



Trade Science Inc.

*Research & Reviews in***BioSciences***Regular Paper*

RRBS, 6(3), 2012 [109-119]

Phyto -toxicological study of certain plants in Jambudia Vidi, Saurashtra region (India)

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Received: 20th May, 2012 ; Accepted: 5th June, 2012**ABSTRACT**

With a wide variety of physical features and climatic conditions, India Possesses the richest and perhaps most diversified flora of all other Countries of a similar size on the surface of the earth. It is estimated that out of 250,000 – 300,000 total plant species of the world, India harbors about 45,000 plant species. The diverse Vegetation and multiethnic groups make India one of the richest countries in term of culture and bio resources having all kind of food, Fiber, timber, species, gums, oils, Perfumes and medicinal plants. The country is also rich in population of poisonous plants but the official records are very less. Plants that causes undesirable or harmful effects on humans and animals are called poisonous plants, some plants shows their toxicological effect after ingestion whereas others only require contact to elicit response in human and livestock Knowledge of on poisonous plant is important as some of them are used in medicine. The Poisonous properties are due to toxic substances such as alkaloids, glycosides, saponins, tannin, resins, amines and bitter principles, etc.

Jambudiavidi is Located between 22°, 29', 69'' N and 70°, 79', 84'' W longitudes, in WankanerTaluka of Rajkot district in saurashtra peninsula. The northern part of Rajkot district adjoining to surendranagar district. A variety of soil is met with in they are, red soil, Loamy Soil, Lateritic and Patches of black cotton Soil Which are compact and grayish green and black in color are common the Climate of the region is tropical and semi-arid characterized by hot summer dryness in the non-rainy season and short monsoon. A wide variation occurs in temperature from season to season which rises form 40°- 41°C and coldest day 10°C. Winds are generally lite too moderate. But summer and monsoon may become stronger. A lot of work has been done on the vegetation of saurashtra region but no work has been done specifically on Phyto toxicological study of Jamudiavidi at saurashtra region.

The present study is based on Self Observation in the actual fields and queries with Local Villagers and rural people residing in remote and far-Flung area of the district surveys were made in such a way that the utility of each and every poisonous plant growing n different seasons in different localities should be recorded.

An account of 25 poisonous plant species has been gathered from the rural people of jambudia and surrounding villages namely Lunsar, Jivapar, Chitrakhada and Rajagadh. In this present work a brief account of toxicological plant resources being utilized by the farmers in remote Communities and other rural people in multipurpose for their exploitation in preparation of herbal products.

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KEYWORDS

Poisonous plant;
Toxicological;
Jambudia.

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INTRODUCTION

The knowledge of poisonous plants perhaps as old as human civilization which has accumulated through age by trial and error. It is believed that primitive men, during the course of their search for food and other requirement in the forest, must have encountered plants containing poisonous substances by accident and by experiences. And soon they learnt to avoid their use.

Poisonous plants are plants, which as a whole or Part there of under all or certain condition and in manner and in amount likely to be taken or brought in to contact with an organism will exert harmful effects or cause death either immediately or by reason of cumulative action of the toxic property due to presence of known or unknown chemical substances in it and not by mechanical action.

This is because of some chemical like, alkaloids, glycosides, toxalbumins essential oils, resins, nepthaquions, Saponins, tannis and bitter principles etc. There is poisonous whereas in others, it is restricted to certain part only, such as seed, Fruits, Leaves resins, latex, hair, bark etc. It is not necessary that all the plants defined as poisonous or hazardous to all living creatures. It depends upon the susceptibility of living organism to the particular toxin or toxins in the plants.

