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Shibabrata Pattanayak
Asst. Director, ARD
(Microbiology), Institute of
Animal Health & Veterinary
Biologicals(R&T), 37, Belgachia
Road, Kolkata 700037, West
Bengal, India.

Tapan Kumar Mandal
Professor, Department of
Veterinary Pharmacology &
Toxicology, West Bengal
University of Animal & Fishery
Sciences, 37, Belgachia Road,
Kolkata- 700037, West Bengal,
India.

Susanta Kumar Bandyopadhyay
Director of Medical Education
and Research, Government of
West Bengal, Swasthya Bhawan,
Kolkata, West Bengal, India.

Correspondence:

Shibabrata Pattanayak
Asst. Director, ARD
(Microbiology), Institute of
Animal Health & Veterinary
Biologicals(R&T), 37, Belgachia
Road, Kolkata 700037, West
Bengal, India.

Use of plants as digestive stimulator and tonic in three southern districts of West Bengal, India

Shibabrata Pattanayak, Tapan Kumar Mandal, Susanta Kumar Bandyopadhyay

Abstract

A study was performed on the use of plants as digestive stimulator and digestive tonic in three southern districts of West Bengal, India with different agro-climatic conditions viz. Paschim Medinipur, Purba Medinipur and Murshidabad. A total of twenty two plants and combinational use of another two new plants are identified and practiced methods of their uses with dose are documented and with the help of available literatures, the previously reported uses of these medicinal plants are analyzed in that perspective.

Keywords: Medicinal plants, Digestive stimulator, Tonic, West Bengal, India.

1. Introduction

It is reported that around 5000 species have specific therapeutic value among 250000 higher plant species on earth [1]. Over 6000 plants in India are in used in traditional, folklore and herbal medicine. The Indian system of medicine has identified almost 1500 medicinal plants of which 500 are commonly used [2]. According to reports of the World Health Organization, 80% of the world's population relies mainly on traditional therapies which involve the use of plant extracts or their active substances [3]. Rural people, especially the ethnic communities of India, traditionally use the plant resources for their food, shelter and health care. Such knowledge, mostly oral, is passed on to generations and thus appears to be eroding owing to the gradual changes in the life style of these communities. Even after identification of many plants used in Indian system of medicine, a large number of plants or uses of plant are yet to be documented, particularly which are confined among the people of rural areas [4].

In the present study, attempts are being made to document the plants used as digestive stimulator and digestive tonic in southern part of West Bengal state of India.

2. Study area

The present study was performed in three districts of the southern part of West Bengal state of India having different agro-climatic conditions. First one was Paschim Medinipur district, where the soil is mostly sandy lateritic type. A good portion of that district is covered by forest. The inhabitants of that area are mainly of tribal origin (Santhal and Lodha). The representative blocks are Gopiballavpur I and Narayangarh. The second district was Purba Medinipur, where the soil is clay-rich, and commonly water lodge in some areas during monsoon. The representative blocks are Moyna and Mahisadal. The third district was Murshidabad, which is having mainly new alluvial loamy soil. The representative blocks are Raninagar I and Berhampur. The blocks of the concerned districts were selected arbitrarily basing on remoteness, representation of agro-climatic conditions of the districts in question and uses of different plants as medicine by the people. Name of the villages from where the samples were collected were also documented. The medicinal uses of the plants listed are not common in every place of the study area. The plant specimens were always collected from an area of its use, though same types of uses were found in some other places of the study areas also.

3. Materials and Methods

The investigation was performed by face to face dialogue with the medicine men and medicine women of the study area. Information was collected from both tribal people as well as from non-tribal people of different castes and religions. The knowledge and practice of those people were noted and no modification has been performed during presentation of the information. The plants used by the inhabitants are all locally grown.

Samples were collected and branded at local name. Subsequently these were identified by Taxonomist and the specimens were preserved in herbarium. Photographs of areal parts of plants are added for easy identification of the plants, though some other parts of the plants (like root or stem bark) of some plants are actually used for medicinal purposes.

4. Results and Discussion

The result of the study is described briefly indicating the species of the plants with family, vernacular names, collection number, place of collection along with a brief statement on their medicinal uses as digestive stimulator and tonic. Important previous observations are also provided along with proper references. This may help in searching correlation of possible expression of physiological effects of the concerned plant under discussion.

1. *Acacia nilotica* (Linn) Delile. (F. Fabaceae).

