CHAPTER 2
REVIEW OF LITERATURE

2.1 INTRODUCTION

India is known for its rich biodiversity, culture, heritage and natural seasonal plants. Rich biodiversity offers unique chance for novel Metabolomes isolation. India have two hotspots i.e. Eastern Himalaya and Western Ghats ranks seventh in sixteen mega-diverse countries. These hotspots possess more than 70% of the world’s species (Sanjappa, 2005).

Indian ancient literature have more than 2000 drugs of plant origin. These drugs were derived from plants based on tribal knowledge and folklore uses of local healer. Further, this plant based knowledge is explored in scientific way by researchers (Mukherjee and Wahile, 2006)

Rajasthan, which was earlier known by the name of Rajputana, was conglomeration of eighteen princely State, two chiefships and the district of Ajmer – Merwara during the British Empire. A sizable portion of Rajasthan is arid or semi arid forming the Great Indian Desert. In the history of the earth, however this region after glaciations was covered by the Tethys sea chiefly in the Jurassic, Cretaceous and Eocene periods which later receded due to upheaval of land during the Upper Tertiary. This region has supported ample vegetation and prosperous civilizations (Mohanjodaro).

Great Indian Thar Desert in western part of Rajasthan is a exclusive character and makes its a unique State of India. The Thar forms the eastern extremity of the desert belt of the earth. The Aravallis, forming edge to the desert in the East, are the oldest and having richest biodiversity mountain chain of the world. This range potentially divide the State geographically into two halves having distinct climatic conditions and having different vegetations.

The desert also called Marusthali contains twelve districts of the State. It has nearly 215,460 sq. kms area which is three fifth of the total State area. It lies between 24°35’ to 30°10’ North Latitudes and 69°30’ to 76° Eastern longitudes.
This extremely barren and arid region covered by a vast expanse of sand is spread up to the Aravalli ranges. Further, a land nearly 100 miles in width parallel to hill range called the Rajasthan Baggar is only semi arid and some forms of Xerophytic vegetation.

The ancient Aravallis having undergone various stages of erosion, having long distance of 692 kms in the form of hills and valleys. A part from the main mountain range a hill tract in Sirohi where rises Mt. Abu with Guru Shikhar – the highest peak of Aravalis about 1727 m high. This is situated between Himalayas in the North of the Country and Nilgiris in South, this is the highest mountain.

2.2 INDIAN MEDICINAL PLANTS

Plants have been used as medicinal agents for a long time. Local healers of Rajasthan are using lot of plants and their parts for cure of various ailments. These plants were surveyed by Charak and Shushutra way back in 100 A.D. The procedure for testing the plants was based on taste on tongue that is organoleptic. Therefore, Ayurveda is based on organoleptic characters till date. Health and healthy living is motto of all still large number of people dying due to insufficient drugs for proper treatment. Traditional System of Medicine is becoming more popular as dominant health care system around the world. Modern research is also considering the potentials of Ayurveda, Unani and Siddha literature (Sen and Chakraborty, 2017).

It was estimated that huge number of medicinal plants are present in India and local people are using them in day to day life for curing small or big problems generated due to life style and unhealthy environments conditions. Studies reveals that more than 1500 plants are present in Rajasthan as medicinal plants and are good percentage of total number of medicinal plants of Rajasthan (Samant et al., 2007) (Figure 2.1).

Schippmann focused on the prominent families responsible for medicinal properties. In studies it was claimed that more than hundreds of families are responsible for medicinal potentials and out of these Asteraceae, Lamiaceae, Polygonaceae, Fabaceae, Apiaceae, Rannunculaceae and Rosaceae families have maximum number of plants that are used as medicinal plants in India. As these are prominent Medicinal Families (Schippmann, 2002). (Figure 2.2)
Out of these prominent families further, *Artemisia, Saussurea, Euphorbia, Polygonum, Aconitum, Prunus* and *Nepeta* are the potential genus having prominent medicinal properties. (Schipmann, 2002) (Figure 2.3).
Medicinal plants are used raw, water extracts and/or alcoholic extracts of various plant parts. These parts can be whole plant, seeds, fruits, bark, flowers, leaves, gum, resins, latex, inflorescence etc. All the parts have different therapeutic potentials to cure various ailments. The mode of extraction is also variable and depend on the type of problem. Likewise hararh can be taken with hot water, cold water or even raw according to the patient situation. (Samant et al., 2007) (Figure 2.4)
2.3 MEDICINAL PLANTS OF RAJASTHAN

