



## Research Article

## Ethnobotanical Survey of Medicinal Plants in Ruhuli Village, Tangail, Bangladesh

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## ABSTRACT

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A study was conducted to explore the diversity and uses of local medicinal plants in the village of Ruhuli, Gobindashi union, Bhuapur upazila, Tangail district of Bangladesh. Data were collected through semi-structured questionnaires, group discussions, and face-to-face interviews with pre-identified informants. This paper documented these medicinal plant species along with their local name, botanical name, family name, parts used, and traditional usage of application. A total of 104 medicinal plant species from 91 genera and 49 families were documented. The Cucurbitaceae, Leguminosae, and Zingiberaceae families each contributed the highest number of species (six), followed by Asteraceae, Lamiaceae, and Rutaceae with five species each. Acanthaceae, Combretaceae, and Malvaceae were represented by four species each, while twenty-seven families were represented by a single species. The most species-rich genera were Terminalia and Curcuma, each with three species, followed by Amaranthus, Citrus, Hibiscus, Justicia, and Senna, each with two species. The remaining 85 genera are represented by a single species. The most frequently used plant parts were leaves (30%) and fruits (16%), with decoction being the most common preparation method (50 species). These plants were primarily used to treat gastrointestinal disorders (58 plant species), followed by urogenital diseases (23 plant species). The other diseases addressed by these plants included cardiovascular; dermatological; ENT, eye and hair; helminthiasis; hematological; infectious; inflammatory; Glandular; Respiratory; Sexual and neurological conditions. The local people used these species in the treatment of 88 different diseases of human being. Frequency of citation (FC), relative frequency of citation (RFC), use value (UV), use report (UR) were used for identification of the popularity level, efficiency medicinal importance of the plants among the community.

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## Introduction

Bangladesh is remarkably rich in plant diversity, harboring 5,327 species, of which about 546 possess medicinal properties (Faruque et al., 2018; Yusuf et al., 1994; Ghani, 2003). Plants have played a vital role in healthcare for centuries, with nearly 80% of the global population relying on them for primary treatment (Srivastava, 2018). Numerous studies have highlighted the ethnomedicinal uses of plants among indigenous communities worldwide (Umair et al., 2017; Aati et al., 2019; Aziz et al., 2018; Teka et al., 2020). In rural areas, people often depend exclusively on herbal remedies, while modern pharmaceuticals also trace their origins to plant-derived compounds. Approximately 25% of prescribed drugs are obtained from plants, and nearly 80% of commercial medicines have plant-based origins (Castro-Muñoz et al., 2022; Bauer & Bronstrup, 2014).

In Asia, nearly 80% of the population uses traditional medicine (Oyebode et al., 2016), and in Bangladesh,

over 80% of people rely on herbal remedies for primary healthcare needs (Yusuf et al., 1994). The increasing use of medicinal plants worldwide is attributed to their accessibility, affordability, and cultural acceptance (Alonso Castro et al., 2017). However, traditional ethnobotanical knowledge is rapidly declining due to factors such as deforestation, limited availability of medicinal plants, urban migration, and reduced interest among younger generations. Loss of traditional knowledge would not only erode cultural heritage but also diminish opportunities for identifying novel therapeutic compounds. Given this background, documenting and conserving medicinal plant knowledge is crucial for sustainable use and future drug discovery. The main objective of the current study was to comprehensively document the ethnomedicinal information from the local communities of Ruhuli village of Tangail district, which has never been explored ethnobotanically, and aims to document the traditional knowledge of local communities regarding

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traditional treatments, including preparation methods and plant parts used, toward building up a comprehensive database of medicinal plants and their traditional uses. We aimed to perform quantitative analysis of the documented data using quantitative ethnobotanical indices such as frequency of citation (FC), relative frequency of citation (RFC), use value (UV), and use report (UR).

## Materials and Methods

### Study area

Ruhuli, a village of Gobindashi union of Bhuapur upazila in Tangail district of Bangladesh. The study area is situated on near to the Jamuna River; it is geographically located at 24.44963036°N and 89.82669711°E and elevation at 19 m above the mean sea level. The area is dominated by a tropical climate with significantly less rainfall in winter than in summer. The average temperature is 25.5°C. The average relative humidity and annual rainfall of the study area is 181.7 cm. January is the coldest month (average 19 °C) and the warmest month is June with average temperature 28 °C (Population Census 2011: Tangail Table C-06) (Figure 1).

