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AN OVERWİEW OF THE MEDİCİNAL PROPERİES OF TERPENOIDS

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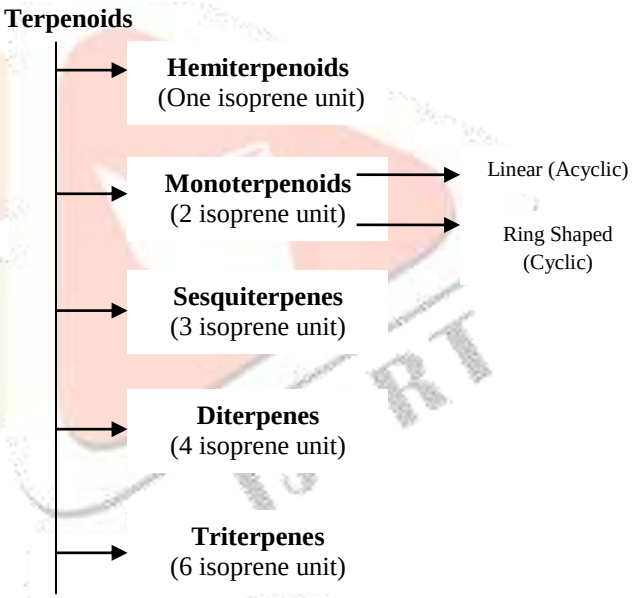
Abstract: The phenomena of multiple drug resistance has led for the search of medicines from alternative sources, mainly those obtained from plants and hence termed as Phytochemicals. Although this search is challenging but this bioactive species serves mankind by providing an array of medicines along with overcoming the threats posed viz. drug resistance. Plants, during metabolism produce metabolites which may be primary (sugars and fats) and secondary (such as protective agents as well as bioactive compounds produced in response to stress and pathogens). In depth perusals of available studies reveal that Terpenoid contents in all the selected plants ranges between 40 to 60 %. Hence the forthcoming literature and study would be helpful in determining of therapeutic use of terpenoids, their isolation and use for the welfare of mankind.

Key word: Terpenoids, Therapeutic use, Phytochemical, Terpenoids estimation.

I. INTRODUCTION

In the changing scenario Terpenes and Isoprenoids have gained relevance due to their physiological activities (viz. hormones, as anchoring materials and membrane constituents),defensive role against insects, animals and poisonous compounds and as flavoring agents in pharmaceutical industries. The biosynthesis of all Isoprenoids begins from isopentenyl Diphosphate (IPP) and Dimethylallyl Diphosphates (DMAPP) both contain 5Carbon atoms. The initial prenyl units can be used to form hemiterpenes or can undergo polymerisation through the successive addition of IPP to generate prenyl diphosphates, which are universal precursors to all the primary terpenes containing 10 carbon atoms, (C10), sesquiterpenes (C15), diterpenes (C20), triterpenes (C30), carotenoids (C40) and polyprenols (>45).

These constitute a class of natural products obtained from isoprene Terpenoids, in general have multi-cyclic structures and differ from each other by functional groups and basic Carbon skeletons. On the basis of number of isoprene units they are classified shown below:



The methods which includes the extraction friom plant issue and their purification depends on the chemical and physical properties of terpenes. In general, the methods include the following steps: 1) breaking the plant cells to release their chemical constituents; 2) extracting the sample using a suitable solvent (or through distillation or the trapping of compounds); 3) separating the desired terpene from other undesired contents of the extracts that confound analysis and quantification; and 4) use an appropriate method of analysis (*e.g.* thin layer chromatography [TLC], gas chromatography [GC], or liquid chromatography [LC]).

II. LITERATURE SURVEY

A brief literature review is needed in order to understand work done by various scholars in this field.

Shakir Ullah et al.[2018] described the Six medicinal plants species Rumex dentatus L., Rumex hastatus L., Verbascum Thapsus L, Solanum nigrum L., Canabis sativa Linn, and Convolulus arvensis L. were collected from the mountain of Arrang Sari ghar War affected area of Bajaur agency, Pakistan. The selected medicinal plants leaves were washed, air dried and

then powdered. The methanolic, ethanolic and chloroform extract of leaf samples were used for the phytochemical investigation both (qualitative and quantative) and antibacterial activity. The key objective of the present work was to check the antibacterial activity and presence or absence of the phytochemical constituents of all the selected medicinal plants. The results of the phytochemical investigation of these medicinal plants showed that the alkaloids, Phlobatannins, tannins, flavonoids, carbohydrates, phenols, saponin, cardiac glycosides, proteins, glycosides and terpenoids were found to be present in all selected medicinal plants. Highest amount of phenol was found in the methanolic extract in sample Rumex hastatus (0.81±0.10 mg/g) followed by Canabis sativa (0.68±0.11 mg/g), Convolulus arvensis (0.58±0.20 mg/g), lowest amount of flavonoids was found Solanum nigrum (0.10±0.11 mg/g). Maximum zone of inhibition was detected against Staphylococcus aureus and Salmonella typhi with zone of inhibition of 24.17 and 21.00 mm respectively by Rumex hastatus. Rumex hastatus showed 17.00 mm zone of inhibition against Escherichia coli. The secondary metabolite of the plants is very essential commercially and has more concentration in pharmaceutical companies for the manufacture of the new drugs for curing of several diseases.[1]