Out of nine botanical regions of India, three fall in the territory of Rajasthan – The Western Region, The Gangetic Plains and The Deccan Plateau. This State comprises nearly 2000 plant species wealth (Shetty and Singh, 1993). This is mentioned in old Flora (Shetty and Singh, 1993). (Figure 2.5)

On the bases of fertility of soil this is indeed a good number of plants. Rainfall and altitude decide the type of vegetation in the different regions of the State ranging from extremely xerophytic scant vegetation of the desert to be lush subtropical evergreen forest of Abu Hills. Further, the vegetation has unique ways of adaptation. Most of the plants are ephemeral- germinating with the first rain, growing, then flowering and fruiting and finally disappearing after shedding seeds, almost with the rains. Most perennials vanish from the surface after the rainy season. Absence of leaves or their reduction into scaly or needle like forms high sap density, succulence and waxy aerial parts etc. These modifications forced research to choose the plants with vivid adaptations.

In present research work researcher and his group surveyed the arid region of Jaipur and Mt. Abu highest peak Gurushikar. In the survey researcher found more
than 350 valuable plants used by local healers and tribal people of Rajasthan. These plants possess potentials as drug. Selection of plants for the present research work is based on previous studies. The selected plants are *Prosopis cineraria* and *Amorphophallus konjac*.

### 2.4 Prosopis cineraria

Arid regions have extremely dry climate with low and erratic rainfall, with varying levels of atmospheric humidity and high wind velocities. In India Rajasthan is the prominent region having low rainfall and high temperature, but is not restricted to the only west. Almost every state has a Zone, natural or created due to anthropological reasons which have similar characteristics. Rajasthan with irregular and less rainfall is considered an Arid region. (Sharma, 2002; Pareek et al., 2015).

Fabaceae possess *Prosopis cineraria* plant. This family consist of forty four species spread about arid parts of India. This plant is used by rural women of Rajasthan and it is a versatile tree of Western India. The plant is also known as kalptaru. It is also labeled as Wonder Tree and the Kind of Desert (Garg and Mittal, 2013).


A large much branched shrub or a small tree. Twigs are slender, smooth, equipped with somewhat compressed, straight, scattered bristles, 3-6 mm long. Leaves two pinnate; main rachis 3-4 mm long, glabrous or puberulous; pinnae usually 2 pairs, opposite, 2.5-8 cm long; leaflets 7-12 pairs, 1-1.8 cm long, 3-5 mm wide, sub-sessile, oblong, obliquely rounded and mucronate at apex, unequal sided; base rounded and very oblique. Flowers in axillary spikes which are 7-11 cm long, solitary or in terminal panicles. Calyx 5x 1.15 mm long cup shaped, faintly 5 toothed. Corolla yellow 3 mm long, recurved. Stamens 10, filaments 3 mm long. Pods 10-20 cm long, rigid, straight, cylindric, torulose, glabrous, 10-15 seeded. Seeds embedded in brown pulp, 3-8 mm long, dull brown oblong. Prosopis is one of the most common tree species growing on sand throughout the area often forming
gregarious patches. Large insect galls upto 4 cm diameter have often seen on the tree. Its local name is khejari.(Bhandari, 1990). Specimens examined: Jodhpur: 1890, 1891 Tandon 329.

The plant is distributed in Afghanistan, Persia, Baluchistan, Pakistan (sind), India (Rajasthan, Delhi, Gujarat, Madhya Pradesh).

The plant pods are used as vegetable and valuable as fodder. The leaves locally known as loong are much valued as a fodder for goats. The bark is powdered and mixed with flour during scarcity of food and famine. The wood is hard but of inferior quality and hence used for rough wood work in villages. The tree is held sacred by the Vishnoies an agricultural community of the region (Figure 2.6 and 2.7).

Figure 2.6: *Prosopis cineraria* different plant parts
2.4.1 Taxonomic Classification:

Kingdom : planate  
Order : fables  
Family : Fabaceae  
Genus : Prosopis  
Species : cineraria  

Vernacular Identity

Arabic - Ghaf  
Bengali - Shami  
Gujarati - Khijado, Sumri, Semru, Sami, Kamra  
Hindi - Janti, Banni, Jand, Chonksa, Sangri, Shami, Chaunkra, Khejri  
Sanskrit - Jhind, Jhand  
Tamil - Perumbay, Vanni, Jambu  
Trade name - Jand, Kandi, Khejri  
Urdu - Jandi, Thand, Kandi (Orwa et al.2009)
2.4.2 Brief about the species:

Plant is medicinally important and Ayurvedic drugs are also using this plant for various preparations. Wood possesses high calorie value. Large number of pods can be collected from old trees. These tree are growing in vary scarce rainfall. They need less water for growth. Pods are brown in colour when ripe. Pods have sugary tissue. Unripe pods are used as vegetables. Some rural people roast the pods and stored it for long use. Boil pods are used in arid region as dish. The vegetable prepared are trikuta and panchkutta (Singh, et al., 2104). Khejri is a medium size tree which plays an important role in Rajasthan. It can stand in extremes temperature about 45 to 50 degrees Celsius in the summer time and 10 to 15 degrees in the winter time.

2.4.3 History of Prosopis cineraria (Khejri)

Plant of Prosopis possess its historical value. One brave women Ms. Amrita Devi came forward to protect the plants from bishnoi family of Marwar place. When the Maharaja Abhay Singh ordered to cut the trees of that region. This lady along with 363 villagers encircle the tree and said that the trees belonged to them and that they would die for them. Every year an annual program is organized in the memory of historical protest for protection of plants in the village Khejri.(Tewari and Singh, 2006).

2.4.4 Uses of P. cineraria in traditional medicine system:

Unripe pods (sangri)/ripe pods indicate that they can offer a good source of livestock feed compared to other native available feeds. Arid foods have great nutritional values. (Malik et al. 2013). Little is known concerning the species even though the nodulation and nitrogen fixation were proved (Bithu et al., 2012; Felker and Clark, 1980). Arid food and its traditional uses are mentioned in ancient literature. The food of arid zone possess great value addition (Goyal and Sharma, 2006).

Prosopis cineraria (Linn.) (Mimosaceae) is popularly known Khejri is a multipurpose tree of Arid and Semi-Arid Zone in Rajasthan (Diagne,1992). It gives Green leaves, dry leaves(long) and green un dried pods, dried pods(sangria and kohl
-khan) for food, fodder, firewood, timber, medicine, mesquite gum etc. (Bhandari, 1974).

It is known as state tree of Rajasthan (Kalwar et al., 2005). It is used in ancient science since ages (Kirtikar and Basu, 1984). The high nutritive potentials of leaves showed that local healers are using its paste on boils and blisters. Some rural people are using it for curing ulcers of livestock (Chopra et al., 1956). The dried smoke of Prosopis plant is used to cure eye ailments. (Malik and Kalidhar, 2007). Poor people of Rajasthan are using sangria or sangar the pods of P. cineraria as protein diet as the pod of this plant are rich source of protein and can cure protein and mineral shortage in diet. (USNAS, 1980).

Pods are cooked as basic food in Rajasthan for well being (Chogem et al., 2007). Some of researches also performed on phytochemicals, antioxidant and bioefficacies of P. cineraria (Tarachand et al., 2012).

2.4.5 Current status – Prosopis cineraria

Phytochemical tests were performed on all extracts as part of investigation for confirmation of the presence of active phytochemical constituents like carbohydrate, proteins, terpenoids, flavonoids, tannins, glycoside, alkaloids (Khandelwal et al., 2016)

Singh and coworkers (2014) studied that P. cineraria is known for sand storms stabilization, soil fertility enhancement and important for agro forestry in arid region (Singh et al., 2014).

Methanolic extract of Prosopis cineraria was screened for respiratory problems and the results showed promising results and also proved its traditional uses. (Janbaz et al., 2012)

Studies were also performed for treatment of diabetic animals with crude ethanolic extract using bark of Prosopis cineraria (P. cineraria). This experiment results in lowering of blood glucose level. The drug is also used for antioxidant efficacy and these enzymes with radial scavenging efficacy were also used for
providing healthier effect. *Prosopis cineraria* bark possess a good biological activity and posses a large number of the compound for better health (Sharma et al., 2010).

Ripe pods of *P. cineraria* were extracted in methanol and antimicrobial assay was performed against selected microbial flora and significant results were found. No positive records against other extractives (pet. Ether extract). Unripe pods showed no results against *E. coli, S. typhi* and *P. aeruginosa* (Sharma et al., 2012).

Further, antibacterial efficacy of stem bark was screened using agar well method. In this method also methanol extract of stem bark was proven antibacterial efficacy (Velmurugan et al., 2010).