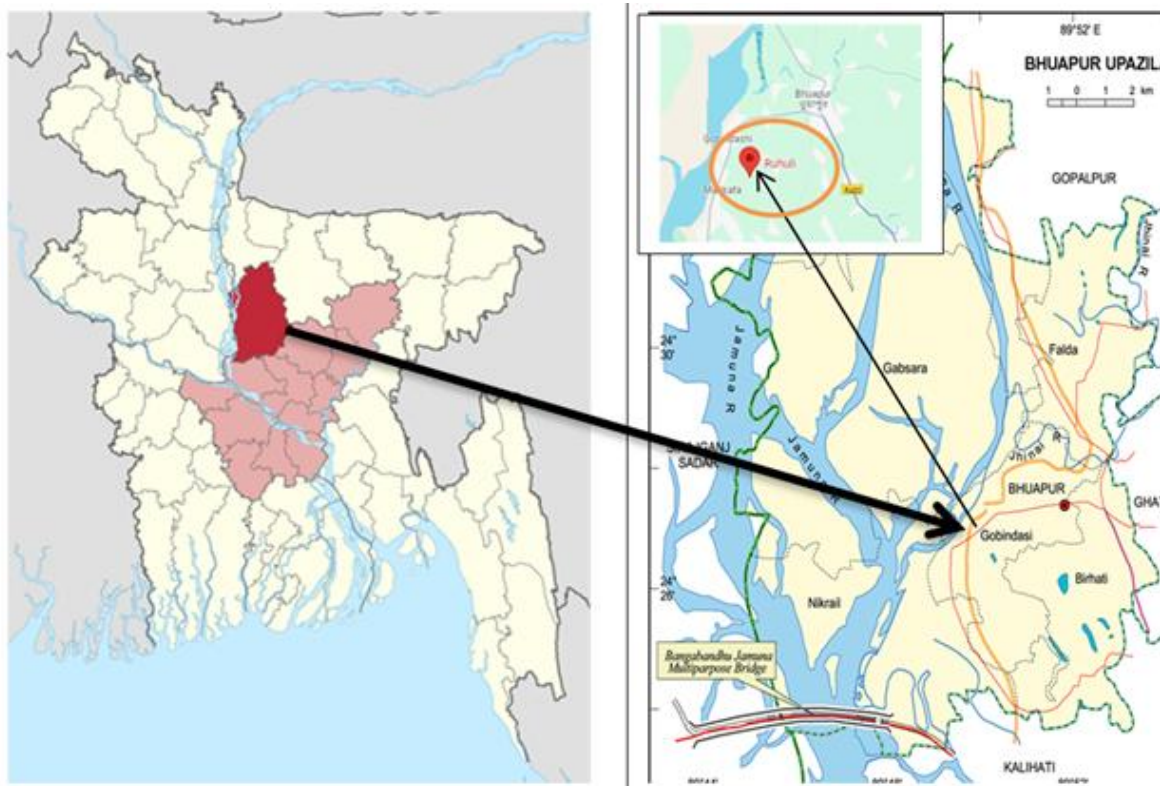


Figure 1: Map of Ruhuli village, Gobindashi union, Bhuapur upazila, Tangail district, Bangladesh.

### Socio-economic conditions of the area

The village Ruhuli is endowed with a wide variety of plants, many of which are therapeutic. The rural areas of the district are still dependent on medicinal plants for their health care because of lack of health centers in the area. Agriculture is the major earning means of the people in the region. Nearly 20% of the population of Ruhuli depends on agriculture. Rice, potatoes, mustard, jute, and other vegetables are important crops that are grown. Some of the local inhabitants collect medicinal plants from the area and sell them to the local traditional market in a very cheap price. The socio-economic standing of the local populace will be significantly changed if the sustainable use of wild flora

and the cultivation of medicinal plants are encouraged in the area.

### Field interviews

An exhaustive field survey was conducted in the village during August to October, 2024. Systematic and frequent visits were undertaken to assess the diverse plant species in the area. The data was collected through free listing interviews with randomly selected informants through informal meetings. The questionnaire was mainly focused on the traditional beliefs of local communities and nearby people. The interviews were conducted using the local languages that are Bangla as the first author is a local person of

the region. For the ethnomedicinal information, a total of 71 local inhabitants were interviewed, including 28 women and 43 men. The informants were divided into different age groups i.e. above 60, 50-59, 40-49, 30-39 and below 30 years old. We interviewed individually to generate the data on diseases treating medicinal plants used, mode of preparation of medicines and usage. The Participatory Rural Appraisal method was followed. During the interviews, information was noted using data documentation sheet of open-ended and semi-structured questionnaire for collecting information.

#### Collection, identification and deposition of medicinal plants

This study involved the collection of fresh plant samples and specimens, accompanied by the recording of essential details. Photographs of plants were taken in the habitat using digital cameras. To ensure the accuracy of species identification, a multi-faceted approach was adopted. Most of the identification of species was done by expert consultations and using different literature including Yusuf *et al.* (1994); Day *et al.*, (2016); and matched Herbarium of BAU. All the specimens are now preserved at the Prof. Dr. Arshad Ali Herbarium (AAHBAU), housed within the Botanical Garden at the Department of Crop Botany, Bangladesh Agricultural University.

#### Data Quantification analysis

The used plant species are listed as local name, botanical name, family, parts used, diseases treatment and mode of preparation of usages. The data collected was analyzed using quantitative value indices.

#### Frequency citation (FC)

The FC of the species of plants being utilized was evaluated using the formula:

FC= (Number of times a particular species was mentioned) \* 100 / (total number of times that all species were mentioned)

#### Relative Frequency of Citation (RFCs)

This index is used to determine the local importance of each species in the study area. the relative frequency citation (RFC) index was done by using the following formula: RFC= FC/N

This index is obtained by dividing the number of informants mentioning a useful species FC or frequency of citation by the total number of informants in the survey (N). RFC value varies from 0 (when nobody refers to a plant as a useful one), to 1(when all the informants mention it as useful)

#### Use value (UV)

The Use value (UV) demonstrates the relative importance of plants known locally. It was calculated using the following formula:

UV=  $\sum U/n$

where UV is the use value of a species, 'U' is the number of use reports cited by each informant for a given plant species and 'n' is the total number of informants interviewed for a given plant. The UV is applied in determining the plants with the highest use (most frequently indicated) in the treatment of a diseases.

#### Use report (UR)

Use report (UR) is the use recorded for every species.

**Table 1. List of medicinal plants used by the local people of village Ruhuli of Gobindashi union of Bhuapur upazila in Tangail district of Bangladesh.**

Local Name	Botanical Name	Family & Voucher No.	Part Used	Disease Treated	Preparation Mode	FC	RFC	U R	UV
Bon Dherosh	<i>Abelmoschus moschatus</i> Medik.	Malvaceae HTS-2024-033	Seeds	Diuretic, Carminative, Leucoderma	Decoction, Paste	0.84	0.012	3	0.17
Ulotkombol	<i>Abroma augustum</i> (L.) L.f.	Malvaceae HTS-2024-039	Root, Bark, Leaves	Dysmenorrhea, Uterine tonic	Decoction, Juice	0.94	0.013	2	0.10
Bael	<i>Aegle marmelos</i> (L.) Corr.	Rutaceae HTS-2024-094	Fruit	Astringent, Digestive tonic, Laxative, Stomachic	Juice,	0.94	0.013	5	0.26
Peyaj	<i>Allium cepa</i> L.	Amaryllidaceae HTS-2024-078	Blub	Tonic, Stimulant, Diuretic	Roasted	1.18	0.016	3	0.12
Roshun	<i>Allium sativum</i> L.	Amaryllidaceae HTS-2024-019	Bulbs	Stimulant, Carminative, Anthelmintic	Extract	1.18	0.016	3	0.12
Gritokumari	<i>Aloe vera</i> (L.) Burm.f.	Asphodelaceae HTS-2024-099	Leaves	Appetite, Jaundice, Asthma, Leucorrhoea	Juice	1.33	0.018	4	0.14
Jongli ada	<i>Alpinia nigra</i> (Gaertn.) Burtt	Zingiberaceae HTS-2024-045	Rhizome	Diuretic, Carminative, Stomachic	Decoction	0.79	0.011	3	0.18
Malancha	<i>Alternanthera philoxeroides</i> (Mart.) Griseb.	Amaranthaceae HTS-2024-015	Whole plant	Malaria, Diarrhea, Dysentery	Decoction	0.74	0.010	3	0.20
Katanotey	<i>Amaranthus spinosus</i> L.	Amaranthaceae HTS-2024-066	Whole plant	rheumatic pain, Burning sensation	Paste, Roasted	0.84	0.012	3	0.17