Col. No. 41(P).

Bengali: Babla/Babul, Hindi: Babhul, English: Babul tree.
Collected from: Uttampur, Moyna, Purba Medinipur.

Uses: Immature leaf bud (2-3 gms) are added with a little amount of common salt, pressed and fed at empty stomach at alternate days for 3 months for stimulation of digestive system and checking of anorexia.

Previous reports: Various parts of this plant is used as/in anti-cancer, anti tumours, antiscorbutic, astringent, anti-oxidant, natriuretic, antispasmodial, diuretic, Intestinal pains and diarrhea, nerve stimulant, cold, congestion, coughs, dysentery, fever, hemorrhages, leucorrhea, ophthalmia and sclerosis^[5]. The leaves and pods are an excellent fodder with antiinflammatory properties, rich in protein. The pods have molluscicidal and algicidal properties^[6]. The leaves are used as gargle for sore throat, tonic to liver, enriches blood^[7].

2. *Aegle marmelos* Corr. (F. Rutaceae).

Col No. 37 (PM).

Bengali: Bail, Hindi: Bel, English: Bengal quince.
Collected from: Nayabasan, Gopiballavpur, Paschim Medinipur.

Uses: The ripe fruit of bail tree (bail) is eaten during the spring and summer months as a protective and curative agent for digestive upset. A preparation (Morabba) of unripe bail fruit is preserved and eaten for the same purpose during the months when ripe fruit is not available.

Previous reports: Fruits are used as/in diarrhea, dysentery, gastric troubles, constipation, laxative, tonic, digestive, brain and heart tonic, ulcer, intestinal parasites, gonorrhea, epilepsy^[8]. Fine powder of unripe fruit can be an alternative medicine to cure intestinal parasites^[9]. Various parts of this plant possess Antidiabetic, antiulcer, antioxidant, antimalarial, anti-inflammatory, anticancer, radioprotective, anti-hyperlipidaemic, antifungal, antibacterial, antiviral properties^[10].

3. *Andrographes paniculata* Nees. (F. Acanthaceae).

Col No. 26 (M).

Bengali: Kalmegh, Hindi: Kirayat, English: Green chirayta.
Collected from: Ramchandrapur, Moyna, Purba Medinipur.

Uses: The leaves of this plant are used in/as a tonic for digestive system. Half teaspoonful of the succulent leaf-extract

is fed regularly at empty stomach at morning for two to three days every week for a few months for that purpose. Alternatively, small pellets are made with the paste prepared by pressing the leaves of this plant and preserved after drying under sunlight. This pellet is also fed instead of leaf-juice.

Previous reports: Traditionally the plant is used for treatment of influenza, dysentery, dyspepsia, malaria, cancer^[11]. In China, India, Thailand, and Malaysia, this plant has been widely used for treating sore throat, flu, and upper respiratory tract infections^[12].

Extracts and pure compounds of the plant have been reported for its efficacy as/in anti microbial, antiprotozoan, anti-inflammatory, antioxidant, antidiabetes, anti infective, angiogenic, hepato-renal protective, sex hormone modifier, liver enzyme modulation and immunostimulent effects^[11]. Andrographolide, a major bioactive chemical constituent of the plant, has shown anticancer potential in various investigations^[12].

4. *Azadirachta indica* A. Juss. (F. Meliaceae).

Col No. 36 (PM).

Bengali: Neem, Hindi: Neem, English: Margosa.
Collected from: Romipur, Raninagar 1, Murshidabad.

Uses: In southern part of rural Bengal, the soft, new born leaves of the plant are eaten after slight frying during the months of December to April. It is believed that it stimulates digestive system and cures stomach problems.

Previous reports: It is used traditionally for skin problems, blood purifying, immunostimulator^[13]; leaf has antiulcer effects^[14].

Various parts of this plant have antibacterial, antifungal, anti-inflammatory, anti-tumour and pesticide properties^[15]. The phytochemicals present in neem poses pharmacological effects like antipyretic, antiviral, analgesic, antibacterial, contraceptive, hepatoprotective etc.^[16].

5. *Blumea lacera* Dc. (F. Asteraceae).

Col. No. 63 (P).

Bengali: Kuksima/Kukursunga, Hindi: Janglimuli/Kakrona, English: Blume.
Collected from: Ramchandrapur, Moyna, Purba Medinipur.