Antimicrobial activity of successive extracts of ethyl ether and alcohol of *P. cineraria* leaves were evaluated against *S. aureus, E. coli and Candida sps*. ethyl ether and alcohol extract showed prominent results against selected pathogens. (Kapoor and Bansal, 2013)

Nath et al (2013) studied zinc chloride activation by use of agro waste for production of activated carbon. The results showed that pods are very useful as low cost agro waste and easily production of such material and can be popularized easily with no side effect. This can also be known as Green Agro Waste Product.

Karim and Azlan., (2012) studied on *Prosopis cineraria* Pods. It contains different useable compounds that have good biological efficacy such as Anti-inflammatory, Antibacterial, and Antifungal and antioxidant on human health. *Prosopis cineraria* contain a number of secondary metabolites that are good healing health and can be useful resources of therapeutic, nutraceutical and pharmaceutical components.

Bithu et al., (2012) studies on memory disorders, *P. cineraria*, a desert plant used to cure various ailment of desert rural and tribal persons for eg. Memory disorders.
Sachdeva and co-workers in 2014 worked on phyto-chemical and pharmacological activities of *Prosopis cineraria*, (Family Fabaceae). The plant shows a large number of secondary metabolites like Fatty acids, tannins, alkaloids, flavonoids, and glycosides were the major phytochemical compounds and also possess pharmacological activities which include analgesic, antihyperlipidemic, antipyretic and antimicrobial activity.

Therefore, the present review reveals that *P. cineraria* plants possess huge potentials and many workers studied one or the other aspect of the State plant. But the systemic studies on *Prosopis* is lacking and hence the plant was selected for the studies so that maximum benefits can be come out with potentials as therapeutics and the plant if proved to be useful for drug preparation can also be important ingredient of plant based formulations, which leads to use of arid zone plants is sustainable way. This kind of research can lower the burden on Indian Medicinal Plants.

2.5 *Amorphallus konjac*

*Amorphallus* plant species possess a history for their use in various parts of Asia. They have been a good source of food and also used in traditional and local medicines of China. This plant possesses an ancient background in potential therapeutic uses. The unique feature of *A. konjac* is the stem has snake like strips on its trunk and proving the doctrine signature about its uses in cure of cancer.

*Amorphallus* belongs to family Araceae. This family has more than 100 genera and 3000+ species which are distributed in tropical and subtropical regions on world map, out of which only twenty five genera were reported in India having approx 200 species. According to Sakuragui studies most common genera of Araceae family are *Arisaema, Amorphallus, Typhonium, Alocasia, Cryptocoryne* etc. having 7 to 19 species and 5-10 varieties each. (Sakurague, 2000). (Figure 2.8).

This family belongs to monocots and diversify characters in different species. As per the climatic conditions maximum number of specie of Araceae were reported from Brazil (Mayo et al., 1997). Out of 3000 species, 800+ were reported to be used as vegetable, medicinal, edible and ornamental. This is the reason why this
family is so popular among humans. Araceae family have a history to cure malaria by local healers. This traditional family is also used to cure liver ailments, pain, fever and headaches etc. (Milliken, 1997a, b)

![Figure 2.8: Number of species and varieties present in family Araceae](chart.png)

The genus Amorphophallus is very popular in tropical and sub-tropical Asia for used as staple food source and also in local medicinal preparations. It is also part of Traditional Chinese System of Medicine. The plants are perennial in nature and have an underground stem which is known as corn. The leaves have an umbrella shape. Genus *Amorphophallus* have more than one fifty species distributed in Western part of Africa (Chua et al., 2010). The most common species are *corrugates, kachinensis, konjac, yuloensis, yunnanensis*. These all are commonly used for edible purposes, fodder and medicinal uses (Liu et al, 1998). In China, *A. konjac* is very popular due to its flour consumed for different edible purposes. Further, it is also an important ingredient of tribal medicinal preparations. The corn is made up of fibers therefore it is used for fibers product preparation by various Chinese Industries. These fibers rich flour is known as konjac Glucomannan (KGM).

In Araceae, *Amorphophallus konjac* possess a long history for use as food and medicine. It is also a part of Chinese Medicine Preparations. The flour of dried corn was used by native people to prepare noodles and other edible bakery items.
The flour has long been known for antitumor potentials and blood pressure control (Chua et al., 2010). Konjac flour is known as Konjac Glucomannan and has nutraceutical values (Figure 2.9 and 2.10).