Shaknotey	<i>Amaranthus viridis</i> L.	Amaranthaceae HTS-2024-076	whole plant	Stomachic Burning sensation, Stomachic, Toothache	Paste, Roasted, Decoction	0.94	0.013	3	0.16
Kalomegh	<i>Andrographis paniculata</i> (Burm.f.) Wall. ex Nees.	Acanthaceae HTS-2024-057	Whole plant	Fever, Ulcer, Anthelmintic, Constipation	Juice	1.08	0.015	4	0.18
Kanthalichapa	<i>Artabotrys hexapetalus</i> (L.f.) Bhandari	Annonaceae HTS-2024-026	leaves, flower, fruit	Cholera, Cardiac depressant	Decoction	0.69	0.009	2	0.14
Shotomuli	<i>Asparagus racemosus</i> Willd.	Asparagaceae HTS-2024-002	Leaves, Root	Epilepsy and Stomach ulcers, Laxative	Decoction	0.74	0.010	3	0.20
Kamranga	<i>Averrhoa carambola</i> L.	Oxalidaceae HTS-2024-075	Leaves, Fruit	Cough, stimulant, Jaundice, Anthelmintic, Dysentery	Juice	0.89	0.012	5	0.27
Neem	<i>Azadirachta indica</i> A. Juss.	Meliaceae HTS-2024-070	Leaves, Bark	Jaundice, Anthelmintic, Astringent, Skin diseases	Decoction, Paste	1.28	0.018	4	0.15
Shialmutra	<i>Blumea lacera</i> (Burm.f.) DC.	Asteraceae HTS-2024-017	whole plant	Skin diseases, Anthelmintic, Antipyretic	Decoction, Juice	0.69	0.009	3	0.21
Shimul	<i>Bombax ceiba</i> L.	Bombacaceae HTS-2024-003	Bark, Root	Astringent, Dysentery, Tonic	Decoction	0.79	0.011	3	0.18
Akanda	<i>Calotropis gigantea</i> (L.) W.T.Aiton	Apocynaceae HTS-2024-028	Root bark, Leaves	Dysentery, Diaphoretic, Asthma, Rheumatism	Juice	1.04	0.014	4	0.19
Pepe	<i>Carica papaya</i> L.	Caricaceae HTS-2024-080	Milky Juice of Fruit, Fruit	Anthelmintic, Digestive, Diarrhea	Milk, Fruit	0.94	0.013	3	0.15
Badorlathi	<i>Cassia fistula</i> L.	Leguminosae HTS-2024-056	Leaves, Root, Bark, Fruit	Rheumatism, Skin disease	Paste	1.14	0.015	2	0.08
Nayantara (pink)	<i>Catharanthus roseus</i> (L.) G. Don	Apocynaceae HTS-2024-042	Leaves, Root	Diabetes, Tonic, Stomachic, Muscle pain	Juice	0.69	0.009	4	0.28
Thankuni	<i>Centella asiatica</i> (L.) Urb.	Apiaceae HTS-2024-064	Whole plant	Joint pain, Stress, Anxiety, Dysentery	Juice	1.73	0.024	4	0.11
Hasnahena	<i>Cestrum nocturnum</i> L.	Solanaceae HTS-2024-084	Leaves, Flower	Heart diseases, Laxative	Infusion	0.89	0.012	3	0.16
Tejpata	<i>Cinnamomum tamala</i> (Buch. - Ham.) T.Nees & C.H.Eberm.	Lauraceae HTS-2024-006	Leaves, Bark	Cough, Diarrhea, Carminative	Decoction	1.38	0.019	3	0.10
Harjora	<i>Cissus quadrangularis</i> L.	Vitaceae HTS-2024-053	Stem	Stomachic, Constipation, Irregular menstruation	Juice	1.18	0.016	3	0.12
Lebu	<i>Citrus limon</i> (L.) Burm.	Rutaceae HTS-2024-034	Fruit	Skin diseases, Stomachic, Anthelmintic	Juice	1.38	0.019	3	0.10
Batabilebu	<i>Citrus maxima</i> (Burm.) Merr.	Rutaceae HTS-2024-058	Fruit, Rind	Cough, Cardio tonic, Vomiting, Anthelmintic	Ripe fruit	1.10	0.015	4	0.18
Vhat	<i>Clerodendrum infortunatum</i> L.	Lamiaceae HTS-2024-055	Leaves, Root	Asthma, Skin diseases, Malaria	Infusion, Juice	0.79	0.011	3	0.18
Telakucha	<i>Coccinia cordifolia</i> (L.) Cogn.	Cucurbitaceae HTS-2024-035	Leaves	Diabetes, Hypertension, Constipation	Juice	1.23	0.017	3	0.12
Narikel	<i>Cocos nucifera</i> L.	Arecaceae HTS-2024-061	Coconut milk	Diuretic, Anthelmintic	Milk	0.84	0.012	2	0.11
Kachu	<i>Colocasia esculenta</i> (L.) Schott	Araceae HTS-2024-101	Corms	Reduce heart disease, Stimulant	Juice, Decoction	0.74	0.010	2	0.13
Pat	<i>Corchorus capsularis</i> L.	Tiliaceae HTS-2024-074	Leaves	Carminative, Stomachic, Anthelmintic, Diarrhea	Decoction, Infusion	0.69	0.009	4	0.28
Dhonia	<i>Coriandrum sativum</i> L.	Apiaceae HTS-2024-048	Dried Fruit	Stimulant, Carminative, Digestive, Anthelmintic	Chewed, Roasted	1.18	0.016	4	0.16
Mistikumra	<i>Cucurbita maxima</i> Duchesne	Cucurbitaceae HTS-2024-081	Fruits	Sedative, Diuretic	Decoction	0.89	0.012	2	0.11
Amada	<i>Curcuma amada</i> Roxb.	Zingiberaceae HTS-2024-046	Rhizome	Carminative, Laxative, Cough, Asthma	Decoction	0.74	0.010	4	0.26
Holud	<i>Curcuma longa</i> L.	Zingiberaceae HTS-2024-050	Rhizome	Rheumatoid arthritis, diabetes, Stomachic, Carminative	Paste, Oil	1.18	0.016	5	0.21
Shothi	<i>Curcuma zedoari</i> (Christm.) Roscoe	Zingiberaceae HTS-2024-060	Rhizome	Stimulant, Carminative, Diarrhea	Decoction	0.69	0.009	3	0.21
Shornolota	<i>Cuscuta campestris</i> Yunk.	Convolvulaceae HTS-2024-036	Whole plant	Constipation, Astringent, Fever, Cough	Decoction	0.89	0.012	4	0.22
Akonadi	<i>Cyclea peltata</i> (Burm.f.)	Menispermaceae HTS-2024-092	Tuberous root, Leaves	Cough, Fever, Urinary disorder, Jaundice	Juice	0.89	0.012	4	0.22



