CHAPTER - ONE : INTRODUCTION

The earth's biological wealth is mind boggling in its sheer diversity, with estimates of millions of wild plants and animals. Biodiversity in wild and domesticated forms is the source for most of humanity's food, medicine, clothing and housing, much of the cultural diversity, and most of the intellectual and spiritual inspiration. It is, without doubt, the very basis of human being.

The natural sources are a common heritage, which we have shared with the past generation and our future generation will be inheriting these resources from us. The early human beings subsisted on the natural means of subsistence i.e. edible plants and hunting the animals, without much of processing. The more primitive the society the higher is its dependence on its immediate environment.

Thus, due to the obvious reasons of easy availability of number of plants growing around him, the very initial experiments on their medicinal uses were conducted. In India, earliest mention of the use of medicinal plants is to be found in the Rigveda\(^1\) having been written between 4500-1600 BC. Properties of various drugs obtained have been
given in details in Sushruta Samhita\(^2\), which was written not later than 1000 BC. It contains a comprehensive chapter on therapeutics. In the Buddhist period other prominent contributions were made by Atreyas and Agnivesa. Indo-Aryans have used soma for medicinal and sacrificial purposes.\(^3,4\)

(Systematic scientific evaluation of the medicinal plants has proved that there are some active principles like alkaloids, steroids, glycosides, essential oils, etc. present in various parts of the plants and they are being used in medicines from the ancient times upto now.)

But severe damage to forests, by rapid industrialisation and other human activities, the medicinal plants are disappearing. So it became very necessary to develop science in such a way that can supplement their daily needs such as medicines, foods, etc.

To fill up the shortage of medicines originated from natural sources, various drugs have been synthesised. In the synthetic medicinal chemistry for the first time in 1907 Ehrlich\(^5\) introduced an organic compound 'arsphenamine' which was found active against spirochaete of 'syphilis'. From that time a number of compounds have been synthesised and introduced in chemotherapy.

(The active constituents present in the plants have been studied by various researchers under the following
headings: i. alkaloids, ii. glycosides, and saponins, iii. sterols, iv. colouring matter, v. essential oils, vi. fixed oils, vii. proteins and amino acids, viii. carbohydrates, ix. tannins, x. enzymes xi. free carboxylic acids, etc.

Some of the active constituents studied by the present author are briefly reviewed below:

**Glycosides and Saponins**

Glycosides are diverse group of compounds most of which are coloured fluorescent and others are chromogenic. These are very reactive and can be hydrolysed easily with enzymes, acids and bases or sometimes undergo autohydrolysis at higher temperature to give aglycones and sugars. Aglycones may be phenols, aldehydes, alcohols, acids, anthraquinones or flavonols and sugars may be mono/disaccharides. On the basis of attachment of sugars to the aglycone part of glycosides, they may be classified as C-glycosides, N-glycosides, S-glycosides and O-glycosides. Several researchers have studied and reviewed them. Saponins are plant glycosides and are generally characterised by foam test in water solution. Saponins are haemolytic, when injected into the blood stream of animals. Therefore it is highly toxic intravenously and toxicity is related to their surface tension. Formation of complexes with sterols is another property of saponins.
Saponins in which aglycone and sugar units are linked through oxygen atom, have pharmaceutical uses as antitumours, bactericides, antifertilitic agents, antihistamines, antiinflammatory, antisickening, antihaemorrhagic agents and antimicrobial agents. Saponins are mainly divided into two groups -

1. Triterpenoidal saponins, and
2. Steroidal saponins.

1. **Triterpenoidal saponins**: Triterpenoidal saponins are the compounds with a carbon skeleton based on six isoprene units and are derived biosynthetically from C-30 acyclic hydrocarbons. These saponins have relatively complex acyclic structure having high melting points. These respond to haemolysis test and give foam in aqueous solution. They possess remarkable physiological activity and used as cleaning agents, as fish poison, for nervous disorder, in vascular frigidity etc. Triterpenoidal saponins are reviewed by many scientists.