Valuable information on a number of poisonous plants has been mentioned several historical and mythological literatures. Various methods of poisoning practiced by trained poisoners during prehistoric times are described in ancient Hindu scriptures, susruta (1000 BC) describes how poisons were mixed with food, drink, clothes, beds, Jewellery etc. of friends, relations foes due to jealousy, selfishness, revenge and politics. Abortifacients were undoubtedly discovered very early in the history of India, and the present day extensive use of the narcotics 'dhatura' sp. (*Datura*) and 'bhang' (*Cannabis sativa* linn.) In criminal practices dates back to the remote past^[3]. very little information on poisonous plant has been provided by earlier workers^[1,3,7]. The old works of Rev. Fr. J. F. caius on medicinal and poisonous plants of India published between 1935 and 1944 has been compiled and published in book form as *The poisonous plants of Bombay* by K.R. Kirtikar^[4], and *The medicinal and poisonous plants of India* by J.F. Caius^[2]. During the last half century, an extraordinary amount of research has gone into

the study of curare or arrow. Poisons, especially from the loganiaceous genus- strychnos and menispermaceous genera abuta, curaria and *Telictoxicum*. It is evident that other aspects regarding the utility of poisonous plants were relatively given less attention in previous time. The sporadic and insufficient publication^[5,6]. On this subject during recent years is evident that still no adequate attention is being paid towards the study of poisonous plants by present day workers. The Floristic and ethnobotanical studies of Gujarat state have been carried out by thaker (1910). Sexton and Sedgwick (1918), Nadkarni (1926). Santapau (1954), Patel (1971), Shah (1978), Jain (1991), Dastur (1996), Shashtri (1996), Punjani (1997), Bhatt, et al (2003) and Jangid (2005). Who studied the systematic part of the plant species. This present work has the basic details such as Botanical & Family names, Common names, short Description, Phenology (Flowering and Fruiting),

Toxic parts and poisonous properties. In present work author have tried to identify the part of plant which are poisonous and are of deep concern to the human being. Therefore, there is an urgent need to take advantage of the extensive knowledge of rural peoples on poisonous plants for scientific scrutiny and adoption for posterity.

AREA OF STUDY AND PHYSIOGRAPHY

Area of wankaner Taluka is good grassland and scrub forest. North-East of wankaner adjoin to them and Halvad is relatively compact patch of forest in table land sparse vegetation of *Acacia*. Jambudiavidi is spread over 1952.78 Hectors. Jambudiavidi is having a four Villages in its close proximity. They are lunasarjivapar, chitrakhada & Rajagadha, The area is dominated by kolimumanas, Darbar, Rabari, Bharvad and Maldhari Agriculture and grazing are the main land use by the Locale people villegers.

The Vegetation of the district is predominantly dry deciduous type scrub forest and savannah type vegetation were also the part of forest.

MATERIALS AND METHOD

The plant were collected from the various zone of vidi and Villages. The collected plants were brought to the laboratory and take photographs. Identified and classified to their respective

species level with the help of Flora – Cooke- 1903 – 1908, Bhandari – 1978, Shah – 1978, Sutaria – 1941. The plant specimens were dried up with customary method and were mounted on herbarium sheets and labelled, as reference specimens for future work. Repeated queries were made for the same plant and same uses form different people at different places, in order to verify the accuracy of information.

ENUMARATION

In the following enumeration, the species are arranged alphabetically. The botanical name of each species is provided with correct name followed by family name local name, Description, phenology (Flowering and Fruiting) and poisonous properties.

Abrus precatorious Linn.

Family: Fabaceae

Local name: Chanothi

Description: A twining shrub. Leaves pinnate with numerous leaflets, the rachis ending in a soft bristle; leaflets opposite, 10-20 pairs, ligulate-oblong, minutely apiculate. Flowers pink or white, crowded in dense racemes on axillary penduncles. Pods oblong, turgid, 3-5 seeded. Seeds subglobose, polished usually scarlet with black eye, sometimes white with black spot or uniformly white or black.

Fls. &Frts.: August-February.

Poisonous property: The seeds are poisonous. If the seeds are chewed and swallowed they cause poisoning in humans. Pordered seed, when inserted in the uterus, causes abortion in women.



Abrus precatorious Linn.

Annona squamosa Linn.

Family: Annonaceae

Local name: Sitafal

Description: A Small tree, branches hairy when young. Leaves albang, obtuse, acute or obscurely acuminate. Flowers axillary, greenish-white, solitary, pendulous, Fruits ovoid

Fls. &Frts.: May-August.

Poisonous property: Leaves and young fruits are made into paste and applied on the body of animals to kill insects. Seeds paste is applied in hair to remove lice.