Durba	Hook.f. & Thomson <i>Cynodon dactylon</i> (L.) Pers.	Poaceae HTS-2024-051	Leaves, Stem	Coolant, Stop bleeding, Epilepsy	Paste, Juice	1.04	0.014	3	0.14
Mutha	<i>Cyperus rotundus</i> L.	Cyperaceae HTS-2024-059	Tuber	Astringent, diuretic, diarrhea, Carminative, Antitussive	Decoction, Infusion	0.74	0.010	5	0.33
Dhutora	<i>Datura metel</i> L.	Solanaceae HTS-2024-068	Whole plant	Anti-inflammatory, Anthelmintic	Decoction	0.84	0.012	2	0.11
Gab	<i>Diospyros peregri- na</i> (Gaertn.) Gurke	Ebenaceae HTS-2024-073	Stem bark, Fruit	Astringent, Dysentery, Wound healing	Infusion, Ripe fruit, Juice	0.79	0.011	3	0.18
Kalokeshi	<i>Eclipta alba</i> (L.) Hassk.	Asteraceae HTS-2024-047	Leaves	Asthma, Hair tonic, Anthelmintic	Juice	1.13	0.015	3	0.13
Helencha	<i>Enydra fluctuans</i> Lour.	Asteraceae HTS-2024-016	Whole plant	Laxative, Bronchitis, inflammation, skin disease	Cooked, Paste	0.79	0.011	4	0.25
Borodudhia	<i>Euphorbia hirta</i> L.	Euphorbiaceae HTS-2024-104	Whole plant	Asthma, Tonic	Decoction, Juice	0.89	0.012	2	0.11
Jog dumur	<i>Ficus racemosa</i> L.	Moraceae HTS-2024-031	Fruit	Carminative, Astringent Rheumatism	Fruit, Paste	0.94	0.013	3	0.15
Ghimashak	<i>Glinus oppositifolius</i> (L.) Aug.DC.	Molluginaceae HTS-2024-032	Whole Plant	Stomachic, Antiseptic	Juice	0.69	0.009	2	0.14
Motkila	<i>Glycosmis pentaphylla</i> (Retz.) DC.	Rutaceae HTS-2024-040	Leaves	Jaundice, Rheumatism, Ascaris	Juice	0.79	0.011	3	0.18
Gamar	<i>Gmelina arborea</i> Roxb. ex Sm.	Lamiaceae HTS-2024-021	Leaves, Flower	Cough, Demulcent in Gonorrhea, Astringent	Juice	0.69	0.009	3	0.21
Hatishur	<i>Heliotropium indicum</i> L.	Boraginaceae HTS-2024-049	Leaves, Root	Astringent, Diuretic, Cough, Fever	Decoction, Juice	0.84	0.012	4	0.23
Keomul	<i>Hellenia speciosa</i> (J. Koenig) S.R.Dutta	Costaceae HTS-2024-052	Rhizome	Fever, Asthma, Bronchitis	Decoction	0.94	0.013	3	0.15
Stholopoddo	<i>Hibiscus mutabilis</i> L.	Malvaceae HTS-2024-062	Flower, Leaves	Stimulant	Decoction	1.00	0.014	1	0.05
Joba	<i>Hibiscus rosa-sinensis</i> L.	Malvaceae HTS-2024-069	Flower	Cooling, Cough Astringent, Dysentery,	Paste, Juice	1.13	0.015	4	0.17
Kulekhara /Talmakhna	<i>Hygrophila auriculata</i> (Schumach.) Heine	Acanthaceae HTS-2024-093	Leaves, Root	Diuretic, Diarrhea	Decoction	0.98	0.014	2	0.10
Tokma	<i>Hyptis suaveolens</i> (L.) Kuntze	Lamiaceae HTS-2024-100	Seed, Leaves	Constipation, Anti- rheumatic	Juice	1.13	0.015	2	0.08
Kalmi shak	<i>Ipomoea aquatica</i> Forssk.	Convolvulaceae HTS-2024-065	Leaves	Constipation, piles, Jaundice, Leprosy	Juice	1.04	0.014	4	0.19
Bashok	<i>Justicia adhatoda</i> L.	Acanthaceae HTS-2024-037	Leaves, Bark	Rheumatism, Emetic	Decoction	1.28	0.018	2	0.07
Jogot Madon	<i>Justicia gendarussa</i> Macrae ex Nees	Acanthaceae HTS-2024-030	Whole plant,	Earache, Oedema, rheumatism, Headaches, pains	Decoction, Juice, The fresh leaves	0.84	0.012	5	0.29
Ekangi	<i>Kaempferia galanga</i> L.	Zingiberaceae HTS-2024-024	Tubers, Rhizome	Stimulant, Diuretic, Cough, Headache	Powder, Oil, Paste	0.74	0.010	4	0.26
Pathorkuchi	<i>Kalanchoe pinnata</i> (Lam.) Pers.	Crassulaceae HTS-2024-043	Leaves, Roots	Diuretic, dysentery	Juice	1.04	0.014	2	0.09
Lau	<i>Lagenaria siceraria</i> (Molina) Standl.	Cucurbitaceae HTS-2024-095	Fruit	Hypertension, Diabetes, Diuretic, Jaundice	Decoction, Oil, Juice	1.08	0.015	4	0.18
Jiga/Jiol	<i>Lannea coromandelica</i> (Houtt.) Merr.	Anacardiaceae HTS-2024-082	Bark	Astringent, Stomachic, Toothache	Decoction	0.79	0.011	3	0.18
Mehedi	<i>Lawsonia inermis</i> L.	Lythraceae HTS-2024-054	Leaves, Bark	Jaundice, Spleen, Skin disease, Leprosy	Paste, Oil, Decoction	1.33	0.018	4	0.15
Kharajora	<i>Litsea glutinosa</i> (Lour.) C.B.Rob.	Lauraceae HTS-2024-072	Leaves	Astringent, Rheumatism, Diarrhea	Decoction, Juice, Oil	1.04	0.014	3	0.14
Shushnishak	<i>Marsilea quadrifolia</i> L.	Marsileaceae HTS-2024-041	Bark, Seed whole plant	Diuretic, Antibacterial	Juice, Cooked	1.13	0.015	2	0.08
Asham Iota	<i>Mikania micrantha</i> Kunth	Asteraceae HTS-2024-089	Leaves	Dyspepsia, Dysentery, Gastric ulcers	Decoction	0.79	0.011	3	0.18
Lajjaboti	<i>Mimosa pudica</i> L.	Leguminosae HTS-2024-025	Leaves, Root,	Stop bleeding, Dysentery	Paste, Decoction	0.79	0.011	2	0.12
Shondhamaloti	<i>Mirabilis jalapa</i> L.	Nyctaginaceae HTS-2024-010	Root, Leaves	Purgative, Inflammation	Juice	0.89	0.012	2	0.11
Korola	<i>Momordica charantia</i> L.	Cucurbitaceae HTS-2024-001	Fruit, Leaves, Root	Stomachache, diabetes, Anthelmintic	Juice, Decoction	0.84	0.012	3	0.17
Kakrol	<i>Momordica dioica</i>	Cucurbitaceae	Fruit,	Asthma, Inflammation,	Cooked,	0.98	0.014	3	0.15