2. **Steroidal saponins**: On hydrolysis these saponins give C-27 nucleus aglycone which is steroidal in nature. These saponins are further divided into cardiac glycosides, diglucosides and spiran glycosides. Cardiac glycosides are the most important due to their physiological action on cardiac muscles. These are highly toxic when taken in large
quantities and even lead to death in higher doses. Some of the steroidal aglycones are reviewed by various researchers. 38-43

**Fixed Oils**

These are triglycerides of saturated and unsaturated fatty acids containing small amounts of sterols, vitamins, pigments, hydrocarbons and other substances soluble in them. Most of the fatty acids have an even number of carbon atoms (C₄-C₂₆). Fixed oils are a good source of energy. Fatty acids and their derivatives are widely used in foods, rubber industries, pharmaceutics, as plasticizers, cosmetic formulation, metallic soaps, greases for making protective coatings and illuminants. Various fixed oils have been studied and reviewed by several workers. 44,45

A very low percentage of unsaponifiable matter is also present in fixed oils, which is soluble in ether. This unsaponifiable matter is an important part of the fixed oil and consists of hydrocarbons, sterols, vitamins and pigments. Among all these constituents, sterols are most important owing to their miscellaneous therapeutic applications. They can be applied for the cure of infections, as antifertilitic agents, as antiinflammatory agents, as sedatives and tranquilizers for haemolytic diseases and to cure exaggerated effects. Sterols are colourless
crystalline alcohols possessing tetracyclic carbon skeleton with an aliphatic side chain. These are found in free state in nature and also in the form of esters of higher fatty acids. These are optically active compounds. Detailed reviews on steroids have been described by Louis Fieser and Mary Fieser,\textsuperscript{60} Robinson\textsuperscript{61} and Bergmann.\textsuperscript{62}

**Carbohydrates**

Carbohydrates are the polyhydroxy aldehydes or ketones. They are said to be a store house of energy for human beings. These are responsible for the transportation of various organic constituents of plants by combining with them. They are used in foods, drugs, papers and textile industries. Carbohydrates have been assayed by several scientists\textsuperscript{63-67} and are classified as (i) sugars and (ii) nonsugars. Sugars are mainly made up of mono and disaccharides whereas non-sugars are polysaccharides.

**Monosaccharides**: They are simple straight chain polyhydroxy aldehydes or ketones and are found as free sugars or linked with glycosides in plants.

**Disaccharides**: On hydrolysis they give two moles of similar or dissimilar monosaccharides.

**Polysaccharides**: They are linear or branched chain macromolecules composed of similar or dissimilar monosaccharide units. They are consumed in tremendous volume by a number
of industries and have been a subject of research in different fields. The polysaccharides may be further classified as homopolysaccharides, which on hydrolysis yield only one kind of monosaccharide units and heteropolysaccharides, which on hydrolysis give more than one kind of monosaccharide.

Naturally occurring polysaccharides are loosely referred to as gums and mucilage, which on complete hydrolysis yield pentoses, hexoses and uronic acids.\textsuperscript{68,69} Voluminous literature is available on them.\textsuperscript{70-73} Polysaccharides composed of galactose and mannose have been reported by various researchers.\textsuperscript{74,75}

**Proteins and Amino Acids**

Amino acids are precursors of protein, which on peptide bonding gives rise to protein or sometimes they are also found in free state in the plants. Amino acids contain carbon, hydrogen, oxygen, nitrogen and sometimes small amount of sulfur. Proteins and amino acids are the reserve energy of seeds. Proteins act as enzymes for the maintenance of cell life and mainly used in foods and in the industries of paints, plastics, gelatin, photographic films and as adhesives. A number of proteins have been reviewed by several scientists.\textsuperscript{76-90}
METHODS USED FOR ANALYSIS

With the advent of modern physico-chemical methods, enormous development in the field of natural products as well as synthetic organic chemistry has been possible. The extensive use of physical methods has been more advanced during the last three decades for successful purification and elucidation of structures of organic molecules. Some of the recent applications of these physico-chemical methods are briefly reviewed below:

**Chromatographic Techniques**

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The term 'chromatography' (Greek : chroma-colour and graphy-writing) means colour writing. It was invented by M.S. Tswett, a Polish botanist in 1906 for the separation of coloured substances into individual components. Now a days, tremendous modifications have been applied to the technique, so it can be used to separate any given mixture of coloured or colourless constituents.

