been used in different parts of the world to treat human diseases and infections. Plants are used medicinally in different countries and are a source of many potential and powerful drugs. India is the largest producer of medicinal herbs and appropriately called as Botanical garden of the world. Drugs from the plants are easily available, less expensive, safe, and efficient and have fewer side effects. Traditional herbal products are heterogeneous in nature. They impose a number of challenges to quality control, quality assurance and the regulatory process. Most herbal products on the market today have not been subjected to drug approval process to demonstrate their safety and effectiveness, for that the main objective of the study was to examine about the proper phytochemical profiling of the ethanolic extract from the leaves of *Cucumis sativus* Linn (EECS). This research is the good platform of future studies on the particular plant. Qualitative analysis of the extract revealed that it contains glycosides, alkaloids, tannins, proteins and amino acids, phytosterols, terpenoids, saponins. The spots obtained from TLC, the peaks obtained from UV, IR, ¹H NMR, Mass spectral datas proposed that the structural similarities with Triterpenoids kind of compound.

KEYWORDS: *Cucumis sativus*, phytochemical screening, thin layer chromatography.

INTRODUCTION

Worldwide it is estimated that 80% of the population uses herbs; in the developing world rates could be as high as 95%.^[1] The medicinal plants are useful for healing as well as for curing of human diseases because of the presence of phytochemical constituents.^[2] Phytochemicals are naturally occurring in the medicinal plants, leaves, vegetables and roots that have defense mechanism and protect from various diseases. Phytochemicals are primary and secondary compounds. Chlorophyll, proteins and common sugars are included in primary constituents and secondary compounds have terpenoid, alkaloids and phenolic compounds.^[3]

The plant kingdom represents an enormous reservoir of biologically active compounds with various chemical structures and protective/disease preventive properties (phytochemicals).^[4] Phytochemical studies have attracted the attention of plant scientists due to the development of new and sophisticated techniques. These techniques played a significant role in the search for additional resources of raw material for pharmaceutical industry (phytochemicals).^[5]

It is now believed that nature has given the cure of every disease in one way or another. Plants have been known to relieve various diseases in Ayurveda. Therefore, the

researchers today are emphasizing on evaluation and characterization of various plants and plant constituents against a number of diseases based on their traditional claims of the plants given in Ayurveda. Extraction of the bioactive plant constituents has always been a challenging task for the researchers.^[6]

Successful determination of biologically active compounds from plant material is largely dependent on the type of solvent used in the extraction procedure. Properties of a good solvent in plant extractions includes, low toxicity, ease of evaporation at low heat, promotion of rapid physiologic absorption of the extract, preservative action, inability to cause the extract to complex or dissociate. The factors affecting the choice of solvent are quantity of phytochemicals to be extracted, rate of extraction, diversity of different compounds extracted, diversity of inhibitory compounds extracted, ease of subsequent handling of the extracts, toxicity of the solvent in the bioassay process, potential health hazard of the extractants.^[7]

The higher activity of the ethanolic extracts as compared to the aqueous extract can be attributed to the presence of higher amounts of polyphenols as compared to aqueous extracts. It means that they are more efficient in cell walls and seeds degradation which have unipolar

character and cause polyphenols to be released from cells. More useful explanation for the decrease in activity of aqueous extract can be ascribed to the enzyme polyphenol oxidase, which degrade polyphenols in water extracts, whereas in methanol and ethanol they are inactive. Moreover, water is a better medium for the occurrence of the micro-organisms as compared to ethanol.^[8] The higher concentrations of more bioactive flavonoid compounds were detected with ethanol 70% due to its higher polarity than pure ethanol. By adding water to the pure ethanol up to 30% for preparing ethanol 70% the polarity of solvent was increased.^[9] Additionally, ethanol was found easier to penetrate the cellular membrane to extract the intracellular ingredients from the plant material.^[10] Since nearly all of the identified components from plants active against microorganisms are aromatic or saturated organic compounds, they are most often obtained through initial ethanol or methanol extraction.^[11] Methanol is more polar than ethanol but due to its cytotoxic nature, it is unsuitable for extraction in certain kind of studies as it may lead to incorrect results.

One of the widely used medicinal herbs, in indigenous systems of medicine, is *Cucumis sativus* Linn which belongs to the family cucurbitaceae^[12-14] and commonly known as "Mullu Vellarikkai". The current study goals to convey the phytochemical assessment of ethanolic extract from the leaves of *Cucumis sativus* Linn. Qualitative investigation of the extract shown that it contains glycosides, alkaloids, tannins, proteins and amino acids, phytosterols, terpenoids, saponins. The peaks obtained from UV, IR, ¹H NMR and MASS proposed that the structural similarities with triterpenoids kind of compound.

MATERIALS AND METHODS

Collection & Authentication of Plant

The herb leaves of *Cucumis sativus* Linn was collected from neighbouring areas of Komarapalayam and Sankagiri, Namakkal District, Tamilnadu, India & legitimate by Mr. G.V.S. Murthy, scientist F, Botanical survey of India, Coimbatore, Tamilnadu (No.BSI/SRC/5/23/2011-12/Tech).