Darohoridra	Roxb. ex Willd. <i>Morinda</i>	HTS-2024-029	Leaves	Fever	Juice				
	<i>angustifolia</i> Roxb.	Rubiaceae	Leaves	Diarrhea, Jaundice, Skin diseases	Decoction	1.04	0.014	3	0.14
Sojina	<i>Moringa oleifera</i> Lam.	HTS-2024-096	Bark,	Stimulant, Carminative,	Cooked,	1.23	0.017	4	0.16
		HTS-2024-087	Leaves, Root	Rheumatism, Inflammation	Paste				
Kola	<i>Musa sapientum</i> L.	Musaceae	Fruit	Constipation, Diabetes	Raw	0.79	0.011	2	0.12
		HTS-2024-044							
Kadam	<i>Neolamarckia cadamba</i> (Roxb.) Bosser	Rubiaceae	Flower	Pain relief	Paste, Decoction	0.84	0.012	1	0.05
		HTS-2024-091							
Tulshi	<i>Ocimum tenuiflorum</i> L.	Lamiaceae	Leaves, Seed	Fever, Cough, Bronchitis	Juice	1.78	0.025	3	0.08
Gondhobadali	<i>Paederia foetida</i> L.	Rubiaceae	Leaves	Astringent, Tonic, Diuretic, Inflammation	Decoction, Juice, Roasted	0.89	0.012	4	0.22
		HTS-2024-098			Juice, Paste				
Luchipata/peperomia	<i>Peperomia pellucida</i> (L.) Kunth	Piperaceae	Leaves	Headache, Abdominal Pain	Juice, Paste	0.84	0.012	2	0.11
		HTS-2024-067							
Bishkatali	<i>Persicaria hydropiper</i> (L.) Delarbre	Polygonaceae	Whole plant	Stimulant, Diuretic, Arrest hemorrhage	Paste, Decoction	0.84	0.011	3	0.17
		HTS-2024-023							
Khejur	<i>Phoenix sylvestris</i> (L.) Roxb.	Arecaceae	Root, Fruit	Nervousness, Cough, Fever	Juice	0.94	0.013	2	0.10
		HTS-2024-090							
Amloki	<i>Phyllanthus emblica</i> L.	Euphorbiaceae	Fruit, Bark,	Diuretic, Cough, Astringent, Hair tonic, Stomachic	Raw, Decoction	0.64	0.009	5	0.38
		HTS-2024-004							
Pan	<i>Piper betle</i> L.	Piperaceae	Leaves	Stimulant, Carminative, Laxative	Chewed	0.94	0.013	3	0.15
		HTS-2024-077							
Pipul	<i>Piper longum</i> L.	Piperaceae	Fruit, Root	Carminative, Diuretic, Cough Stomachic,	Decoction	0.84	0.012	4	0.23
		HTS-2024-088							
Peyara	<i>Psidium guajava</i> L.	Myrtaceae	Leaves, Bark	Astringent, Diarrhea, Dysentery	Decoction	0.74	0.010	3	0.20
		HTS-2024-022							
Dalim	<i>Punica granatum</i> L.	Lythraceae	Dried fruit	Stomachache, Dysentery, Astringent	Decoction	0.79	0.011	3	0.18
		HTS-2024-083	rind, Stem						
Shorpogandha	<i>Rauvolfia serpentina</i> (L.) Benth. ex Kurz	Apocynaceae	Root	Hypertension, Insomnia, Insanity, Hypnotic, Diarrhea	Infusion	0.79	0.011	5	0.31
		HTS-2024-013							
Benna	<i>Ricinus communis</i> L.	Euphorbiaceae	Seed, Leaves	Moisturizer, Rheumatism, headache	Oil, Decoction	1.04	0.014	3	0.14
		HTS-2024-102							
Golap	<i>Rosa indica</i> L.	Rosaceae	Flower	Eye infections, Constipation, Beauty, High blood Pressure	Raw petals, Decoction	0.79	0.011	4	0.25
		HTS-2024-020							
Ashok	<i>Saraca indica</i> L.	Leguminosae	Dried bark	Astringent, Uterine tonic	Decoction	0.59	0.008	2	0.16
		HTS-2024-097							
Dadmardan	<i>Senna alata</i> (L.) Roxb.	Leguminosae	Leaves	Skin disease, Scabies	Paste	0.74	0.010	2	0.13
		HTS-2024-005							
Jhi jhi gach	<i>Senna sophora</i> (L.) Roxb.	Leguminosae	Root	Leg pain, Rheumatism	Paste	0.84	0.012	2	0.11
		HTS-2024-079							
Kumarilota	<i>Smilax zeylanica</i> L.	Smilacaceae	Root, Stem, Leaves	Skin disease, Gonorrhea, Blood purifier	Decoction, Juice	0.94	0.013	3	0.15
		HTS-2024-071							
Tit begun	<i>Solanum nigrum</i> L.	Solanaceae	Fruits	Tonic, Diuretic, Diaphoretic	Syrup	1.04	0.014	3	0.14
		HTS-2024-085							
Amra	<i>Spondias pinnata</i> (L.f.) Kurz	Anacardiaceae	Bark, Fruit	Astringent, Dysentery, Rheumatism	Infusion, Paste	0.69	0.009	3	0.21
		HTS-2024-007							
Gadha Phul	<i>Tagetes erecta</i> L.	Asteraceae	Leaves, Flower	Rheumatism, Cold, Bronchitis, Piles, Earache	Infusion, Juice	0.79	0.011	5	0.31
		HTS-2024-008							
Tetul	<i>Tamarindus indica</i> L.	Leguminosae	Fruit, Leaves	Decrease LDL Cholesterol, Cough	Juice	1.00	0.014	2	0.10
		HTS-2024-018							
Arjun	<i>Terminalia arjuna</i> (Roxb. ex DC.) Wight & Arn	Combretaceae	Bark, Leaves	Diuretic, Asthma, Astringent, Dysentery,	Juice	1.33	0.018	4	0.14
		HTS-2024-027							
Bohera	<i>Terminalia bellirica</i> (Gaertn.) Roxb.	Combretaceae	Fruit	Astringent, Laxative, Cough, Hepatitis, Diarrhea	Decoction	1.43	0.020	5	0.17
		HTS-2024-086							
Kathbadam	<i>Terminalia catappa</i> L.	Combretaceae	Fruit	Hepatitis, Reduce Cholesterol	Oil	0.79	0.011	2	0.12
		HTS-2024-009							
Horitoki	<i>Terminalia chebula</i> (Gaertn.) Retz.	Combretaceae	Fruit, Bark	Stomachic, Carminative, Asthma, Diuretic	Decoction	1.43	0.020	4	0.13
		HTS-2024-063							
Vhuikumra	<i>Trichosanthes cordata</i> Roxb.	Cucurbitaceae	Leaves, Stem	Skin diseases, Fever	Decoction	0.69	0.009	2	0.14
		HTS-2024-038							
Nishinda	<i>Vitex negundo</i> L.	Lamiaceae	Leaves, Flower	Antiseptic, Ulcers, Diarrhea, Astringent	Juice	1.33	0.018	4	0.14
		HTS-2024-014							