Fundamental principle behind this technique is, there is difference in movability of different constituents through a porous medium (known as stationary phase) under the influence of some solvent or gas (mobile phase). Chromatography can be classified as -

a. **Adsorption chromatography** : It is based on the difference in adsorption coefficients. In this the fixed phase is
a solid e.g. alumina, magnesium oxide, silica gel, etc. The solutes are adsorbed in the adsorbent and move out on eluting with suitable solvents.

b. **Partition chromatography** : It operates by the mechanism analogous to counter current distribution. In this the fixed phase may be a liquid strongly adsorbed on a solid. In this case, solutes get distributed between this fixed phase and eluted by moving liquid (solvent).

c. **Gas chromatography** : When the moving phase is a gas, it is called gas chromatography or vapour phase chromatography.

d. **Paper chromatography** : It is a special case of partition chromatography. In this technique, solution of the sample is applied as a small spot on filter paper and it is developed with a suitable solvent. Solvent moves through paper due to its capillary action and different constituents of the sample gets separated with respect to their partition coefficients. When the solvent has moved to appropriate distance or sometimes run-off, the paper is dried and the separated spots are visualised by a suitable reagent. The movement of substances relative to the solvent is expressed in terms of Rf values.

Different types of chromatography that have been used in the present studies are:
i. **Descending paper chromatography**: When the development of the paper is done by allowing the solvent to travel down the paper, it is known as descending chromatography. The advantage of this technique is that the development can be continued indefinitely even though the solvent runs off at the other end of the paper.

ii. **Ascending paper chromatography**: When the development of the paper is done by allowing the solvent to travel up the paper, it is known as ascending paper chromatography.

iii. **Two dimensional paper chromatography**: In this method, rectangular paper is used. The sample is applied slightly away to one of the corner and after developing in one direction, the paper is allowed to dry and is developed again at right angle to the first. Solvents may be the same or different in both the directions.

Paper chromatography is the most widely used technique for the separation of amino acids$^{93,94}$ and carbohydrates,$^{95}$ steroids$^{98}$ and saturated and unsaturated fatty acids.$^{99}$

iv. **Thin Layer Chromatography**: The technique of thin layer chromatography was first introduced by Izamailov and Shraiber in 1983. It is also known as surface chromatography and open column chromatography. For this techniques, various coating materials like silica gel (acidic), alumina (basic), Kieselguhr (neutral) and cellulose powder (neutral) are
used as adsorbents according to the nature of separating material. In this technique, slurry of the adsorbent in a suitable solvent is spread uniformly on a glass plate and after drying the plates at room temperature for 30 minutes, activated at 100-110° for 30 minutes. Samples in appropriate solvent is applied through a capillary and developed in a solvent. Separated constituents are visualised by spraying with a suitable reagent. This technique has several advantages over other techniques because it is simple, faster and the separated compounds can easily be recovered by scraping the adsorbent layer and dissolving in a suitable solvent, etc.

Thin layer chromatography is now one of the most frequently described separation technique in quantitative as well as qualitative analysis. It has been used successfully for separating methyl esters of saturated and unsaturated fatty acids, alkaloids, glycosides and amino acids.

v. Column Chromatography: This technique was developed by the American petroleum chemist D.T.Day in 1990. Adsorption columns were first used by M.S. Tswett, the Polish botanist, in 1906, in his investigations of plant pigments. The general principle for this technique is that the substance having greater adsorbing power is adsorbed first, in the upper part of the column and when the column is eluted, it comes
at last. So according to their different adsorbing power various components present in the samples can easily be separated. Adsorbents used for column chromatography are starch, calcium and magnesium carbonate, activated silicic acid, activated magnesium silicate and activated alumina. Size of the column and adsorbent are used according to the samples to be separated eg. alumina columns are used for separating glycosides\(^{109}\) and saponins,\(^{110}\) silver nitrate impregnated columns are applied for the separation of methyl esters of fatty acids,\(^{111}\) starch and cellulose columns are employed for the separation of amino acids and carbohydrates.\(^{112}\)

**vi. Gas Liquid Chromatography\(^{113}\):** It is quite similar to the column chromatography except that a gas is used as the mobile phase instead, of a liquid and stationary phase is always a liquid. Gas liquid chromatography was originated by A.J.P. Martin in 1951 together with A.T. James. It is based on the Henry's law of partition i.e. \(x/m = kc\), where \(c\) is the mass of the gas sorbed by mass \(m\) of the sorbent and \(k\) is constant. According to this phenomenon, if vapour or gas comes in contact with a liquid, a fixed amount of it gets dissolved in the liquid. For this purpose, most widely used carrier gases are hydrogen, helium, nitrogen and air. Columns usually made up of glass, copper, stainless steel or aluminium tubings. These columns
are filled with porous solid support which absorbs the liquid stationary phase. Solid supports are that it should consist of inert uniformly spherical particles having a large surface area per unit volume and that it should be mechanically strong over a wide range of temperature. Most widely used supports are celite, chromosorb W., chromosorb P, etc.

