The genus *Phyllanthus* contains large number of species of shrubs, trees and annual or biennial herbs distributed throughout the tropical and subtropical regions of both hemispheres.

*Bhui amla* (common name) is a small, erect, annual herb that grows 30-40 cm in height. In southern India and China, *Phyllanthus niruri* is a quite prevalent in Amazon and other wet rainforests, growing and spreading freely (much like a weed). Unfortunately, there remains a great deal of confusion among scientists regarding plant identification. In many cases, plant misidentification makes evaluation of published information difficult. *Phyllanthus amarus* and *Phyllanthus sellowianus* are often considered a variety of *Phyllanthus niruri*. However, *Phyllanthus amarus* and *Phyllanthus* are closely related to the *Phyllanthus niruri* in appearance, phytochemical structure, history and uses (Nicole Maxwell, 1961; Holm Nielson 1979, Webster, 1956-58).
No distinction is made among these three species in published clinical research. Often quite one name is indicate to be synonyms with other and, some times both names are interchangeably as referring to one plant.

Man since time immemorial has been using herbs or plant products as medicine. The traditional system of medicines viz., Ayurveda, Siddha and Unani are based on the experiences in the use of plant products in cure of common diseases. A vast majority of tribal pollution living in rural village and remote forest areas depend largely on herbal remedies and their local formulations for the treatment of various disorders. In recent times, focus on medicinal plant research has increased all over the World and large body of evidence has collected to show immense potential of medicinal plants used in various tribal areas and traditional systems.

In India the native people have exploited a variety of herbal medicines for effecting curing of various diseases. The plants used, preparation and administration of drugs varies from area to area. Although the knowledge of herbal medicine is gradually vanishing, some of the traditional healers and aged tribal men are still practicing this art of healing with medicinal plants.

A traditional health care practice of indigenous people pertaining to human health is termed as ethno medicine. The knowledge of certain herbs, animals and minerals that have curative and palliative effects were transmitted from one generation to another and it is the outcome of bold experimentation through trial and error methods over hundreds of years.
The Indian system of medicines has played an important role in our country in providing medical care since antiquity. The system of medicine is as old as the Indian history itself, because it formed an integral part of the Indian traditions since time immemorial. Reference to plants used as drugs are often found in old literature (Atharveda, Charak, Samhita, Sushruta Samhita etc.). Inspite of achievement of allopathic medicines the Indian system of medicine known as Ayurveda, Unani, Siddha and naturopathy still continue to provide medical cure to majority of the people on account of their cheaper cost and no side effects. India is declared as one of the 12 mega-diversity regions of the world and estimated to have 45000 plant species or 7% of the world flora (Swami,2000). Value and its practices are of great utility to us information of this kind is orally handed down from generation by rural people and village Vaidyas (Ganesh et al. 2007).

Several of the research organizations and institution are involved in search of new drugs by using ethno-botanical information as the clue, of which plants are prime candidates for further screening and chemical analysis. Plants used for traditional medicines contain a wide range of substances to treat variety of ailments (Ganesh et al. 2007)

According to an all India ethno biological survey carried out by the Ministry of Environment & Forests, Government of India, there are over 8000 species of plants being used by the people of India and majority of these (more than 4,500) are used in folk medicines, followed by Ayurveda, Siddha, Unani and other indigenous systems. Herbal medicines have been improved in developing countries, as an alternative solution to health problems and costs of pharmaceutical products.
Modern pharmacopoeia still contains at least 25% drugs derived from plants. Herbal medicines have occupied an important position in India (Arora, 2008).

Chopra et al. (1956) gave list of Indian medicinal plants. They gave certain medicinal plants of family Euphorbiaceae. Chopra et al. (1958) further gave importance of *Phyllanthus* sp. as indigenous drug in Indian system. Dastur (1962) also worked on medicinal plants of India and Pakistan. Gupta (1962) reported plants of Dehradun. Chopra et al. (1969) further added some additional medicinal plants in the Indian system.