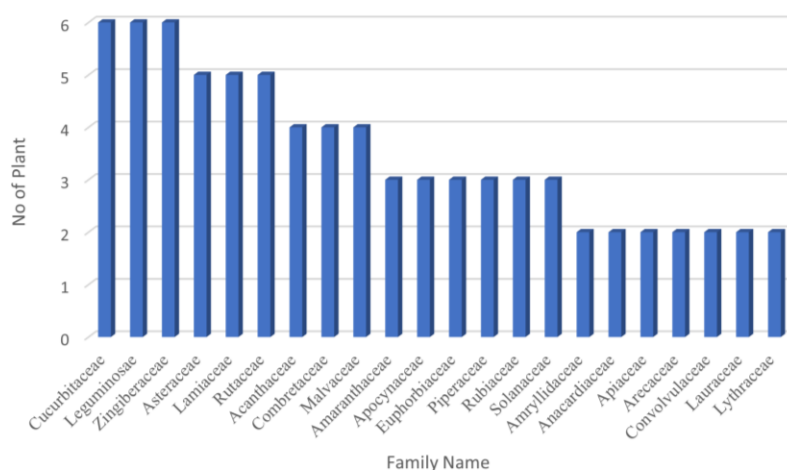
Bajna	<i>Zanthoxylum rhetsa</i> (Roxb.) DC.	Rutaceae HTS-2024-012	Fruit, Stem, Seed	Astringent, Stomachic, diarrhea	Decoction, Oil	0.79	0.011	3	0.18
Ada	<i>Zingiber officinale</i> Roscoe	Zingiberaceae HTS-2024-011	Rhizome	Carminative, Digestive, Laxative	Decoction	1.53	0.021	3	0.09

Here, RFC- Relative Frequency of Citation, FC- Frequency of Citation, UV- Use Value, and UR- Use Report.