This technique is very popular for the separation of samples in microlevel. It needs only a few µg of samples. It has strong separating power. Its sensitivity is very high and it takes short time for the analysis of even a complex mixture. Due to these advantages a number of researchers have been using this technique to separate fatty acids,\textsuperscript{114-116} mixture of sterols,\textsuperscript{117-118} amines and amino acids,\textsuperscript{119-121} carbohydrates,\textsuperscript{122} terpenes and essential oils,\textsuperscript{123-125} and many other oxygenated compounds.

\textbf{Spectral Methods}\textsuperscript{126,127}

For the structure elucidation, now-a-days spectral techniques are more widely used. These methods are comparatively recent, quick and accurate. It is of two types.

\textbf{i. Atomic spectroscopy} : This deals with the interaction of electromagnetic radiation with atoms, and

\textbf{ii. Molecular spectroscopy} : This deals with the interaction of electromagnetic waves with molecules. This results in
transitions between rotational and vibrational energy levels. The molecular spectra extends to visible through infrared into the microwave region.

**Ultraviolet and Visible Spectroscopy**: In this region, transitions are associated with the electronic energy level of the compounds. Change in electronic energy involve relatively large quanta, so that the electronic spectra of molecules are found in the wavelength region, 1,000-8000 Å\(^0\) of the electromagnetic spectrum. The visible region is subdivided into two spectral regions. The region between 2,000 and 4,000 Å\(^0\) is known as ultraviolet region and below 2,000 Å\(^0\) is called far or vaccum ultraviolet region. This technique is used for the identification of a compound, detecting impurities, quantitative analysis, determination of molecular weight, structure diagnosis and for the study of equilibrium in solution.

A number of scientists\(^{128-130}\) are using UV and visible spectroscopy for the determination of degree of unsaturation and nature of double bonds. Hantzh\(^{131}\) first suggested the use of UV absorption spectra in the field of terpene chemistry. In recent years many scientists have employed this technique for the structure determination of naturally occurring compounds.\(^{132}\) Amino acids\(^{133}\) and sugars\(^{134}\) can also be detected quantitatively by using UV analysis.
\[ \text{α} : \beta\text{-unsaturated ketones like chalcones give very good ultraviolet spectra}^{135} \text{ from which structure and the nature of the substitution can be predicted.} \]

**Infra Red Spectroscopy** : Infra red spectroscopy is one of the powerful analytical techniques which offers the possibility of chemical identification. The technique is based upon the simple fact that a chemical substance shows markable selective absorption in the infrared region. After absorption of IR radiation, the molecule of a chemical substance vibrate at many rates of vibration, giving rise to a close packed absorption bands called IR absorption spectrum. The ordinary infrared region extends from 2.5-15 \( \mu \) (400-667 cm\(^{-1}\)), the region from 0.8-2.5 \( \mu \) (12500-4000 cm\(^{-1}\)) is called the near infrared and the region from 15-200 \( \mu \) (667-50 cm\(^{-1}\)) is called the far infrared. This technique is also useful for the identification of functional groups, study of chemical reaction, study of tautomerism and for finding out hydrogen bonding in the molecule.

Bellamy\(^{136}\) and Rao\(^{137}\) have reviewed the applications of IR spectroscopy. Many scientists\(^{138-143}\) have applied IR spectroscopy for the structural interpretation of carbohydrates, steroids, terpenes and glycosides.

Nowadays IR technique is very popular for the identification of synthetic compounds. Dhar and Singh\(^{144}\) have studied the IR spectra of some new chalcones.
**Nuclear Magnetic Resonance Spectroscopy**: It is a branch of spectroscopy in which the resonance absorption of radio frequency electromagnetic radiation by substance in a permanent magnetic field caused by magnetic properties of the nuclei is measured. The frequency of radio waves lie between $10^7$ and $10^8$ cps.

In order to determine resonance frequency, the energy absorbed by the nuclei is measured, as the magnetic field $H_2$ is varied. As the field $H_2$ is increased so that the precessional frequency of the nucleus increases and when this frequency becomes equal to the oscillation field, transitions occur between nuclear energy states. The energy absorbed in this process produces a signal at the detector and this is amplified and recorded as a band in the spectrum. NMR spectrum is plotted between absorption signal at the detector and the strength of the magnetic field $H_2$, but it is generally calibrated in units of frequency rather than units of magnetic field strength.