Jha (1969) worked on the chemotaxonomy of family Amentiferae. Its reported some phytochemicals substances in members of this family. Watt (1972) gave a list of economically important medicinal plants. Airy shaw (1973) published work on the medicinally important flowering plants. Chopra et al. (1974) further published work on medicinal plants of north India Nadkarhi (1976) gave details of Indian medicinal plants used as drug in the Indian region. Jha (1977) worked on chemotaxonomy of Hamameidaceae

He identified certain alcoliods, flavonoids, tanning etc in this family. Singh and Maheswari (1983) gave traditional methods of phytotherapy among the tribals of Varanasi district. Kirtikar and Basu (1984) revised Indian medicinal plants and gave the importance of family Euphorbiaceae. Agarwal (1986) published work on medicinally important plants in this book. Singh et al. (1986) isolated some biologically important Chemical substances in the members of family
Modern pharmacopoeia still contains at least 25% drugs derived from plants. Herbal medicines have occupied an important position in India (Arora, 2008).

Chopra et al. (1956) gave list of Indian medicinal plants. They gave certain medicinal plants of family Euphorbiaceae. Chopra et al. (1958) further gave importance of Phyllanthus sp. as indigenous drug in Indian system. Dastur (1962) also worked on medicinal plants of India and Pakistan. Gupta (1962) reported plants of Dehradun. Chopra et al. (1969) further added some additional medicinal plants in the Indian system.


Vitaceae of Bihar. Joshi and Sukhdev (1988) gave chemical details of crude drugs. They also worked out glycosides of shatavarin.


Fransworth (1990) stated that the herbal medicines of ancient times practiced by the large number of workers like Assyrians (4000 BC), and Egyptians (2500 BC). He further reported that in due these herbal medicines were subdued under the impact of modern medicine. However, comeback of 'herbal renaissance' is taking place all over the world. It is estimated that 80 percent people of the world rely on traditional medicine for primary healthcare needs. And of the 119 plant-based drugs used today by modern medicine, about 74 percent are from plants traditionally used as herbal cures (Fransworth, 1990).

Asolkar et al. (1992) gave active principles and biologically important compounds of Indian medicinal plants.

Gupta et al. (1993) reported traditional Indian medicinal plants used as anti-allergic source of Indian medicine.

Ogata et al. (1992) reported that Phyllanthus niruri contains some chemicals which inhibit the reverse transcriptase activity of HIV-I. Observation shows that aqueous extracts of Phyllanthus niruri inhibited viral DNA activity in vitro. Behl et al. (1993) reported large number of herbs used as medicinally important plants.

Seigler (1994) gave phytochemistry of the Euphorbiaceae. Euphorbiaceae is the most diverse and interesting among the plant
families and is comparable to the biological diversity of the family. Plants of this family are also known for their economic potential as a source of raw material for pharmaceutical industries. Many of them have been used by man kind as food crops or for various other purposes.

Warier et al. (1994) published work on Indian medicinal plants. Webster (1994) classified family Euphorbiaceae. Its also gave medicinally important species of *Phyllanthus*.

Chatterjee and Pakrashi (1994) gave details of chemical compounds present in the Indian medicinal plants. Dey (1994) gave detailed account of Indian medicinal plants used in Ayurvedic preparations to control certain ailments. Chopra et al. (1994) reported indigenous drugs of Indian medicinal plants and their uses. Chatterjee and Pakrashi (1995) further reported the treatise on Indian medicinal plants.

Kishore et al. (1997) found that the alcoholic extracts of different parts of *Calatropis procera* (Asclepiadaceae) such as leaves, shoots and flowers & their dilutions result antimicrobial activity against *Micrococus luteus*, *Staphylococcus aurous* and *candida albicans*.

Calixto et al. (1998) reviewed the genus *Phyllanthus* and gave their chemistry, pharmacology and also gave therapeutic potential. The plants of the genus *Phyllanthus* (Euphorbiaceae) are widely distributed in most tropical and subtropical countries, and have long been used in folk medicine to treat kidney and urinary bladder disturbances, intestinal infections, diabetes, and hepatitis B. In recent years, the interest in the plants has increased considerably. Substantial progress on their
chemical and pharmacological properties, as well as a few clinical studies of some *Phyllanthus* species have been made. This review discusses the current knowledge of their chemistry, the in vitro and in vivo pharmacological, biochemical, and clinical studies carried out on the extracts, and the main active constituents isolated from different species of plants of the genus Phyllanthus. These studies carried out with the extracts and purified compounds from these plants support most of their reported uses in folk medicine as an antiviral, in the treatment of genitourinary disorders, and as antinociceptive agents. However, well-controlled, double-binding clinical trials are lacking. Several compounds including alkaloids, flavonoids, lingams, phenols, and terrenes were isolated from these plants and some of them interact with most key enzymes. Together this data strongly supports the view that the plants belonging to the genus Phyllanthus have potential beneficial therapeutic actions in the management of hepatitis B, nefrolitiasi, and in painful disorders.