## Results

In the present findings, a total of 104 plant species belonging to 49 families used by the local people of the study areas have been documented. The diversity of the medicinal plant species found in the study areas belonged to Cucurbitaceae, Leguminosae and Zingiberaceae with 6 species each; then Asteraceae, Lamiaceae and Rutaceae have 5 species each;

Acanthaceae, Combretaceae, and Malvaceae have 4 species each; Amaranthaceae, Apocynaceae, Euphorbiaceae, Piperaceae, Rubiaceae and Solanaceae have 3 species each; Amrillidaceae, Anacardiaceae, Apiaceae, Arecaceae, Convolvulaceae, Lauraceae, Lythraceae, have 2 species each; and remaining 28 families have single species in each enumerated in **Table 1, Figure 2.**



**Figure 2: Most used medicinal plant species of Village Ruhuli according to their family**

During the study 71 informants were interviewed. The distribution of informants by age, gender, and education level and occupation is shown in **Table 2.** Among them, 33% of informants were over 60 years

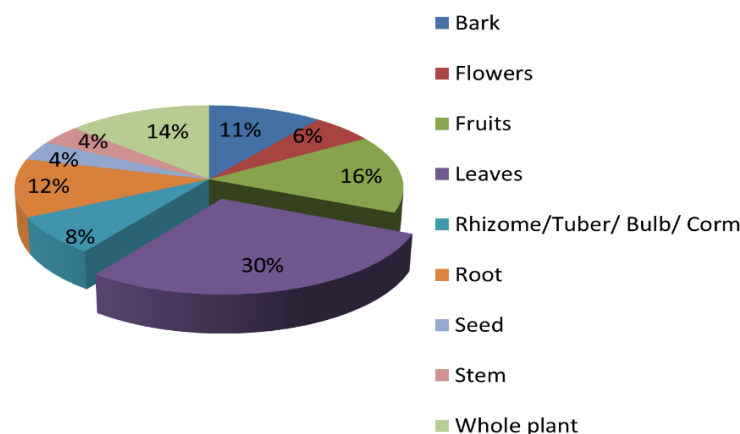
old, 39% informants were housewife, 32% of Informants were illiterate and 27% had only a primary education. There were more male informants (61%) than female informants (39%).

**Table 2: Demographic profile of informants**

Indicators	Description	Informants	Frequency %
Age	Above 60	23	33
	50-59	17	24
	40-49	13	18
	30-39	15	21
	Below 30	3	4
	Male	43	61
Gender	Female	28	39
	Illiterate	23	32
Education	Primary	19	27
	Secondary	15	21
	Higher secondary	12	17
Occupation	Graduate	2	3
	Housewife	28	39
	Farmer	14	20
	Driver	4	6
	Job holder	7	10
	Teacher	3	4
	Business man	15	21

The plant parts used for the preparation of medicine are presented in **Table 1, Figure 3**. Among the different parts of the plants leaves was used (30%) with maximum citations (48 citations), was found to be the most frequently used plant parts in the preparation of

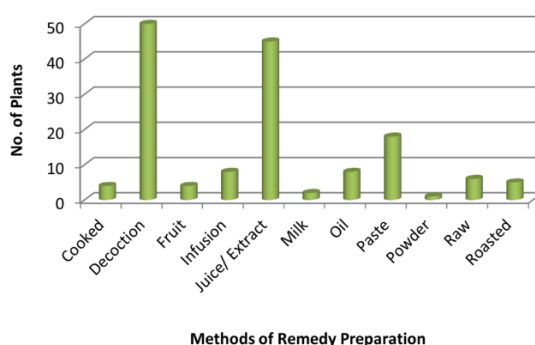
medicine followed by fruits (16%), root (12%), bark (11%), whole plant (9%), rhizome/tuber/bulb/corm (8%), flowers (6%), seed and stem (4%) used by the informants.



**Figure 3: Plant parts used in the preparation of medicine**

There are number of methods for remedy preparations, viz. Decoction, Fruit, Infusion, Juice, Milk, Oil, Paste, Powder, Raw, Roasted. Among herbal remedy preparation method, decoction followed by 50 species,

Juice/ Extract 45 species, Paste with 18 species (**Table 1, Figure 4**). Some of the reported medicinal plants followed more than one remedy preparation methods.



**Figure 4: Methods of remedy preparation**

Plants species are used by the local people for curing different diseases. The medicinal plants were used by the informants to treat 13 categories of human diseases. These include Cardiovascular; Dermatological; ENT, Eye and Hair; Gastrointestinal; Helminthiasis; Hematological; Infectious; Inflammation and pain; Glandular; Neurological; Respiratory; Sexual; Urogenital diseases. The most frequent disease categories treated with the reported medicinal plant species and showing the highest citations, were Gastrointestinal; Urogenital; Respiratory; Inflammation and pain; Dermatological diseases with the citations of 58, 23, 21, 16 and 15 respectively (**Table 3**). Most of the reported medicinal plants were used to treat more than one disease. The

highest use values were reported for *Phyllanthus emblica* (0.38), *Cyperus rotundus* (0.33), *Rauvolfia serpentina* (0.31), *Tagetes erecta* (0.31); and least use values were reported for *Hibiscus mutabilis* (0.05), *Justicia adhatoda* (0.07). Although it was impossible to match the quantitative data within the region particularly in the village Ruhuli and other parts of Tangail district, due to first quantitative ethno-medicinal report in the region. Highest use report was calculated for *Curcuma longa*, *Cyperus rotundus*, *Justicia gendarussa*, *Tagetes erecta*, *Terminalia bellirica*, *Aegle marmelos*, *Averrhoa carambola*, *Phyllanthus emblica* (5 UR for each) and least use report were calculated for *Hibiscus mutabilis* (1 UR) (**Table 1**). The



Highest RFC value were calculated for *Ocimum officinale* (0.021) and least RFC were calculated for *tenuiflorum* (0.025), *Centella asiatica* (0.024) *Zingiber Saraca indica* (0.008) (Table 1).