NMR is a powerful tool for investigating nuclear structures. This was first applied for the structure diagnosis of ethyl alcohol by Purcell$^{145}$ and Bloch$^{146}$ in 1945. Nowadays the structures of a number of natural products$^{147-157}$ as well as other organic compounds$^{158}$ are confirmed by their NMR spectra.
**Mass Spectroscopy** : It is a method for studying substances by measuring masses of atoms and molecules incorporated in them. In this technique the compound under investigation is bombarded with a beam of electrons which produce an ionic molecule or ionic fragments of the original species. The resulting charge particles are then separated according to their masses and the spectrum produced is known as mass spectrum. Mass spectrum may be used to determine component masses and percentage in a substance, the analysis of isotope and chemical composition of the substance can also provide information concerning the molecular structure of the compounds. It can be used for direct measurement of molecular weight of the compounds as high as 4000. Various scientists\(^{159-169}\) have used this technique for measuring molecular weight and finding molecular formulae of the compounds.

**Synthesis of some Biologically Active Compounds**

The contrast between the drugs of today and those of yesterday are dramatic in several respects. From the time of Rigveda (1500-1600) to half a century ago, man has exclusively depended on the nature to produce the drugs he needed. But in 1920's the US chemical industry was born as the result of lst World War and in 1935 discovery of sulphonamide as the therapeutic moiety of prontosil gave unprecedented impetus to the quest for synthesis. In 1964 US companies originated 62% of 587 new sample entities
which appeared as prescription items in domestic market during the 1941-1963 period. 170-172

The great utility of today's new basic drugs are distinct organic chemical compounds. Most of these are products of synthetic chemistry, although some such as reserpine, ACTH and most of the antibiotics are products of the natural origin. Chemists have played a very important role in deliberate chemical alternation of these naturally occurring compounds and produce derivatives which are either more potent or superior in some or other respect eg. dihydroarotamine, fluorocorticosteroid, semisynthetic penicillins, methyl testosterone, etc.

Some molecular modifications of known pharmacodynamic compounds and synthetic compounds constitutes one of the main kind of research offered in the field of chemotherapy.

Chemotherapy may be defined as the study of agents which are selectively toxic to the parasite. Paul Ehrlich, the father of Chemotherapy, was more absolute in his concept and used the term to describe the cure of an infectious disease without injuring the host. The scientific principles of chemotherapy were established chiefly during the period 1919-1935.

Due to the great utility of the drugs for curing a number of diseases, an attempt has been made to synthesize better drugs that are also economically cheap. Thus some
chalcones of 2,4-dihydroxyacetophenone, and 4',6'-bis
(aminolo)-2'-aryl/alkyl amino-S-triazine have been prepared
in the present work. The synthesised products have also
been tested for their antimicrobial, antihelminthic and insecti-
cidal activities.

**Chalcones**: These are the simple unsaturated ketonic compounds
formed when benzaldehyde or substituted benzaldehyde and
acetophenone or substituted acetophenones undergoes 'Claisen
reaction',\(^\text{173-174}\) in the presence of ethanolic NaOH. The
utility of chalcones as antimicrobial agents was first
reported by Schraufastatter\(^\text{175}\) and Eaton and Devies.\(^\text{176}\)
Besides their antimicrobial properties, chalcones possess
sedative, analgesic, antihistaminic, carcinogenic and anti-
fertility properties.

For the present study 2,4-dihydroxy acetophenone
was condensed with different aldehydes (aromatic) and screened
for their antimicrobial, antihelminthic and insecticidal
activities.

**S-triazines**: S-triazines and their condensation products
have been found to be widely applied as lubricants, dyes,
bleaching agents, varnishes, anion exchangers and surface
active agents. S-triazine derivatives have been the subject
of several investigators in the realm of potential therapeutic
agents like antitubercular,\(^\text{177}\) antitumour\(^\text{178}\) and anti-
cancer.\(^\text{179}\) S-triazine derivatives are also associated
with various kinds of biological activities like sedative,\textsuperscript{180} antiinflammatory,\textsuperscript{181-182} anthelmintic\textsuperscript{183} and fungicidal.\textsuperscript{184} Jensch\textsuperscript{185} claimed that cynauric quinolinyl derivatives were effective in diseases caused due to bacteria and protozoa.\textsuperscript{186}

For the present study 4′,6′-bis-(anilino)-2′-aryl/alkyl amino-S-triazines were prepared and screened for their antimicrobial, anthelmintic and insecticidal activities.