Uses: The root of this plant is fed to the patients to cure digestive upset. The roots (2-3 grams) are collected, cleaned, made paste, added with a little amount of sugar and a glass of water and fed at morning.

Previous reports: It is described in Ayurveda as bitter, astringent, acrid, thermogenic, anti-inflammatory, styptic, ophthalmic, digestive, antihelminthic, liver tonic, expectorant, antipyretic, diuretic, and stimulant and antioxidant^[17]. The juice of the whole plant is used on wounds of animals^[4]. Root paste is taken with honey three times daily to check diarrhea^[18].

6. *Cajanus indicus* Spreng. (F. Fabaceae).

Col. No. 3 (M).

Bengali: Arahar, Hindi: Arhar dal, English: Pigeon pea.
Collected from: Bhabta, Berhampur, Murshidabad.

Uses: The leaf juice collected from succulent leaves of this plant is used to treat chronic anorexia and digestive upset. 2-3 leaf's extract is fed daily for at least one week.

Previous reports: Leaf and seed used for protection of liver [19]. Fruit used to treat diarrhea [20].

7. *Canna indica* L. (F. Cannaceae).

Col. No. 71 (P).

Bengali: Ramkala/Sarbajaya/Kalabati, Hindi: Sarvajayaa, English: Indian shot.

Collected from: Ramchandrapur, Moyna, Purba Medinipur.

Uses: The root of this plant is used to cure chronic digestive upset. The roots are collected, washed and then kept inside a little amount of pasty cow dung. Then the whole material is burned slowly in a charcoal - oven overnight. The roots are collected, washed thoroughly and filtered extract is taken as medicine after mixing a little amount of sugar and water with it at alternate days for two weeks.

Previous reports: The roots are used as diuretic, demulcent, diaphoretic and also in dropsy and fever. The infusion of the leaves is reported to possess diuretic property and is used in fever. The plant is reported to possess molluscidal and anti-fungal activities [21].

The pharmacological studies showed that this plant exerted antibacterial, antiviral anthelmintic, molluscicidal, anti-inflammatory, analgesic immunomodulatory, antioxidant, cytotoxic, hemostatic, hepatoprotective, and anti-diarrhoeal effects [22].

8. *Carica pappaya* L. (F. Caricaceae).

Col. No. 81 (P).

Bengali: Pepey, Hindi: Papita, English: Papaya.

Collected from: Madhyahinghli, Mahisadal, Purba Medinipur.

Uses: Latex of the green fruit is used as a medicine for the patients of chronic digestive upset. A green fruit is taken from the household garden, the stalk along with a portion of the fruit is cut off with a sharp knife and the oozing latex is added with a little amount of sugar and taken as a medicine after mixing with water daily at morning for 7-10 days.

Previous reports: It can be used for treatment of diseases like warts, corns, sinuses, eczema, cutaneous tubercles, glandular tumors, blood pressure, dyspepsia, hyperacidity, dysentery, constipation, amenorrhoea, general debility, expel worms and stimulate reproductive organs [23].

It has anti-inflammatory hypoglycaemic, anti-fertility, abortifacient, hepatoprotective, wound healing, antihypertensive and antitumor activities [24].

9. *Centella asiatica* (Linn) Urban. (F. Apiaceae).

Col. No. 16 (P).

Bengali: Thankuni, Hindi: Mandookaparni, English: Marsh pennywort.

Collected from: Ramchandrapur, Moyna, Purba Medinipur.

Uses: The leaves of this plant are used from a very ancient days by the villagers as a 'medicine' which can be eaten as such by chewing, preparing an extract from green leaves or after preparing a 'curry' of its leaves. It is used as stomachic and digestive tonic. The dose is 4-5 leaves or leaf extract daily at empty stomach for 7-10 days or a curry of about 10 gram of leaves daily for 10-15 days.

Previous reports: It is used traditionally in asthma, skin disorders, ulcers, body aches, elephantiasis, gastric catarrh, kidney troubles, leprosy, leucorrhoea, urethritis, for improving

memory, as a nervine tonic, dropsy, maternal health care and stomach disorders [25].

It is reported to possess pharmacological activities like antimicrobial, anticancer, wound healing, neuroprotective, immunomodulatory, anti-inflammatory, hepatoprotective, insecticidal and antioxidant activity [26].

10. *Cocculus villosus* DC. (F. Menispermaceae).

Synonym: *Cocculus hirsutus*.

Col. No. 34 (PM).