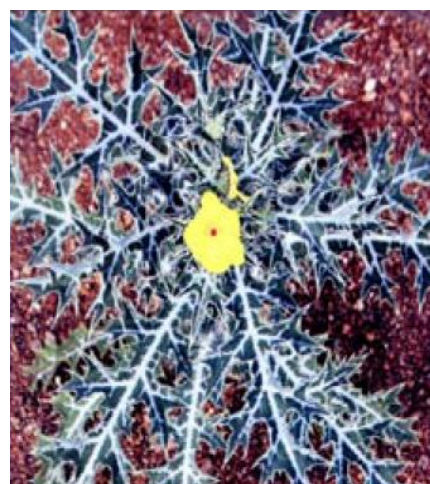
Annona squamosa Linn.

Argemone mexicana Linn.

Family: Papaveraceae

Local name: Darudi

Description: A prickly herbaceous annulal, with spreading branches. Leaves sessile, half amplexicaule, sinuate pinnatifid, greenish white, spines-



Argemone mexicana Linn.

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cent. Flowers yellow, prickly. Capsle elliptic or oblong prickly. Seeds rounded, blackish-brown with hexagonal ornamentation on surface.

Fls. & Frts.: February-May.

Poisonous Property: The Oil expressed form seeds, if used for cooking food, causes vomiting, diarrhea, and intense body pain in humans and animals. The root is crushed with water and taken to expel roundworm from the stomach.

Butea monosperma (Lam.) Taub.

Family: Fabaceae

Local name: Khakharo – Kesudo

Description: A small or medium-sized tree with black bark. Leaves pinnatelythree: foliate; leaflets rigidly coriaceous, glabrescent above, silky tomentose and strongly veined beneath; terminal one rhomboid, obovate, from a cuneate base, apex obtuse or emargined; lateral obliquely ovate. Flowers scarlet and orange, born in great profusion on the usually leafless branches. Pods hairy (downy), stalked. Seeds oval, compressed, brown.

Fls. & Frts: March-June.

Poisonous property: Seeds, are used to expel worms from stomach. (roundworm, hook worms.) The seeds, sometimes produce pain in abdomen, vomiting and giddiness when taken internally. A paste made with lemon juice used as a remedy against ringworm. Seeds power is used to kill larva of insects in ulcers.



Butea monosperma (Lam.) Taub.

Calotropis gigantea (Linn.) R.Br. ex Ait.

Family: Asclepiadaceae

Local name: Akando (Safed)

Description: A small shrub, young parts downy-tomentose, dark-ash colored. Leaves sessile or sub-sessile. Flowers purplish or white in umbel-late cymes. Fullicles curved, turgid, smooth. Seeds numerous broadly ovate, flat, minutely tomentose, brown.

Fls. &Frts.: February-August.

Poisonous property: Powdered bark is taken in-tenrnally with water to expel intestinal worms.



Calotropis gigantea (Linn.) R.Br. ex Ait.

Calotropisprocera (Willd.) ex W. Ait.

Family: Asclepiadaceae

Local name: KaloAnkdo

Description: Evergreen, erect undershrub, with woody base. Stem branched form the base, terete, white-tomentose. Leaves sub-sessile, elliptic-obovate to oblong with cordate and semi amplexi-caul base, abruptly acute or acuminate, globours



Calotropisprocera (Willd.) ex W. Ait.

above and white tomentose beneath. Flowers purple, in cymes between the leaf-petioles.

Fls. & Frts.: March-November.

Poisonous property: Juice of the plant is highly purgative. It is used to kill mad dogs. It is also used as abortifacient. It is also used for suicide. Leaves are also used as cattle poison.

Cassia italica (Mill) Lam. ex F.W. Andrew

Family: Caesalpiaceae.

Local name: Mindhiaval.

Description: A Shrub with very thick hairy branches. Leaves sessile, paripinnate. Rachis without glands; stipule deltoid, persistent; leaflets 16-28 pairs, oblong, minutely mucronate, oblique at the base. Flowers yellow, peduncled, arranged on long racemes. Pods ligulate, with four broad wings, membranous, straight, glabrous, dehiscent. Seeds trigonous, 50 or more, brown.

Fls. & Frts.: September-February.

Poisonous property: The leaves and twigs are used as cattle poison. The seeds are used as vermifuge. Plant reported to be poisonous to livestock.