Patil and Honrao (1998) did chemo taxonomical studies in the genus *Tetrastigma planch* (Vitaceae) chemotaxonomical analysis of twelve *Tetrastigma* sps. (vitaceae) revealed presence of raphides and mucilaginous substances and absence of cyanogenic glycosides, quinines, naphtha quinine and aurones compound in all species. Thirteen test shows presence or absence of chemical compounds with Variable reaction and three with doubtful reactions. Significance of such phytochemicals to control various diseases' and pests and improvement in genetic resistance in cultivated grapes has been discussed.
Sharma (1998) stated that there is divergence of opinion about the circumscription of the tribe justicieae. He investigated on the chemotaxonomy of 42 taxa representing the ix sub tribes of the tribe justicieae. Total 24 standard tests have been done with fresh material as well as ethonolic extracts of the shade dried materials.

Sekar and Francis (1998) did biochemical studies of some plants. The study was undertaken to observe the biochemical constituents namely protein, lipid & fibre in nine species of four families.


Martin and Ernst (2003) reviewed *Phyllanthus* as an antiviral "penicillin"—The initial antibiotics all were are antibacterial compounds derived from plant sources. The first antibiotic that has been industrially produced, penicillin, is a compound extracted from the *Penicillium* mold. By and large, plants depend much more on chemical defenses against diseases then do animals, including humans. And plants, just
like animals, are infected, and rendered ill, by both bacterian and viruses.

Just as they have antibacterial compounds, many plant also have some antiviral chemicals in their arsenal of defenses against disease. These antiviral phytochemicals typically are not effective against all viruses, not in the concentrations at which they are present, and neither for the living plant against those viruses that infect it, nor for the use as herbal medications against human viruses, not in the amounts typically consumed of herbal medications. But herbal antivirals have a substantial advantage when compared to the huge number of chemical antivirals: they can confer an antiviral benefit without otherwise doing harm. At present the world is full of synthetic antivirals: bleach, caustic acid, arsenic, and practically every chemical poison kills viruses. They also kill humans that are treated with this kind of "antivirals". We want to find antivirals that are not otherwise unhealthy to the humans treated with them.

The big advantage of herbal antivirals is that (as all living organisms are connected through evolution and environmental adaptation) they are something that has been around in the natural environment of mankind and their evolutionary ancestors for millions of years. Thus, there is a far increased probability that some of the relationships between plants and ill animals, including humans, are symbiotic. And yes, on the evolutionary timetable, the used of herbs to treat physical states of discomfort reaches back for further than the time of the first hominids. Primates, and even less developed animals, do
add certain plants to their diet not for the purposes of food intake but for "medical" applications.

Among all plants that have been tested for a possible antiviral used in the treatment of humans, Phyllanthus species, especially Phyllanthus urinaria, has yielded the most promising results. Many antiviral compounds presently in clinical use have a narrow spectrum of activity, limited therapeutic usefulness and variable toxicity. There is also an emerging problem of resistant viral strains. This study was undertaken to examine the published literature on herbs and plants with antiviral activity, their laboratory evaluation in vitro and in vivo, and evidence of human clinical efficacy. Data from clinical trials of single herb preparation used to treat uncomplicated viral infections were extracted in a standardized, predefined manner (Martin and Ernst, 2003).

Many hundreds of herbal preparations with antiviral activity were identified and the results of one search presented as an example. Yet extracts from only 11 species met the inclusion criteria of this review and have been tested in clinical trials. They have been used in a total of 33 randomized, and a further eight nonrandomized, clinical trials. Fourteen of these trials described the use of Phyllanthus spp. for treatment of hepatitis B, seven reporting positive and seven reporting negative results. The other 10 herbal medicines had each been tested in between one and nine clinical trials. Only four of these 26 trials reported no benefit from the herbal product.

Though most of the clinical trials located reported some benefits from use of antiviral herbal medicines, negative trials may not be
published at all. There remains a need for larger, stringently designed, randomized clinical trials to provide conclusive evidence of their efficacy." The antiviral of *Phyllanthus urinaria* go hand in hand with a protective effect *Phyllanthus urinaria* has on liver cells. In Chinese and Indian traditional medicine, *Phyllanthus urinaria* has been used in the treatment of liver problems long before it has been known that hepatitis is a liver disease caused by viruses. The plant compound that are responsible for the liver-protective benefits of *Phyllanthus urinaria* have been identified.