Bengali: Do-doi/Dahi-anthi, Hindi: Farid buti, English: Broom creeper.

Collected from: Nayabasan, Gopiballavpur, Paschim Medinipur.

Uses: Extract made from the succulent leaves is mixed with sugar and kept undisturbed for 3-5 minutes to allow it to take a green *dahi* (curd) like consistency before drinking at empty stomach in digestive upset and as a digestive tonic. The treatment is continued for 10-15 days for that purpose.

Previous reports: Traditionally the plant is used in all types of cuts, wounds, boils, gonorrhoea, spermatorrhoea, urinary troubles, diarrhea, hyperglycemia, eczema, dysentery, urinary problems, eye diseases, as diuretic and in gout. The leaves of the plant have been evaluated for anti hyperglycemic, antibacterial, diuretic and laxative effects [27].

The mucilage of this plant contains polysaccharides and a gelatinous type of material which is not absorbed in the gastrointestinal tract and passes through the system undigested. The leaves used topically as emollient and demulcent is non-toxic to human skin [28].

11. *Corchorus aestuans* L. (F. Malvaceae).

Col. No. 44 (M).

Bengali: Tetopat, Hindi: Banpat, English: Wild Jute.

Collected from: Romipur, Raninagar 1, Murshidabad.

Uses: The leaves of the matured plant is collected, washed and then preserved after drying in shade. During use, some dry leaves are kept in a pot with some warm water at night. In the next morning, the aqueous extract of the leaves is fed to the children with week digestive power.

Previous reports: It is used as/in stomachic, gonorrhoea, urethral discharge, pneumonia [29], anemia, pre-delivery problems of women [30].

The plant is said to possess anticancer, antipyretic, anticonvulsant, stomachic and digitalis glycosides like actions [29].

12. *Curcuma angustifolia* Roxb. (F. Zingiberaceae).

Col. No. 10 (PM).

Bengali: Palo, Hindi: Tikhur, English: East Indian Arrowroot.

Collected from: Belda, Narayangarh, Paschim Medinipur.

Uses: The roots are pressed, mixed with water and filtered to remove the rough portions. Then it was mixed with water and fed at empty stomach at morning. According to the belief, it can 'cool' stomach, improves appetite and regulates secretion of gastric juices.

Previous reports: It is used in gastrointestinal disorders, applied on skin to soothe the painful, inflamed mucous membrane, used as weaning food, to treat stomach ache and curing worm infestation [31]. Used in peptic ulcers, dysentery, tuberculosis and bronchitis [32].

13. *Curcuma longa* L. (F. Zingiberaceae).

Col. No. 85 (P).

Bengali: Halud, Hindi: Haldi, English: Turmeric.

Collected from: Asnan, Moyna, Purba Medinipur.

Uses: A small piece of succulent tuber collected from the living plant is eaten at empty stomach daily within three days of collection as a curing agent for chronic digestive upset.

Previous reports: Rhizome is useful in the treatment of diabetics, hemorrhoids, anemia, jaundice, cough, asthma, wound healing, colic, gout, renal calculi, poisoning, freckles, skin and neurological disorders [33].

A wide spectrum of biological activities, like antifungal, antibacterial, antidiabetic, anti-oxidant, anti-allergic, anti-cancer, anti-inflammatory and anti-protozoal activities are reported by various workers [34].

14. *Cyperus rotundus* L. (F. Cyperaceae).

Col. No. 8 (P).

Bengali: Muthaghas, Hindi: Koreti-jar, English: Nut Grass.

Collected from: Romipur, Raninagar 1, Murshidabad.

Uses: A drink prepared from the paste made from 5 - 6 grams of rhizomes of this plant and 2-3 grams of common salt is fed as a medicine in chronic digestive upset.

Previous reports: In some Asian countries rhizomes of this plant are used as folk medicine for the treatment of spasms, stomach disorders, bowel disorders and inflammatory diseases. In Chinese pharmacopoeia, it was described as an agent to regulate circulation, normalize menstruation, and relieve pain. In Sudan the tubers are used in stomach disorders and bowel irritation, dyspepsia, diarrhea, dysentery, ascites, vomiting, cholera, fevers and as anthelmintic. A poultice of the fresh tubers is used to cure wounds, ulcers and sores and also applied to the breast to promote the flow of milk [35].

15. *Glinus oppositifolius* L. (F. Molluginaceae).

Col. No. 1 (P).