**Table 3: Diseases grouped by major diseases categories**

Category	Common diseases/Medical terms	No. of species used
Cardiovascular	Cardio tonic, Hypertension, Hypotension	5
Dermatological	Dandruff, Burns, Wounds, Skin diseases, Scabies, Dry Skin, Leprosy, Leucoderma	15
ENT, Eye and Hair	Earache, Eye infections Hair loss, Hair tonic	5
Gastrointestinal	Constipation, Stomach disorders, Stomach ulcer, Appetite, Diarrhea, Cholera, Acidity, Vomiting, Dysentery Gastric troubles, Indigestion, Tonic, Carminative, Astringent, purgative, Laxative, Dyspepsia	58
Helminthiasis	Anthelmintic, Ascaris	14
Hematological	Anemia, Hemorrhage, Blood purifier	4
Infectious	Malarial fever, Viral fever, Pyretic	9
Inflammation and pain	Inflammation, Headache, Rheumatic pain, Body pain, Muscle Pain, Toothache	16
Glandular	Jaundice, Hepatitis, Spleen diabetes	13
Neurological	Sedative, Insomnia, Insanity, Stress, Anxiety, Epilepsy, nervous weakness	5
Respiratory	Cough, respiratory disorders, Asthma, Antitussive Bronchitis	21
Sexual	Menstrual disorders, Gynecological disorders, Leucorrhoea, Dysmenorrhea	4
Urogenital	Urinary problems, Piles, Edema, Diuretic, diaphoretic	23

## Discussion

The present study provides an extensive ethno-botanical survey of medicinal plants used by the rural people of Ruhuli, a village in the Tangail district of Bangladesh. A total of 104 plant species belonging to 54 families were documented, indicating the richness and diversity of plant species utilized in the traditional healthcare system of the local community. The study highlights how closely people relies on plants for treating different diseases. The diversity of medicinal plant species documented in this study similar reports from other parts of the world, where plants from families such as *Cucurbitaceae* (7.51%), *Zingiberaceae* are most frequently used in traditional medicine (Feyisa et al., 2022; Saensouk, & Saensouk, 2021). The demographic profile of the informants reveals that traditional knowledge is passed down primarily by older generations. Older individuals, especially those with limited formal education, are often the key holders of traditional knowledge. The higher proportion of male informants could reflect they are more engaged in gathering and preparing medicinal plants, but women also show their active role in the household and healthcare decisions. In terms of plant parts, leaves were the most commonly used (30%), followed by fruits, roots, and bark. This is consistent with other studies, where leaves are often preferred due to their accessibility and medicinal potency. In the literature Saleh et al., (2020) it was also noted that from the

majority of the plants, leaves (55%) were the most used parts, followed by fruits (16%), stems (13%), rhizomes and roots (6%), and flowers (3%). A similar result was reported by Sultanul Amir et al. (2025) who noted that leaves are the most frequently used plant parts (38.41%). The leaves are main photosynthetic organs and the parts are easily accessible and available throughout the year (Kefifa et al., 2020).

Among various preparation methods, decoction was the most common followed by juice/extract, these methods are simple, effective, and accessible. Some plant species were used in more than one method, reflecting different forms of preparation may be used for different therapeutic effects. The results of wide spread use of decoction and infusion agree with the results of Kayani et al., 2014 who reported that decoction and infusion were the most commonly used preparation method, followed by Juice was recorded. The literature reveled that, Among the formulations, decoction (39.3%) and powder (17.1%) were recorded most frequent mode of preparation (Birjees et al., 2022).

The medicinal plants were used to treat a broad range of diseases, with the most frequent categories being gastrointestinal, urogenital, respiratory, inflammation and pain, and dermatological diseases. These results mirror the prevalent health concerns in rural areas of Bangladesh, where gastrointestinal and respiratory

disorders are common due to environmental factors and dietary habits. Birjees *et al.*, 2022 also reported that 40% plants species were utilized to treat Gastrointestinal disorders.

The highest use values reported for *Phyllanthus emblica*, *Cyperus rotundus*, *Rauvolfia serpentina*, and *Tagetes erecta* suggest these plants are highly valued by the local community for their effectiveness and frequency of use. On the other hand, plants with lower use values, such as *Hibiscus mutabilis* and *Justicia adhatoda*, though still important, may have more specialized applications or be used less frequently due to their less pronounced medicinal properties or limited availability. However, few quantitative works have been done in the other parts of the country (Rudra *et al.*, 2022; Faruque *et al.*, 2018; Hossain *et al.*, 2018; Islam *et al.*, 2014), but there is a clear difference regarding most cited species and their quantitative values. For example, in the study carried out by Faruque *et al.*, (2018), the five most commonly used ethnomedicinal plant species were *Duabanga grandiflora* (0.43), *Zingiber officinale* (0.41), *Congea tomentosa* (0.40), *Matricaria chamomilla* (0.33), and *Engelhardtia spicata* (0.28). The least used species were *Senna alata* and *Senna hirsuta* (0.03 each). The differences may be due to variation in knowledge of local people, vegetation and geo-climate of the area.

Highest RFC value were calculated for *Ocimum tenuiflorum*, *Centella asiatica*, *Zingiber officinale* and least RFC were calculated for *Saraca indica*, it means that these species are the most popular medicinal plants agreed by the majority of the informants and they are the most popular plants in village Ruhuli. The high values of RFCs mean higher use of particular plant species for different diseases and low RFCs values indicates the lower use of plant species for treating human disease which confirms for less preference to use in the study areas. In the literature Bibi *et al.*, (2015) it was also noted that the highest RFC value were calculated for *Achillea millefolium* (0.19) and least RFC were calculated for *Blepharis sindica* (0.02). Shinwari *et al.*, (2017) also reported that some medicinal plants are the most popular in Northern Pakistan have high degree of RFC values, that were *Berberis lycium* (0.39), *Mentha spicata* (0.38).

## Conclusion

This study documents the traditional use of medicinal plants in Ruhuli village, Tangail district, Bangladesh. The area is rich in medicinal plants and people still use the plants in their daily lives, but younger generations are losing knowledge about them. So, it is essential to document and preserve these plants for future

generations. This study also highlights the need to conserve local plant species. Based on the current findings, the following recommendations are proposed for the sustainable use and management of plant resources to conserve traditional ethno-medicinal knowledge: i) Efforts should be made to protect traditional knowledge of medicinal plants and encourage younger generations to use them in healthcare; and ii) Local communities should be trained on how to use these plants. The government, along with organizations like the Bangladesh Forest Research Institute (BFRI) and the Bangladesh Council for Scientific and Industrial Research (BCSIR), can help to implement programs. This study highlights the local and global importance of medicinal plants and their conservation.

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## Conflict of Interest:

The authors have no conflict of interest to declare.

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