2.5.1 Classification

**Botanical name**: A. konjac

**Synonyms**: A. rivieri, A. mairei

**Family**: Araceae (arum), Arecaceae (palm)

**Common name**: Snake Palm or Plant, Dragon Plant, Voodoo Lily, Devil's Tongue

**Habitat**: The herb grows in different parts of India in many forests and hill (From Rajasthan, it was reported from Mt. Abu by researcher)

![Figure 2.9 Amorphophallus konjac plant parts](image-url)
Review of Literature

2.5.2 Properties of Araceae

Araceae family possesses aquatic and terrestrial plants. Each type of plants has one or other characteristics peculiar to the genera (Shetty and Singh, 1993).

1. Aquatic plants
   i. Free floating aquatic herbs, leaves rosulate obovte cuneate, pubescent
      Pistia
   ii. Submerged attached herbs, leaves radical, glabrous grass like
      CRYPTOCORYNE

2. Plant terrestrial often marshy places
   i. Leaves peltate, entire
      a. Spadix with an apical barren appendage, adnate to the apathe at base
         Colocasia
      b. Spadix without apical appendage, entirely appendage, free from
         spathe Remusatia
   ii. Leaves not peltate, variously dissected
      a. Spadix with an apical barren appendage Plants dioccious, male
         flower shortly pedicelled Arisaema Plants monoecious male flowers
         sessil Sauromatum

Figure 2.10 Amorphophallus konjac A. Amorphophallus konjac (Vegetative stage), B. Reference plant C. Mature inflorescence.

Perennial herb with solitary, deeply variously lobed leaves. Scapes 30-60 cm tall. Spathes ovate lanceolate. Spadix columnar as long as spathe. Ripe berries deep organe.

This species is chiefly concentrated in Concan region. Sankhala (1951) reported it from North west Rajasthan.

*Amorphallus paeoniifolius* (Dennst.) Nilcolson (*Dracontium paeoniifolium* Dennst.) Suran (Hindi)- Dedidcous, cormous herbs. Corn upto 35 cm in diameter, subglobose with depressed top. Leaf segments bifurcate-pinnatifid with oblong lobes of varying sizes. Spathes campanulate, purplish within, spasix stout. Cultivated at some places. Corms are used as vegetables (Shetty and Singh, 1993).

Amorphallus species are herbs and have bulbaceous tuber commonly called corm. Leaf typically sectioned and pinnate or bipinnate. Stalk known as peduncles are long. Spathes large, oval or oblong with a broader shape. Limb Campanulate significant to its family having funnel like shape and open or convulate (Saxena and Brahman, 1996).

### 2.5.3 Distribution

The species are present in Western Africa, Thailand, Indonesia, Malaysia, Ceylon and Malaya. In India Amorphallus is also present. It is maximum in Sikkim, Kerela, Tamil Nadu, Bengal, Odisha, Bihar, Punjab and Maharashtra (Saxena and Brahman, 1996).

### 2.5.4 Uses of *Amorphallus* in traditional system of medicine

Amorphallus genus belongs to Aroid family and it is native of Asia. Amorphallus species were reported for treatment of various ailments. The petioles of *A. campanulatus* were used to cure scorpion string and pain during menstrual cycle (Sahu et al., 2009). The tubers are also have potentials to treat the enlarged spleen (Reddy et al., 2012) and it is also used in cure of rheumatism.
Tubers are also used to treat piles, diarrhea, fever (Chua et al., 2010) and stomachaches (Reddy et al., 2012). These tubers were also reported to cure pimples and throat infections, even some reports are also on treating disability (Hettersceid, 1994). Antimicrobial activity of *A. campanulatus* was studied by Pandey and Gupta in 2013 and appreciable results were observed against *K. pneumonia* (Pandey and Gupta, 2013). The tuber is locally known as suran and used by Indian people as vegetable A lot of healthy and traditional vegetables are prepared using suran. It is dark brown in colour. Tribes people of Rajasthan use this plant to cure snake bites (Jain et al., 2005; Kavitha et al., 2011).

Further, *A. konjac* is rarely reported in Rajasthan, rather in Mt. Abu area one of the Ayurvedic practitioner showed the presence of this plant in tribal pockets of Mt. Abu. It is a seasonal plant and grows only during the rain and completes its life cycle and disappears after rains. Only tubers were left underground. The peculiar observation about the *A. konjac* is the snake like stripes on the stem of konjac. It is so specific that stem looks like snake surface in close observations. This may be a doctrine signature that it can cure snake bite or even cancer. The survey and locations of such rare plant in India attract author to select this plant for further studies. The powder of dried tubers were used to cure skin disorders and blisters as per cited in Traditional Chinese System of Medicine (Niwa et al., 2010). It is commonly grown in Korea, Indonesia, China, Thailand and Japan where Japan and China are the biggest producer of the konjac flour (28% and 60% respectively) of the global market (Parry, 2010).