Isaac John Umaru et al.[2018] have been studied Medicinal plant over the years has been used to treat many diseases such as Diabetic, cancer, tumour, ulcers and bacterial. This study aimed at conducting the phytochemical analysis and in vitro antioxidant activities of the stembark extracts of selected medicinal plants (Leptadenia hastata, Barringtonia asiatica and Barringtonia racemosa). All the plants were extracted by solvent maceration extraction methods. The Phytochemical analysis for alkaloids, phenolic compounds, tannins, flavonoids, coumarins, steroids, terpenoids, cardiac glycosides, essential oils, saponins and resins by using the standard methods. The in vitro antioxidant property was evaluated by assessing the DPPH˙ radical scavenging ability. The preliminary Phytochemical evaluation of these plant species exhibited that the Dichloromethane extracts of Leptadenia hastata, Barringtonia asiatica and Barringtonia racemosa (Stem-bark) contain alkaloids, Sterols, Phenols, Flavonoids, Essential oil, Tannins, Terpenoid, Carbon hydrate, Cardiac glycosides, Saponins, Proathocyanidins, Coumarins, with Sterol and essential oil absent in the Leptadenia hastata and Coumarin in the Barringtonia asiatica and Barringtonia racemosa. The in vitro antioxidant activity of the species of Leptadenia hastata, Barringtonia asiatica and Barringtonia racemosa from five solvent extract of stem-barks have prominent antioxidant activities. This study suggests the potential source of natural antioxidant in Leptadenia hastata, Barringtonia asiatica and Barringtonia racemosa. Further research is highly recommended on the isolation of the bioactive compounds from these species and also to understand their mode of action in controlling various dreadful diseases.[2]

Gladis Raja Malar C et al.[2017] have been an investigation was carried out to quantify the phytochemical constituents such as total flavonoid, total terpenoid and anti-inflammatory activity of aqueous stem extract of Salacia oblonga. Preliminary screening involved the qualitative methods to detect the availability of phenol, tannin, saponin, alkaloids, terpenoids, quinones, flavonoids, coumarins, steroids, glycosides etc. Total flavonoid and total terpenoids were quantitatively estimated. Since flavonoids and terpenoids have potential anti-inflammatory activity. Total flavonoid and total terpenoid contents of aqueous stem extract were found to be 19.82 mg quercetin equivalents per gram and 96.2 mg per gram respectively. In vitro anti-inflammatory activity of aqueous stem extract of S.oblonga was evaluated by albumin denaturation membrane stabilization tests. The percentage inhibition of denaturation at a concentration of 50 mg/ml of extract was 97.5% and the percentage inhibition of haemolysis shown 89.14%. From the result it was concluded that the availability of secondary metabolites in the stem extract of S.oblonga may be responsible for the antiinflammatory activity. [3]

S.Divya et al.[2017] have been studied phytochemical screening reveals the presence of various bioactive compounds like alkaloids, terpenoids, reducing sugar, phlobatannins and flavonoids. These compounds are used as drugs for curing various human diseases. These medicinal plants can also act as antimicrobial activities.This present study reveals the medicinal properties and phytochemical analysis of Mimosa pudica, Leucas aspera, Tridax procumbens, Punica granatum and Cymbopogon citratus. The leaves of these five medicinal plants were selected for the present study. The leaves samples were washed in fresh water, air dried at room temperature and then powdered using mixer. By using distilled water, the plants extracts are collected and used for phytochemical analysis. As a result, no plants have the presence of all the phytochemicals at the concentration of the extracting reagents. The results,shows that the plant Cymbopogon citratus shown the presence of three phytochemicals such as reducing sugar, alkaloids and terpenoids.Leucas asperashown negative results as absence of all phytochemicals.Punica granatum, Mimosa pudica, Tridax procumbensshown positive results as presence of two phytochemicals.Mimosa pudica shown the presence of phlobatannins and terpenoids. Punica granatum shown the presence of flavonoids and alkaloids. Tridax procumbens shown the presence of Reducing sugar and phlobatannins. The phytochemical analysis plays a major role in pharmaceuticals industries for production of drugs and vaccine for curing various human diseases.[4]