"Hepatitis B is one of the major diseases inflicting the human population. Conventional treatment with interferon-alpha is very expensive and has many serious side effects. Alternative herbal medicine using extracts of *Phyllanthus niruri* (amarus) and *Phyllanthus urinaria* has been reported to be effective against hepatitis B and other viral infections. Antiviral activity induced by the herbal extract was measured as inhibition of the cytopathic effect (CPE) which normally results from infection of untreated MDBK cells with vesicular stomatitis virus (VSV) (Martin and Ernst, 2003).

Paridhi et al. (2003) reported medicinal value of gum and resin secreting plants of district Saharanpur. Most of the medicinal plant found on Shiwalik belt.

Kumar and Bhargava (2005) reported some important medicinal plants of family leguminosae in district Saharanpur of Uttar Pradesh. Kathriarachchi et al. (2005) gave molecular phylgeneties of *Phyllanthus* sp. They stated that, Its applications for kidney stones and gallstones, cellular and liver protection, hypertension and high cholesterol, cancer prevention, and its pain-relieving and antiviral effects, it is gaining in popularity on many continents as an effective herbal remedy. It's also important to note that in all the research have been reported in any of the human or animal studies, even in acute or chronic use.

Bagalkotkar et al. (2006) observed the presence of phytochemicals in *Phyllanthus niruri*, Linn and suggested their pharmacological properties. They gave following uses of *Phyllanthus urinaria*. Medicinal uses: treats kidney stones. A tea from the shrub itamira kidney stone-tree is made from the leaves of *Phyllanthus urinaria* (which is not a tree, but a small herb) for treating kidney stone (ITA) and kidney infections in general. This species and several of its nonspecific are widely used in Brazil an Amazonia by rural people for the same purposes. Recent research suggests that the anti-spasmodic effect of certain (as yet unidentified) substances in Phyllanthus may be responsible for a genuinely remedial effect with regard to kidney stones; these species also appear to be effective against viral hepatitis.

Chatterjee (2006) suggested that protein isolate of herbaceous plant *Phyllanthus niruri* protects liver from nemesulide induced oxidative stress in human beings.
Choudhary and Bhargava (2006) reported some medicinal plants in district Saharanpur. Dhiman et al. (2006) reported antipyretic traditional herbal medicinal plants in district Saharanpur.

Hoffmann et al. (2006) gave a phylogenetic classification of Phyllanthaceae. They summarized following properties of *Phyllanthus* sps. Botanical Name: *Phyllanthus niruri* Family Name:Euphorbiaceae Common Names: *Phyllanthus* plant, Child pick-a-back, Gulf Leaf flower, Black Catnip, Meniran, Chanca peidra, Shatterstone, Stone Breaker, Quebra pedra, Gale of Wind, Carry me Seed, Creole Senia, Daun Marisan.


Kumar et al. (2006) reported ethno medicinal uses of plants of Ghar area of district Saharanpur of Uttar Pradesh. Micali et al. (2006) gave a randomized, prospective long term study of *Phyllanthus niruri* and reported that it can control this renal store.
Trivedi (2006) suggest the revival of interest in natural drugs, especially those derived from plants, started in the last few decades mainly because of the widespread belief that 'green medicines' are healthier and safer than the synthetic ones. Herbs are staging a comeback and a 'herbal renaissance' is blooming across the world. The WHO took note of the role that traditional Medicine can play role in the extension of health services particularly in the remote rural areas.

Trivedi (2006) further opined that the skill and painstaking labour of ancient traditional folk healers of India and the world, who were pioneers in discovering the curative effects of several herbs, often at the risk of the lives of their own fellowmen. Folklore medicine is as old as any other traditional medicine in India and can be called the parental body. All other branches of traditional medicine such as Ayurveda, Unani and Siddha have been greatly benefited from folk medicine. Several of the herbal drugs used by the traditional folk healers since long have proved to be of great biological significance, and modern research has convincingly established their medicinal properties and restored their credibility which was eroded with the coming of modern synthetic medicos. (Trivedi, 2006).

Vijay & Vijay Vergia (2007) reported that primary metabolites are substance widely distributed in nature, occurring in one form or another in virtually all organisms. In plants such compounds are often concentrated in seeds and vegetative storage organs and are needed for physiological development because of their role in basic cell metabolism.