Extraction of Plant

The leaves of *Cucumis sativus* Linn were dried under shade, mixed together and then made in to a coarse powder with a mechanical grinder. The powder was passed through sieve no.40 and stowed in an airtight container for additional usage. The dried powder material (150gm) was defatted with petroleum ether (60-80°C) to remove waxy substances and chlorophyll, which habitually affect in the isolation of phytoconstituents. The marc after defatted with

petroleum ether was dried and extracted with ethanol (99.9% v/v) in a Soxhlet extractor for 72 hr. The solvent was then distilled off and the resulting semisolid mass was dehydrated in a vacuum evaporator to get a yield of 4.5% w/w.

Phytochemical Profiling

The *Cucumis sativus* extract obtained was subjected to preliminary phytochemical screening, to identify the chemical constituents like alkaloids, flavonoids, carbohydrates, glycosides, proteins, amino acids, phenolic compounds, tannins, oils, fats and saponins. The ethanolic extract of *Cucumis sativus* Linn was subjected to thin layer and column chromatography and then the isolated compound was subjected to UV, IR, ¹H NMR, Mass spectral studies.^[15-20]

RESULTS AND DISCUSSION

The plant leaves of *Cucumis sativus* Linn [cucurbitaceae] were powdered and extracted effectively with petroleum ether and ethanol by hot continuous Soxhlet extraction. The ethanolic extract of *Cucumis sativus* Linn was subjected to qualitative phytochemical screening to find the active constituents which showed the presence of glycosides, alkaloids, tannins, proteins and amino acids, phytosterol and steriods, and terpenoids, saponins (Table No.1).

EECS was exposed to thin layer chromatography on silica gel G which had shown good resolution of solutes systems like Benzene : chloroform (9:1), Hexane Ethyl acetate (9:1). The different spots expansion in each system were identified by means of reliable detecting agent and R_f values were calculated. On the foundation of phytochemical screening and TLC study, isolation was done by column chromatography through isocratic elution technique with the help of solvent system Hexane and ethyl acetate (9:1). The isolation of the compound of interest from the Fraction 33-36 obtained by column chromatography of ethanolic extract of EECS by solvent system Hexane: Ethyl acetate (9:1) and compound EECS - 1 was isolated. It was further characterized by UV, IR, ¹H NMR, Mass spectral studies. The UV spectra shown the λ max =230nm and IR spectra shown characterized OH stretch 3480.99 cm⁻¹, C=C at 1628.47 cm⁻¹ region. It further ¹H NMR spectra signal appear in the region of δ 1.46 and 2.27 of methine and methylene proton respectively. In addition signal indicated that penta cyclic structure of triterpenoids. The mass spectra of EECS I show the M/C 559.06 suggesting approximate molecular weight as 559 and the spectrum gave the fragment ions peaks at 394, 249, 231, 193, 104 and 89. The peaks obtained from IR, ¹H NMR and MASS suggested that the structural similarities with triterpenoids type of compound.

PRELIMINARY PHYTOCHEMICAL SCREENING OF *CUCUMIS SATIVUS* LINN. TABLE NO.1

Phytoconstituents	Petroleum ether extract	Ethanol Extract
Reducing sugars	-	-
Glycosides	-	+
Alkaloids	-	+
Phytosterol and steroids	+	+
Flavonoids	-	-
Protein & Amino Acids	+	+
Tannins	-	+
Resins	-	-
Triterpenoids	-	+
Saponins	-	+

+ Present - Absent.

SUMMARY AND CONCLUSION

The plant based compounds have the effective dosage response and minimal side effects when compared to the synthetic compounds. The leaves of *Cucumis sativus* Linn [cucurbitaceae] were selected for present project on the basis of ethanobotanical information. Literature survey revealed that not much work has done in this plant. So we felt it worthwhile to validate scientifically, the folkclaim for its therapeutic activity. The detailed preliminary phytochemical investigations proved its appropriate identification and rationalized its use as a drug of therapeutic importance. These plant have so many phytoconstituents like terpenoids, alkaloids, saponins, tannins and so on. Triterpenoids are found to possess many pharmacological activities like antioxidant, anticancer, antiinflammatory, antimicrobial activities. So it was planned to isolate the potent anti oxidant from ethanol extract of *Cucumis sativus* Linn leaves.

The present study resolved that one phytoconstituent was isolated from the leaves of ethanolic extract of *Cucumis sativus* Linn and characterized scientifically. The peaks gotten from IR, ¹H NMR and MASS encouraged that the structural comparisons with triterpenoids type of compound. Thus the present study provides a scientific foundation for future works on this plant.

This primary work has a good platform of future promising work. A few suggestions can be made for improved results in the future work. First of all, the pharmacological activity will perform with isolated compounds, it will give better result than the extract because other phytoconstituents of the extract may also responsible for the activity. Further studies are necessary to asses the in vivo potential of active constituents in a variety of animal models and other unknown pharmacological activities also need to be explored with the help of isolated compounds. It further reflects a hope for the development of many more novel potent drug from nature.

ACKNOWLEDGEMENT

The authors are gratefully acknowledge their beloved Secretary and Correspondent N. Sendamaraai, J.K.K

Nataraja Educational Institutions, Komarapalayam, Tamilnadu, India for provided the abound facilities.

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