Cassia italica (Mill) Lam. ex F.W. Andrew

Cassia fistula Linn.

Family: Caesalpiaceae.

Local name: Garmalo.

Description: A small tree, branches spreading, branchlets drooping. Leaves bipinnate; leaflets ovate, acute, entire, truncate or rounded at the base. Flowers bright yellow in long pendulous, axillary lax racemes. Pods pendulous, cylindrical, straight, smooth, brownish black, indehiscent. Seeds embedded in sweet yellow pulp.

Fls. & Frts.: April-October.

Poisonous property: The bark is made in paste with water and taken orally by women for premature abortion. Seeds and pulp of fruits are highly purgative, cause diarrhoea.



Cassia fistula Linn.

Cassia auriculata L.

Family: Caesalpiaceae

Local names: Aaval

Description: Evergreen tree. Leaves bipinnate; leaflets 4-15 pairs, elliptic, oblong, gland on rachis is absent. Flowers yellow arranged in long corymbose panicles, terminating the branches. Pods long, strap shaped – Planted, along roadsides in the area.

Fls. & Frts.: Throughout the year.

Poisonous property: The leaves and pods are used to kill termites.



Cassia auriculata L.

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Cocculushirsutus Linn

Family: Menispermaceae

Local name: Vevedi

Description: A villous, slender, deciduous straggling climber; leaves arepubescent, ovate, blong with cordate base, apex mucronate. Flowers yellowish; male in axillary panicles; females in clusters. Drupe small, black, laterally compressed. Seeds curved – Common, along the margins of forests and roadsides.

Fls. & Frts.: November-March.

Poisonous property: Roots are taken orally to romveintestinal worms.



Cocculushirsutus Linn

Cyperusrotundus Linn.

Family: Cyperaceae

Local name: Motha



Cyperusrotundus Linn.

Descripton: An erect, glabrous very variable herb with tuberuous roots. Leaves usually shorter than the stem. Inflorescence an umble of more or less condensed spike. Nut ovoid, ellipsoid in outline with three flat or vey slightly concave sides.

Fls. & Frts.: Throughout the year.

Poisonous property: Tuber is made into paste and used to remove lice from hair, Powder made by tubers and sprayed to repel insects and flies. Tuber is taken internally to expel instestinal worms.

Datura sstramonium Linn.

Family: Solanaceae

Local name: Dhatura

Description: a glabrous or farinos-puberulous, annual herb. Leaves ovate, deeply ttothed or sinuate. Flowers whtie, large, soliatary. Capsule erect, ovoid, deeply dour-volved, covered with rigid long and short prickles, surrounded below by the enlarged. Reflex base of calys. Seeds many, compressed, rugoes.

Fls. & Frts.: March-Novmber.

Poisonous property: Young fruits are crushed and thrown in ponds to stupefy aquatic small creatures. Leaves and seeds produce sedative and narcotic action, large doses cause death.



Datura sstramonium Linn.

Desmodumgangeticum (Linn.) DC.

Family: Fabaceae.

Local name: Salparni

Description: A slender, erect or sub erect undrshrub. Stem slightly andular, glabrascent; branches clothed with apressed white hair. Leaves

one foliate, ovate, oblong acute, rounded, subcordate or tuncate at the base. Flowers white tinged with lilac, many in axillary racemes. Pods flatate, deeply indented on lower surface, clothed with minute hooked hair.

Fls. & Frts.: July - October.

Poisonous property: root and seeds are taken separately after grinding in water to getrid of intestinal worms.



Desmodum gangeticum (Linn.) DC.

Gloriosa superba Linn.

Family: Liliaceae

Local name: Vachanag

Description: A tall, branched, glabrous herbaceous climber. Rootstock a chain of arched, fleshy, cylindrical tubers, budding from the convex upper side; roots fibrous. Stem annual. Leaves sessile or nearly so, scattered or opposite



Gloriosa superba Linn.

or sometimes ternately whorled, ovate, lanceolate, acuminate, tip spirally twisted to form a tendril, base cordate. Flowers solitary or sub - corymbose towards the end of branches, persistent, large red. Capsule linear oblong. Seeds few sub-globose.

Fls. & Frts.: October - January.

Poisonous property: Leavs are made into paste and applied to hair to kill lice.