Primary metabolites are of primary important and essentially required for growth of plants for example: sugars, protein, lipids, starch. Many primary metabolites lie in their impact as precursor or pharmacologically active metabolites in for pharmaceutical compounds.

David (2008) published a good detail of work done on plant *Phyllanthus niruri*. Vishuti et al. reported medicinal plants of Saharanpur. He also gave medicinal uses of this plant. Krithika (2009) noted anti oxidative effect of Phyllanthin against chloroform induce toxicity in hepatitis G 2 cell- Line.

Pagare et al. (2009) found that *Phyllanthus amarus*, Schum & Thonn is important herbaceous species of medicinal value, used in the Ayurvedic formulation 'Chyawanprash'. Phyllanthin and hypophyllanthin are reported as therapeutically active constituents and serve as hepatoprotective agents. The whole plant is useful in dropsy, jaundice, diarrhea, dysentery, intermittent fevers and diseases of urinogenital system, scabies, ulcer and wounds. It is tested for their in vitro inactivation properly of hepatitis B surface antigen. It is also used for the treatment of liver, kidney, bladder problem, diabetes, hypoglycemic, antihypersensitive, antibacterial, antifungal and insecticidal. Thus, phyllanthin & hypophyllanthin present in this plant are reported as
therapeutically active constituents and serve as protective agents. (Pagare et al. 2009).

Vijay Vergia et al. (2010) did biochemical estimation of primary metabolites' of some medicinal plants of Euphobiaceae family. They suggested that medicinal plants at present are largely being used in pharmaceutical, cosmetic, agricultural & food industry. Plants are source of many bioactive compounds. Primary metabolites, directly involved in fundamental plant physiological processes, are rarely considered to be major determinants of host-plant resistance. Primary metabolites are responsible for growth and development of plant. They analyzed primary metabolites such as protein, lipid, starch, phenol and carbohydrates in 3 different plant parts of family Euphobiaceae. The result obtained suggest that primary metabolits are of pharmaceutical interest.

Boim et al. (2010) reported that Phyllanthus niruri can act as a promising alternative treatments for nephrolithiasis. Thus, it is an important medicinal plant.

Idu et al. (2010) carried phytochemical and acute toxicity studies of aqueous and methanol extracts of Emelica coccinea plant.

Brusotti et al. (2011) found antimicrobial properties of stem bark extracts of Phyllanthus muellemianus of family Euphorbiaceae. Paithankar et al. (2011) published a good account of Phyllanthus niruri and said that this plant is a magic herb. Patel et al. (2011) reviewed the details of Phyllanthus amarus. They gave ethnomedicinal uses, phytochemistry and pharmacology of this plant. The inflammatory
response in this plant extract is due to presence of cytokines &
chemokines and is partially propagated by damaged tissue-derived
products (DAMPS=Dome associated molecular products.

Ravi Kumar et al. (2011) found *Phyllanthus amarus* as a potent
natural source for inhibition of *Hepatitis C Virus* Plant extract of
*Phyllanthus amarus* inhibits replication of DNA of this virus. Xia et al.
(2011) reported that *Phyllanthus species* can control chronic hepatitis B
virus infection.

Adeneya (2011) noted that leaf and seed aqueous extract of
*Phyllanthus amarus* improves insulin resistance diabetes in experimental
animal studies.

Gaikwad & More (2012) investigated carbohydrate, proteins,
vitamins, phenolic compounds, flavonoids, tannins and minerals in
cowpea *Vigna unguiculata*, (L) walp of family fabaceae. Observation
indicated that dork colored seed contains more phenol, as compared to
light colored seeds.

.Pisal et al. (2012) reported that climatic conditions significantly
influence the pigment composition of plants. They estimated
chlorophyll a, chlorophyll b and total chlorophyll in six wheat varieties
obtained from wheat research centre Mahabaleshwar.

Ram and Mishra (2012) surveyed medicinal plants of Ranchi
district useful in chronic human diseases such as diabetes, skin diseases,
hypertension. This study documented the pharmaceutical importance of
plant resources in Ranchi district, particularly the significance of
medicinal plants in primary health eared. They found great diversity of
plants used for medical purposes as well as their wide range of medicinal application.

Srirama (2012) reported medicinal value of Indian *Phyllanthus* species. Observation shows that this plant contains Hepatoprotective activity.