Bengali: Gimesag/Duserasag, Hindi: Jima/Gandhibudi, English: Indian-chickweed.

Collected from: Projabbarh, Moyna, Purba Medinipur.

Uses: Regular eating of the curry made from leaves and succulent stems of this plant is considered as a stimulator of digestive system.

Previous reports: Traditionally this plant is used in the treatment of skin diseases, to increase appetite, to cures vata, kapha, piles, leucoderma, tonic to intestine, urinary infections, fever, cough, liver problem and also used as antioxidant due to its excellent properties and potent phyto-constituents [36]. It is having hemostatis property [37].

16. *Hibiscus rosasinensis* L. (F. Malvaceae).

Col. No. 48 (PM).

Bengali: Jaba, Hindi: Jasum, English: China rose.

Collected from: Kuthighat, Gopiballavpur, Paschim Medinipur.

Uses: The leaves of this plant are used to cure digestive upset. 3-4 leaves are pressed and the extract is fed daily at morning after mixing it with some sugar and water for consecutive 7-10 days.

Previous reports: The leaves are used as/in anodyne, emollient, aperients, alopecia, blackening hair, cooling, astringent, to remove burning of the body, urinary discharges, seminal weakness, piles, uterine and vaginal discharges, for fetal growth. The flowers fried in ghee check excessive menstruation, the fresh root in gonorrhoea, and the powdered root in menorrhagia, coughs. The flowers are considered emollient, and an infusion of the petals is given as a demulcent and refrigerant drink in fevers. Externally they are used in all kinds of inflammation [38].

17. *Litsea glutinosa* (Lour) C.B. Robins. (F. Lauraceae).

Col. No. 4 (PM).

Bengali: Piplas/Pipulti, Hindi: Maidalakdi, English: Indian laurel.

Collected from: Chaturibhara, Narayangarh, Paschim Medinipur.

Uses: The leaf of this plant is used as a protective as well as curative agent for chronic digestive upset and anorexia. 4-5 leaves are pressed; the thick agar-like extract is taken out and fed at morning after mixing it with some sugar and water for at least 10-15 days.

Previous reports: Leaves are mucilaginous and used as/in antispasmodic, emollient, poultice, diarrhea and dysentery, wounds, bruises [39], curing of prickly heat, summer itches and *acni* [4]. The leaf extract shows antibacterial and cardiovascular activities. The oil extracted from bark is used in rheumatism [39].

The bark is considered to be capable of relieving pain, arousing sexual power and also producing a soothing effect on the body; it is good for the stomach and considered to be mild astringent, used in diarrhea and dysentery. The methanolic extract of the bark showed antibacterial activity [40].

18. *Oxalis corniculata* L. (F. Oxalidaceae).

Col. No. 67 (PM).

Bengali: Amrul Shak, Hindi: Amrul, English: Creeping woodsorrel.

Collected from: Jhautala, Mahisadal, Purba Medinipur.

Uses: It is used to cure anorexia and digestive upset and for speedy recovery after suffering from any disease. For this purpose, curry is prepared with this plant and fed for 5-7 days.

Previous reports: It is used traditionally in/as appetizer, anemia, wounds, burns, sprains, cancer, piles, skin eruptions, influenza, fever, urinary tract infection, diarrhoea and snake bites [41]. It is a good source of vitamin C, niacin and beta carotene. It acts as antibacterial, antifungal, antimicrobial, anticancer, anti-diabetic, anti-inflammatory, astringent, depurative, diuretic agent [42].

19. *Paederia foetida* Linn. (F. Rubiaceae).

Col. No. 83 (M).

Bengali: Gandal/Gandha-bhadulia, Hindi: Gandhaprasarini, English: Stinkvine/Chinese flower plant.

Collected from: Romipur, Raninagar 1, Murshidabad.

Uses: The leaf-extract of this plant is directly fed to the patients in some areas, but generally consumed after preparing a curry to revive patients from digestive upset. After cure from any long illness, the leaf curry is regularly fed to the patients for 10-15 days to restore the digestive functions.

Previous reports: The aqueous paste of this plant is traditionally used for treatment of rheumatoid arthritis, hepatic disorders, piles, diabetes, asthma, coughs, body ache, itches, wounds, stomach-ache, diarrhea, dysentery, flatulency and toothache. It is having antibacterial, cytotoxic, anthelmintic, antihyperglycemic, hepato-protective, anti-fungal, anti-ulcer, antioxidative and anti-diarrhoeal effects ^[43].