**Biological Assay**

For the development in the field of chemotherapy, it is necessary to test new chemicals for their curative properties against various diseases. So it was thought worthwhile to test synthesised chalcones, S-triazines and the alcoholic extracts of the seeds of *Cassia nodosa*, *Cassia renigera* and *Taxodium mucronatum*, for their i. antimicrobial, ii. anthelmintic and iii. insecticidal properties.

i. **Antimicrobial Activity**\textsuperscript{187-189}

Fracastorius in 1548 wrote from the knowledge of 'syphilis' that it is a disease which is transmitted by living germs. Agostino Bassi in early 1800's proved that muscardin is a fungal disease which is most common in silk worms. There after various researchers were successful to isolate various organisms but Joseph Lister in 1878
was the first scientist who developed pure culture technique
to the germs outside the body. After that 'Koch' was able
to grow 'anthrax' disease germs outside the body and as
the results of his experiments, he proved that germs grow
outside the body are also susceptible to produce same symptoms
when it is inoculated into the body.

On the basis of these experiments, it was thought
that bacteria and fungi can be grown outside the animal
body and a number of chemicals can be tested \textit{in vitro} for
their activity on microbes.

The antimicrobial activity is measured \textit{in vitro}
in order to determine (i) the potency of antimicrobial
agent and (ii) sensitivity of a given micro-organism to
the known concentration of the drug.

Determination of these quantities\textsuperscript{190-197} may be
undertaken by one of the two principle methods (i) dilution
methods or (ii) diffusion methods, using an appropriate
standard test organism and a known sample of drug for
comparison.

\textbf{Anthelmintic Activity :}

Anthelmintic drugs are those that are used to rid
the parasitic worms, known as helminths from the body.
These drugs are of great importance because helminthiasis
is the most common disease in the world.
The term anthelmintic should not be restricted to drugs acting locally to expel worms from the gastrointestinal tract. There are several types of worms which penetrate tissues. The drugs used to combat systemic infections should be included under the general term anthelmintic. It is a great problem that very few helminths of man infect laboratory animals and the conditions of alimentary tract of different worms habitat can also be reproduced in the laboratory experiments. Sollman\(^{198}\) reported that all the clinical anthelmintics are toxic to the earth worm. Therefore, earth worms can be used to have an idea whether the test substance has any anthelmintic activity and to compare its relative activity with different samples of known anthelmintic drug. A number of workers\(^{199-203}\) have used earth worms for the preliminary \textit{in vitro} evaluation of anthelmintic activity of new substances.

\textbf{Insecticidal Activity}\(^{204}\)

Literally insecticide means insect killer. Although the name suggests that only insects are killed but in real sense insecticides are such chemicals that can affect biological system of many living organisms and act as poisons to many animal species. According to their mode of action on insects, they are classified as (i) stomach insecticides, (ii) contact insecticides, and (iii) fumigants.
Insects are man's chief competitors on earth. Over 80% of all living animals are insects. They eat his crop and some of his other possessions. They transmit diseases such as malaria, onchocerciasis, trypanosomiasis and other diseases of his animals. The above losses result in the economic and wealth damage, that's why from a long time a number of chemicals have been introduced in the literature of the insecticides. Elliott suggested that synthesised compounds have such characteristics like high insecticidal activity, low mammalian toxicity and controlled environmental stability. The development of such insecticides is a costly operation but even after that 16-25 new products are introduced per year.

**PROBLEM TAKEN AND WORK DONE**

Since a long time man has used plant products in medicines, cosmetics, dying, edible fats, perfumes, etc. So it has become more essential to investigate the plant products present in the plants and find out their uses in human life. With the rise of population and increasing demands for more food and medicines, Indian scientists have started research in the field of natural products as well as in the field of synthetic organic compounds. The results of these investigations are that a large number of natural products and synthetic drugs have come in contact with man.
Keeping in view of the importance of plant products, fixed oil, saponin, proteins, polysaccharides and reducing sugars from the seeds of *Cassia nodosa*, *Cassia renigera* and *Taxodium mucronatum*, have been taken up for investigations in the present work.

Another aim of the proposed work is to prepare some new compounds to test their biological activities. For the present work, chalcones from 2,4-dihydroxy acetophenone and S-triazine derivatives from 4',6'-bis (anilino)-2'-chloro-S-triazine, have been prepared to test their antimicrobial, anthelmintic and insecticidal activities.
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