**REVIEW OF LITERATURE IN ANALYTICAL, BIOLOGICAL, AND PHYTOCHEMICAL STUDIES:**

Studies in biological and Phytochemical studies got interest as herbal medicines are in great demand since ancient time. These herbal medicines are synthesis of therapeutic experiences of generations.

Allen (1940) gave methods for the estimation of phosphorus. Nelson (1944) gave a photometric adaptation method for the determination of glucose. Feigel (1947) developed methods for qualitative analysis by spot test for various phytochemical substances present in plants. Arnon (1949) gave technique for the estimation of total chlorophyll a and chlorophyll b and also worked on copper enzymes in isolated chlorophyll of *Beta vulgaris* plant.

Mc Gready et al. (1950) introduced method for the determination of starch and amylase in vegetables and plants. Sandell (1950) gave colorimetric methods for the determination of traces of metals and heavy metals in plant samples and dried soil samples.

Dubois et al. (1951) gave a colorimetric method for the determination of sugar in plants. Lowry et al. (1951) suggested protein measurement with Folin phenol reagent. Youngmen (1951) published a
good account of Pharmaceutically important chemicals present in plants. Somogyi (1952) gave methods of sugar determination in plants.

Bray and Thrope (1954) analysed Phenolic compounds of interest present in biological metabolism. Gibbs (1954) worked on the chemical compounds present in the flowering plants. Snell and Snell (1954) also gave colorimetric methods of analysis of total nitrogen.

Yemen and Cocking (1955) gave methods for the determination of amino acids with the help of ninhydrin using chromatographic methods. Dubois et al. (1956) also gave calorimetric method for the determination of sugars and related substances in plants. Bligh and Dyer (1959) gave a rapid methods for the total lipid extraction and purification.


Anderson and Dea (1969) described chemotaxonomic aspects of the chemistry of gum exudates obtained from Acacia sp. of family Leguminosae. Harborne (1970) analysed phytochemical compounds of various plant and concluded that it can be a parameter to determine phytogenetic relationship among plants. Kapoor et al. (1971) surveyed
large number of Indian plants for certain biochemical substances like
colloids, flavoroids and saponins. Kohli et al. (1971) estimated total
colloid content of Sarcocca prunifermis.

Harborne (1973) introduced various phytochemical methods for
the analysis of chemical compounds present in the plants. Gibbs (1974)
worked on chemotaxonomy of flowering plants. Wealth of India also
consist of large number of phytochemical details of Phyllanthus sp. and
analysis of crop plants. Babu (1997) gave some details of plant
Phyllanthus sp. at Dehradun.

Hellebust and Gragie (1978) gave large number of physiological,
phytological and biochemical methods for the analysis of plants.
Bachmann and Blaish (1979) gave properties of condensed tannins in
family Vitaceae and also reported their importance in plants.
Bhumyalalaki et al. (1983) reported chemicals like Polyphenol,
saponins, glycosides, lignins, tannins in Phyllanthus species and
suggested that Phyllanthus niruri can control Jaundice in children. Ghos
(1984) gave some details of Chemical compounds.

Calixto et al. (1984) noted antispasmodic effects of an alcoloid
extracted from Phyllanthus sellowianus and compared this alcoloid with
Papaverine.alcoloid of family Papaveraceae. They also gave uses of this
alcoloid.

Syamasundar (1985) reported antihepototoxic principles of
Phyllanthus niruri, a herb plant of family, Euphorbiaceae. Upadhyaya
& Singh (1986) evaluated Cassia obfastoliotia and Cassia tora
phytochemically & suggested the presence of some common chemicals found in family leguminosae. Dutta (1986) worked on essentaial oil of Aegale marmelos.

Venkateswaran et al. (1987) noted the effect of an extract from Phyllanthus niruri on hepatitis B and wood chuck hepatitis viruses under both in vitro and invivo conditions.


Chopra et al. (1994) reported indigenous drugs of India & gave their role in controlling several diseases. Sarraf et al. (1994) also worked on phytochemical aspects of Indian medicinal plants. Wang et
al. (1994) made observations of the efficacy of *Phyllanthus* species in treating patients with chronic hepatitis B.

Prakash et al. (1995) noted hepato protective activity of three *Phyllanthus* species *Viz Phyllanthus niruri, Phyllanthus simplex* and *Phyllanthus urinaria* on carbon tetrachloride induced liver injury in the rat.

Ito et al. (1995) determined *Aconitum* alkaloids in the tubers of *Aconitum japonicum* using gas chromatography/selected monitoring.