20. *Phyllanthus amarus* Linn. (F. Phyllanthaceae).

Col. No. 16 (PM).

Bengali: Bari amla, Hindi: Bhui - aonla, English: Carry me seed.

Collected from: Rantua, Gopiballavpur, Paschim Medinipur.

Uses: A small piece (1-2 gram) of fresh root of this plant is fed to the patients having weak digestive power at alternate days of alternate months.

Previous reports: It is used in diarrhea, dysentery, dropsy, colic, jaundice, intermittent fever, pain, urogenital disorders, kidney and urinary bladder problems, diabetes, gonorrhoea, scabies and various skin problems, wounds. The root extract is used to cure stomach pain ^[44].

21. *Piper betle* L. (F. Piperaceae).

Col. No. 12 (M).

Bengali: Pan, Hindi: Pdn/Tambul, English: Betel.

Collected from: Asnan, Moyna, Purba Medinipur.

Uses: Extract of 'Pan', made with the leaves of this plant and some small pieces of 'Supari' (Areca nut, *Areca catechu* Linn., Family : Arecaceae), a little amount of 'Chuna' (Calcium hydroxide), and a few Panmouri (*Foeniculum vulgare* Mill.). According to the belief, chewing and drinking the extract of 'Pan' with these additives after taking meal act as a digestive stimulator.

Previous reports: The leaves of this plant are used to treat alcoholism, bronchitis, asthma, leprosy and dyspepsia ^[45]. It is having antifungal, hypotensive, respiratory depressant, antihelminthic, cardiotoxic, antiplatelet, antifertility, antitumour, antiulcer and antibacterial activities ^[46].

22. *Tamarindus indica* Linn. (F. Caesalpinaceae).

Col. No. 51 (P).

Bengali: Tentul, Hindi: Imlı, English: Tamarind.

Collected from: Ramchandrapur, Moyna, Purba Medinipur.

Uses: The sour tasted leaves, particularly the new leaves and buds are used by villagers as a tool for treatment of chronic anorexia. 5-6 grams of leaves along with leaf-buds are boiled and used as a drench two times daily for seven days. The sour fruit pulp is kept in a covered earthen pot for at least three years with occasional sunlight treatment so that a portion of it becomes semisolid or liquid. That liquid/semisolid pulp is used to cure chronic digestive upset. 4-5 ml of it is mixed with boiled rice and taken orally daily at noon for one month for that purpose.

Previous reports: It is used as/in laxative, abdominal pain, diarrhoea and dysentery, peptic ulcer, spasmolytic, cancer, antimicrobial, antiparasitic, antifungal, antiviral, antinematodal, anti-inflammatory, antioxidant, anti-diabetic, liver protective, cardiovascular protective, wound healing agent ^[47]. Used in Unani system as demulscent, cardiac tonic, stomachic, carminative, digestive, laxative, antiscorbutic,

antibilious and antiseptic ^[48]. The stored pulp is used for treatment of enteritis and dysentery ^[49].

23 A. *Syzygium cumini* (Linn) Skeels. (F. Myrtaceae).

Col. No. 89 (P).

Bengali: Kalojam, Hindi: Jamun, English: Jambul.

Collected from: Nayabasan, Gopiballavpur, Paschim Medinipur.

Previous reports: The bark of this plant is used as/in astringent, refrigerant, carminative, diuretic, digestive, anthelmintic, febrifuge, constipating, stomachic and antibacterial ^[50].

23 B. *Terminalia arjuna* (Roxb.) Wight & Arn. (F. Combretaceae).

Col. No. 88 (MP).

Bengali: Arjun, Hindi: Arjun, English: Arjun tree.

Collected from: Nayabasan, Gopiballavpur, Paschim Medinipur.

Previous reports: The bark of this tree has been used in cardiac disorders in Ayurveda ^[51]. The bark is used for treatment of angina and heart disease, relieving excessive menstrual bleeding, leucorrhoea, diarrhea, dysentery, tubercular cough, asthma, earache, cleansing sores, ulcers and syphilitic infection, skin disorder ^[52]. Stem bark is also used in/as Aphrodisiac, styptic, Spermatorrhoea, intrinsic hemorrhage, liver problems ^[53].

The preclinical studies in modern medicine suggest that there are strong antioxidant properties of *Terminalia arjuna* and reduction of ischemic perfusion injury. It also causes attenuation of oxidative stress and antifibrotic activity ^[51].