Gossypium herbaceum Linn.

Family: Malvaceae

Local name: Kapas.

Description: A shrub. Leaves usually 3-9 palmately lobed. Flowers large, purple, Capsule loculicidally 3-5 valved. Seeds densely clothed with cottony hair.

Fls. & Frts.: February - April.

Poisonous property: The root is poisonous and used for abortion.



Gossypium herbaceum Linn.

Jatropha curcas Linn.

Family: Euphorbiaceae

Local name: Ratanjoyat.

Description: A deciduous, large shrub, with watery juice. Bark grey, smooth, peeling off in thin flakes. Leaves alternate, broadly ovate-cordate, palmately five-lobed. Flowers yellowish-green, in axillary and terminal paniced cymes. Capsules dark brown or black, three-lobed. Seeds large, dark brown, smooth, dull.

Madhuca indica J. Gmelin.

Family: Sapotaceae

Local name: Mahudo

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Description: A large, deciduous tree, young branches pubescent, or tomentose. Leaves clustered at the end of branches, oblong, elliptic, entire, shortly acuminate, base rounded or acute. Flower cream coloured, fleshy, in dense racemes near the end of leafless branches, fragrant. Berries ovoid, fleshy. Seeds one, dark-brown, shining.

Fls.: March - May

Frts.: June - August.

Poisonous property: The oil cake is used in Fresh water pond's fish stupefaction, and burnt to repel insects.



Jatropha curcas Linn.



Madhuca indica J. Gmelin.

Pongamia pinnata (Linn.)

Family: Fabaceae

Local name: Karanj

Description: A moderate-sized, globrous, almost evergreen tree. Leaves imparipinnate; leaflets op-

posite, 5-7, oblong or ovate, obtuse or shortly acuminate. Flowers white tinged with violet or pink in simple, peduncled, axillary, racemes nearly as long as the leaves. Pods with a short, with a short, decurved point, flattened, woody, glabrous brownish-green, indehiscent, one seeded rarely two seeded, Seeds reniform, whitish, marked with brownish lines.

Fls.: February-April.

Frts.: May-June.

Poisonous property: Poultice of leaves is used to remove larva (maggots) from ulcers in animals. Seeds and roots are said to be poisonous to fish.



Pongamia pinnata (Linn.)

Ricinus communis Linn.

Family: Euphorbiaceae.

Local name: Arendi

Description: Evergreen, Soft wooded shrub, Stem



Ricinus communis Linn.

fistular. Leaves palmately lobed, peltate; lobes serrate, acute or acuminate. Flowers yellowish or reddish in terminal, sub-panicled racemes. Capsule ovoid, 3-lobed, echinate. Seeds oblong or elliptic, gray or brown mottled, shining, arillate.

Fls. & Frts.: December-May.

Poisonous property: Seeds are highly purgative and cause diarrhoea.

Citrulluscalocynthis Linn

Family: Cucurbitaceae.

Local name: indramanu.

Description: An extensively trailing annual herb with bifid tendrils, angular branching stems and woolly tender shoots. Leaves deeply divided flower monoecious, yellow, fruit a globose, 5-7.5cm in diameter seeds pale brown.

Fls. & Frts.: January-May.

Poisonous property: It is violent purgative. The pulp of fruit is a powerful cathartic and bitter. The fruit pulp is useful in fever and kill worms. The seed extract is useful in expel worms.



Citrulluscalocynthis Linn

Sterculiaurens Roxb.

Family: Sterculiaceae.

Local name: A moderate-sized, soft wooded tree, outer bark peeling off like paper, whitish tinged with pink. Leaves crowded at the end of branches, palmately 5-lobed, glabrous when ripe, mesocarp bony, longitudinally and transversely divided, endocarp thin, corky. Seeds 2-3.

Fls. & Frts.: Throughout the year.

Poisonous property: the milky juice is highly poisonous in large doses to humans and animals.

If bark is taken internally in large quantity, it causes diarrhoea. Seeds are highly poisonous and have been commonly used for suicide since long time. It is also use for pre-mature abortion. The mature seeds are made into power and mixed bread, used to kill cangerous animals by tribals and villagers.



Sterculiaurens Roxb.