Santos et al. (1995) further studied on the antinociceptive action of the plants of the genus *Phyllanthus*. Wang (1995) used herbs of the genus *Phyllanthus* in the treatment of chronic hepatitis B. Results were obtained with three preparations of *Phyllanthus niruri*. Collected from three different sites.

Miguel et al. (1996) observed the chemical and preliminary analgesic effect of geranium and furosin alcoloid insulated from *Phyllanthus sellowianus*. Wegner and Bladt (1996) published work on plant drug analysis.


Kimothi (2000) studied chemotaxonomy and pharmacogostical aspects of some species of *Polygonum*, Linn of family Polygonaceae. Rajesh et al. (2000) observed that *Phyllanthus amarus* extract


determined four lignans in *Phyllanthus niruri*, L. by a simple high performance liquid chromatography method with fluorescence detection.

Susheelamma et al. (2007) suggested that chlorophyll content in mulberry leaf (*Morus indica*, L.) is a parameter for determination of leaf quality.


**REVIEW OF LITERATURE IN MORPHOLOGICAL STUDIES :-**

Woodson & Moore (1938) worked on the Vascular anatomy and comparative morphology of apocynaceae flower. Eames and Mac Daniels (1947) gave certain morphological and anatomical details of family *Euphorbiaceae*. Ashby (1948) gave large number of details of leaves & its morphogenesis in plants. Boke (1948) reported development of the parian in *Vinca rosea*, Linn.

Katherine Esau (1953) published a detail account of anatomy in various plants including family Euphorbiaceae.

Paliwal (1966) reported structure and ontogeny of stomata in some Acanthaceae family members. Fahn (1967) published a book on plant anatomy. Shah (1968) described development of stomata in some members of family Papilionaceae.


Shashi and Paliwal (1975) described foliar anatomy of family Acanthaceae with particular reference to the tribe Thunbergiaceae and Nelsonieae. Chakrabarty (1977) gave epidermal structure and stomatal characteristics of Vigna sp. of family leguminosae.

Dehan (1980) worked on family Euphorbiaceae. He gave application of epidermal morphology to taxonomic delimitations in the
genus *Jatropha*. Mohan Das and Shah (1980) reported epidermal studies in some Indian varieties of *Piper betle* with details of their taxonomic importance.

Philip (1983) found stomatal abnormalities in some members of order Aristolochiales. Raghava and Murty (1985) worked on the effect of growth regulator on stomata and epidermal cells of *Physalis peruviana*, L. Thomas et al. (1988) reported chemosystematics of some members of family Caprifoliaceae.

Baruah and Nath (1997) studied epidermal characters and stomatal structures of some members of family Euphorbiaceae. They also gave stomatal details of *Phyllanthus* sp. Baruah et al. (1999) described micro morphology of *Cinnamorrum sulphuratum*, Nees of family Lauraceae. They gave some chemotypes in this plant.

Baruah and Nath (2000) found certain morphological Variants of *Cinnamomum bejloghota*, Sweet and their relevance to foliar micro-morphology.

Thakur et al. (2007) reported the foliar epidermal studies of some members of family Euphorbiaceae.

**EFFECT OF ECOLOGICAL VARIATIONS ON BIOCHEMICAL CHANGES:-**

**I STUDIES IN TOTAL NITROGEN AND PHOSPHORUS:**


Richa et al. (2003) also evaluated total heavy metal, total Nitrogen and total Phosphorus in road side growing sugar cane at Saharanpur district of U.P. Ruhina (2003) also studied on the uptake of total N, total P and total heavy metals in plants near Tapri of district Saharanpur.

Lone (2004) studied on total N content in plant as effected by seasonal air pollution. Reshu (2005) also worked on this aspect. Kumar et al. (2006) studied on total N and total P and total heavy metal uptake in road side *Oryza sativa* plant.

Kumar and Bhargava (2008) also studied on the uptake of total N, total P and total heavy metal in Pea plant growing at two places of road side in district Saharanpur. Rajat (2008) worked on biochemical analysis
of four medicinal plants growing at two places along road sides in district Haridwar of Uttranchal. Dhiman et al. (2009) also studied on the uptake of total N, total P and total heavy metals in *Terminalia arzuna* growing on road side in district Saharanpur.

II STUDIES IN TOTAL CHLOROPHYLL, OIL AND ENZYMATIC ACTIVITY:-