### 2.5.5 The molecular composition of *Amorphophallus* corn tissue

Studies showed that tuber/corn of *A. konjac* is a complete package of rich diet. It is rich in fiber and low in carbohydrates and presence of inorganic elements, proteins with blend of low sugars are showing its prominent role as flour. Western countries are cultivating it as it possesses nutritional values. Percent composition of corms of *A. konjac* is shown in Figure 2.11. (Li et al., 2005)

Further, other compounds in traces are carotene, cis- and trans -N-(P-Coumaroyl) Serotonin, riboflavin, thiamine and choline in freshly collected corn
(Niwa et al., 2000). All the compounds are very important for the human and its diet. These are the richest source of compounds and if used in diet will enhance the health benefit to mankind.

![Figure 2.11: Percent composition of Corns of A. konjac](image)

2.5.6 Current status

Torres and his team performed an interesting studies on Zucker fa/fa rats. They gave glucomannan isolated from A. konjac and spirulina rich meat diet will alter the liver fatty acid profile and alter the antioxidant profile of the experimental model (Torres et al., 2017).

A. konjac is very important crop cultivated in China and Japan. The sustainable conservation of this wild plant is very essential and hence Pan and co-workers performed the genetic sequencing of more than one hundred species using amplified fragment length polymorphism. The coefficient of genetic differentiation among population was recorded as 0.348 (Pan et al., 2015).

A. campanulatus tuber were screened for antioxidant potentials and methanol and water extracts showed appreciable efficacy (Sahu et al., 2009) whereas in A. bulbifer analgesic activity was tested by tail flick and tail immersion techniques. The
animal model was rat. The results were prominent and explained and justify its use in traditional medicine. (Reddy et al., 2012).

Anticancer screening of *A. campanulatus* tuber were performed and moderate efficacy was found in the ethanolic extracts showing potentials alkaloids responsible for the same. Further, some of the experiment on antioxidant efficacy were also reported positive (Madhurima et al., 2012; Madhuri et al., 2008).

Antimicrobial activity of some flavonoids were screened. These flavones were isolated from *A. campanulatus*. The selected microbes gram positive and gram negative bacteria. The Minimum inhibition concentration ranges between eight to sixty four (Khan et al., 2008). One of the reports also suggest the potentials in aqueous extracts also showed high efficacy against test microorganisms. (Dubey and Mishra, 2010)

Acetone extract of *A. paeonii folius* showed efficacy against diabetes where animal models were Wistar diabetic rats (Arva et al., 2012) *A. konjac* peroxynitrite scavenging efficacy was screened. The glucopyranoside, dihydroxy-benzaldehyde and serotonin was isolated from corn and experiments were performed and promising results were obtained for serotonin (Niwa et al., 2002).

*Indian Medicinal Plants and their usage is increasing day by day and loading a burden on biodiversity badly. It is high time to select few plants with potential screening and justifying their role as nutraceutical as well as therapeutics to give new horizons to our Earth. Therefore, from the above literature review it is evident that P. cineraria and A. konjac are grown in Rajasthan. Till now no systemic studies were done on both the plants. Bio-potentials of A. konjac were also not screened so far. No report on antimicrobial screening was done by any worker on A. konjac. Therefore, screening and systemic studies of both the plants were selected for present studies.*
2.6 RESEARCH OBJECTIVES OF THE THESIS

India is floristically very rich and recognized as flora rich country. At a modest estimate, there are at least 47,000 species of plants not including aquatic life forms, a significant proportion of which is employed for medicinal purposes in a wide variety of ways. Isolation of various bioactive from plants have been performed by man for a long time but now a days there are degenerative diseases due to mutations and radiations in the environment. It is thus an urgent cause to search for the new bioactive with therapeutic potentials. To aid such applied aspect of science will be the prime objective of investigations to search for the bioactive which can cure from human ailments.

Hence the main objectives of the present project are following:

1. To isolate various bioactive from arid zone plants (*Prosopis cineraria*, *Amorphophallus species*) by CC, TLC, and HPLC.
2. To identify pure compounds by IR, NMR and structure elucidation by MS.
3. To authenticate the bioactives by various bioactivities (Antimicrobial, Antioxidant and Antitumor assay)
4. To Isolate proteins with therapeutic potentials.
5. DNA Fingerprinting for Validation of plants.