V. Nandagoapalan et al.[2016]described screening of phytochemicals is a precious stair in the detection of bioactive principles present in particular medicinal plant and may lead to novel drug discovery. In the present study, principal phytoconstituents of 25 traditional medicinal plants were identified in order to relate their presence with bioactivities of the plants. Screening of the plants was performed using standard methods and resulted in the detection of the presence of tannins, flavonoids, phenolics, saponins, steroids, cardiac glycosides and alkaloids. Flavonoids were present in 19 of 25 plants while alkaloids were present in sixteen plants. The presence of these phytochemicals can be correlated with medicinal potential of these plants. Further studies are needed with these plants to evaluate their pharmacological potentials, isolate, characterize and elucidate the structures of the bioactive compounds responsible for their activities and other medicinal values.[5]

Farhana Jabin et al. [2016] described the extract of leaves of Murraya koenigii, Punica granatum, Jatropa curcas, Lawsonia inermis, Capsicum annum, Syzygium cumini were investigated for its phytochemical analysis. Qualitative phytochemical analysis of these plants confirm the various secondary metabolites like saponins, terpenoids, steroids, anthocyanins, tannis, flavonoids and alkaloids (Table no.1). Therefore these secondary metabolites had played fundamental role in controlling the vegetable diseases due to their antioxidant activities. This study provides the information for preventing the plant diseases at affordable cost and eco-friendly.[6]

Rohit Kumar Bargah et al.[2015] conveyed the bioactive compounds present in the plant are responsible for the medicinal properties of the plant. The present investigation is aimed in screening the bioactive compounds present in the leaves, stem bark and flowers of Moringa pterygosperma an important ethnomedicinal plant. The qualitative analysis for the present phytochemicals was performed using ethanol and aqueous extracts of leaves, stem bark and flowers of Moringa plant by various standard techniques available. Phytochemical analysis revealed the presence of alkaloids, flavonoids, terpenoids, glycosides, steroids and phenols in all the extracts varying quantities. Since the plant contain high quantities of these new bioactive potential

compounds, it is reliable to possess large number of pharmacological values like antioxidants, antifungal, antibacterial, anti abortifacient, anti-inflammatory, antiulcer, diuretics activities and are being employed for the treatment of different ailments in the indigenous system of medicine.[7]

Manjulika Yadav et al.[2014] have studied Preliminary screening of phytochemicals is a valuable step, in the detection of the bioactive principles present in medicinal plants and subsequently may lead to drug discovery and development. In the present study, chief phytoconstituents of the six selected medicinal plants of different families were identified in order to relate their presence with bioactivities of the plants. Screening of six selected medicinal plants was performed for the presence of tannins, flavonoids, terpenoids, saponins, steroids, phlobatannins, carbohydrates, glycosides, coumarins, alkaloids, proteins, emodins, anthraquinones, anthocyanins and leucoanthocyanins using standard methods. All the selected medicinal plants were found to contain tannins and flavonoids. Moreover, terpenoids were also present in all the selected plants except P. dactylifera. except P. dactylifera. On the other hand, saponins and steroids were absent in all plants except S. chirata and phlobatannins were absent in all plants except R. sativus. In addition, carbohydrates, glycosides and coumarins were present in all the selected plants except P. dactylifera and R. sativus. Alkaloids were present in all the selected plants except F. religiosa, P. dactylifera and R. sativus. Proteins were present only in F. religiosa and S. chirata. Whereas emodins, anthraquinones, anthocyanins and leucoanthocyanins were absent in all the selected six plants.[8]

Mamta Saxena et al.[2013] perposed about Medicinal plants are a rich source of bioactive phytochemicals or bionutrients. Studies carried out during the past 2-3 decades have shown that these phytochemicals have an important role in preventing chronic diseases like cancer, diabetes and coronary heart disease. The major classes of phytochemicals with disease-preventing functions are dietary fibre, antioxidants, anticancer, detoxifying agents, immunity-potentiating agents and neuropharmacological agents. Each class of these functional agents consists of a wide range of chemicals with differing potency. Some of these phytochemicals have more than one function. There is, however, much scope for further systematic research in screening Indian medicinal plants for these phytochemicals and assessing their potential in protecting against different types of diseases.[9]

III. CONCLUSION

The above literature review reveals that Terpenoids and other Ethnobotanically important plants that have been used for the cure of variety of diseases as well as metabolic disorder, have been proved to be useful. Hence even the Terpenoids extract which may be extracted from other plants provide remedies for variety of ailments, so that could be used for human welfare.

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