Thevetia peruviana (pers.) k.Schum

Family: Apocynaceae

Local name: kaner

Description: A large evergreen shrub or small tree, leaves spirally arranged crowded, linear, narrowed at both ends, bright green and shining above, margin slightly recurved. Flower yellow, large solitary or few cymes, brupes broadly obovate in horizontal cross-section broad exocarp fleshy, black when ripe, mesocarp bony, endocarp



Thevetia peruviana (pers.) k.Schum

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thin, corky seed 2-3.

Fls. & Frts.: Throughout the year.

Poisonous property: The milky juice is highly poisonous in large doses to humans and animals. If bark is taken internally in large quantity. It causes diarrhoea seeds are highly poisonous and have been commonly used for suicide. Since long time. Time. It is also used for pre-mature abortion. The mature seeds are made into powder and mixed in bread used to kill dangerous animals by tribals and villagers.

Plumbagozeylanica Linn.

Family: Plumbaginaceae.

Local name: Chitrak.

Description: A perennial, sub-scandent shrubs glabrous, flowers white in elongated spikes, capsule oblong, pointed contained in viscid glandular persistent calyx.

Fls. & Frts.: February - August.

Poisonous property: The root in very small doses acts as a powerful stimulant to the mucous membrane of the digestive tract. And in large doses it acts as a powerful irritant and narcotic poison.



Plumbagozeylanica Linn.

Vitexnegundo Linn.

Family: Verbenaceae.

Local name: Niragundi.

Description: A white tomentose shrub or small tree. Leaves 3-5 foliolate; acuminate, base, acute, dark green above, densely white tomentose beneath. Flowers bluish in opposite lateral cymose. Drupe flobose, black at maturity. Seed one.

Fls. & Frts.: November-March.

Poisonous property: Powdered leaves are used as insect repellent. Fresh aqueous solution of leaves is sprayed in crop fields to kill insects and pests. A bath of decoction of leaves and young twigs is given to animals to remove mites from the body and maggots from ulcers.



Vitexnegundo Linn.

Xanthium strumarium Linn.

Family: Asteraceae.

Local name: Lapetue, Gadariyu.

Description: A coarse, annual herb, stem spotted, harsh with bristly hairs. Leaves long petioled, scabrid, palmately angled-cordate, cuneate at the base, margin toothed, strongly three-nerved flowers whitish in heads terminal and axillary racemes. Fruits ovoid oblong, covered with hooked prickles, beaks erect.

Fls. & Frts.: June-December.



Xanthium strumarium Linn.

Poisonous property: Leaves produce skin disease in susceptible persons. Pre fruiting plant causes itching and sores through contact.

DISCUSSION AND RESULT

The poisonous Properties of plants are due to the presence of certain toxic constituents which include alkaloidssaponins, bitter principles toxic proteins, essential oils resins organic acids, tannins and other toxic compounds. According to the nature of these chemical compounds and how they occur in different plants, they produce varieties of toxic effects. Some of them cause deadly poisonous effect to humans, and livestock.

The deal with 25 poisonous plant species belonging to 17 different families. The toxic part of majority or rootbark. Besides these toxic parts of some plants were fruit, stem bark tubers, bulbs and some time whole plant also.

CONCLUSION

The enumerated plants are wild and they have proved handy and easily available remedy materials which give quick results also. The rural people of these Jambudia area and their surroundings, do not run to the doctors as and when they have any complaint. They treat themselves with fresh plant parts only. The investigation can generate useful information and create awareness about poisonous property of toxic plants to the local people. Phytotoxicity can cause deadly poisonous effect to humans, livestock, insects, pest and maggots while other produce colic, vomiting, dehydration, blistering, violent irritation, etc. The herbal products prepared carefully from various poisonous plants for the treatment of various elements and other

beneficial purposes may play an important role in the economy of tribal and rural societies as well as of the country.

The potentiality of phytotoxicological investigation is perhaps more scintillating in the quest for new poisonous plants that can be used in the preparation of many ecofriendly insecticide and other bio drugs.

ACKNOWLEDGEMENT

The author is grateful to D.F.O. Rajkot (Shri. L.J. Parmar), Staff and Local People of Jambudia. And also thankful to Management and principal of M.&N. Virani Science college – Rajkot who extended their help during the course of this study.

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