23 C. *Acacia nilotica* (Linn) Delile. (described in Sl. No. 1).

Combinational Use: Approximately 5 gms of bark is collected from each tree, the outer scaly rough portion is taken off and are pressed together to some extent and kept in hot water at night. Extract of it is taken out by manual pressing of the material at the next morning and given to the patients to drink as a tonic of digestive system. The treatment is continued for three consecutive days each week for one month.

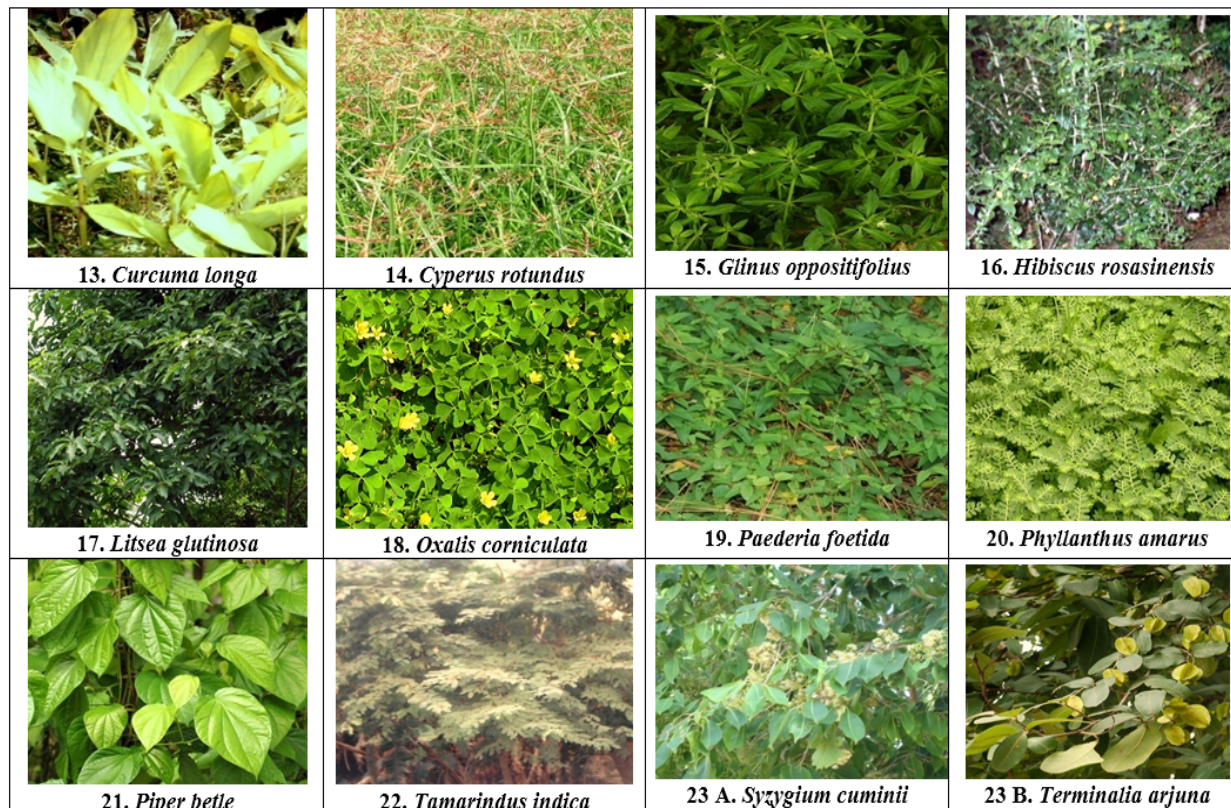
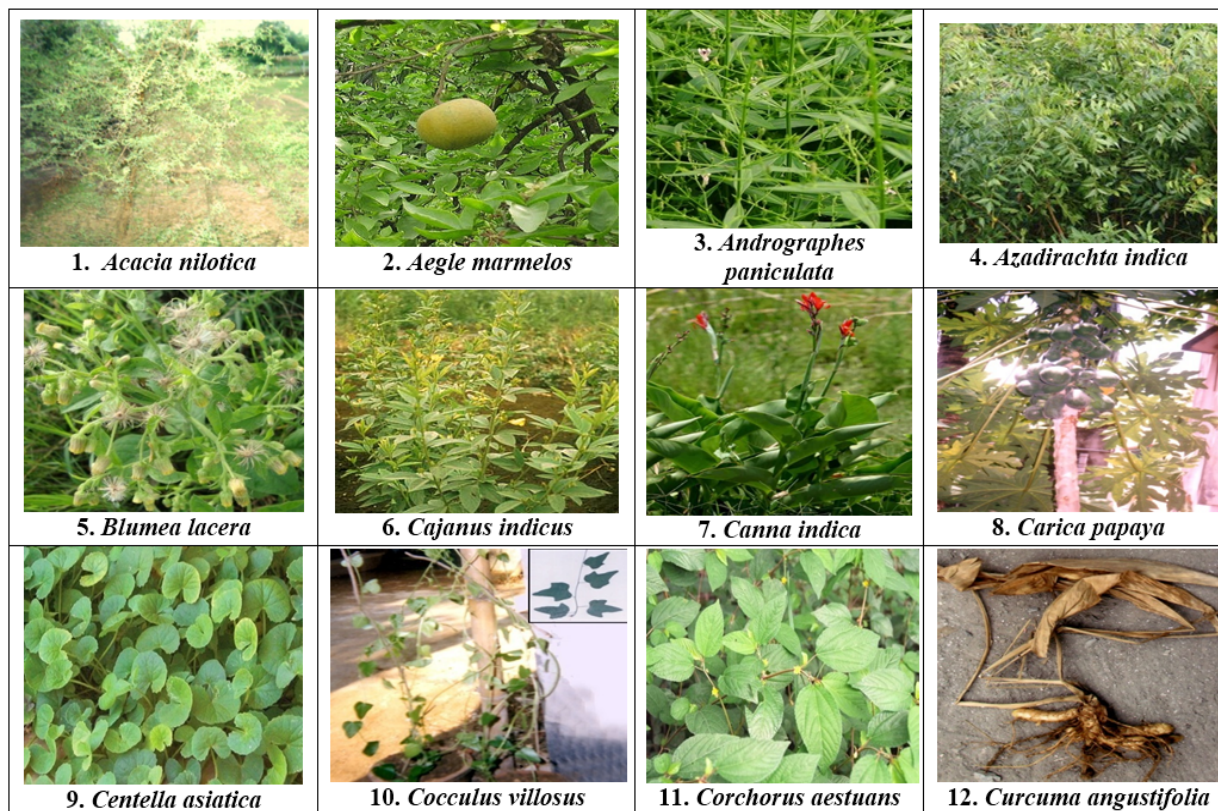
It appears from the study that along with the use of modern medicine, a segment of rural people residing in West Bengal are still in practice to use various parts of locally available plants to cure problems rated with digestive upset. Among the twenty four plants identified, only three plants are used in a combination in stimulation of whole digestive system as a tonic. Parts of other plants are used singly. Among the documented plants, succulent leaf or leaf extract of nine plants; watery extract of dry leaf of one plant; leaf and fruit pulp of one plant; root, tuber, rhizome or their extracts of six plants; leaf and stem together of one plant and fruit of two plants are used. The combinational uses of watery extract of bark of three plants are also reported. Except the stored fruit pulp of *Tamarindus indica*, root of *Curcuma angustifolia* and leaves of *Corchorus aestuans*, all the plant parts are used at succulent condition on the day or within a few days of collection.

In one previous report 13 plants were enlisted with stomachic effects ^[54]. Among them, no plant is common with the present observation. In some studies on the stimulatory effect of spices on digestive system, it was concluded that the digestive stimulant action of spices seems to be mediated through two possible modes: (i) by stimulating the liver to secrete bile rich in bile acids, components that are vital for fat digestion and

absorption, and (ii) by a stimulation of enzyme activities that are responsible for digestion [55].

Some typical and perhaps novel type of use of plant parts are documented during the study. Eating or drinking of immature leaf and leaf bud of *Acacia nilotica*; soft, new born leaves *Azadirachta indica*; burned root of *Canna indica* inside cow dung; oozing latex of the freshly collected fruit of *Carica*

papaya; green curd prepared from the leaves of *Cocculus villosus*; fresh succulent tuber of *Curcuma longa*; agar like leaf extract of green leaves of *Litsea glutinosa*; new leaves and buds as well as three years old fruit pulp of *Tamarindus indica* and feeding of the aqueous bark extract of *Syzygium cuminii*, *Terminalia arjuna* and *Acacia nilotica* are the examples.



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6. Reference

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