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NUTRITIONAL ANALYSIS OF PLANTS USED FOR PREPARATION OF MEDICATED AND EDIBLE HERBAL RECIPE BY BODO TRIBE DURING RONGJALI BWISAGU FESTIVAL IN BODOLAND TERRITORIAL REGION OF ASSAM

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Keywords:

Herbal recipe, Bwisagu, Bodo, Medicinal plants, Nutritional values, Medicinal properties

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ABSTRACT: India is endowed with several tribal foods. Tribal foods have received global recognition for their potential to improve food security while enhancing biodiversity worldwide. The valuable properties of wild tribal foods require proper study and documentation in order to bridge the gap between scientific evidence generation and ancestral indigenous people's knowledge. Herbal recipes were prepared by the Bodo tribe from immemorial time during the Rongajali Bwisagu Festival from April to the end of April in the Bodoland Territorial Region of Assam. In this festival, people collect a total of 101 plant species. Usually, these 101 plant species are used to prepare an herbal food recipe. These plant species have been used for thousands of years for health benefits in this region. People believe these ingredients can strengthen plant species and destroy many viruses. This recipe preparation is a rich source of phytochemicals that help protect humans' wellness. This herbal recipe can help treat many diseases like- anti-hypertensive potential, anti-cancer, anti-diabetes, anti-bacterial, skin diseases, fever, ulcers, ringworms, allergic asthma, wound healing, anti-inflammatory, injury and itching. This study presents the nutritional analysis of these plants, which are used for the preparation of herbal recipe by Bodo tribe to determine the nutritional values.

INTRODUCTION: About 50,000 plants has been used for the treatment of various diseases out of 4,22,000 flowering plants documented across the globe [1]. Whereas, more than 43% of flowering plant has documented for their medicinal uses in India [2, 3]. As per ancient literature, Indian traditional practitioner / local Vaidya' shas been used plant to cure several ailments [4, 5]. Due to development of science and technology, peoples have moved towards modern medicine, which has lot of side effect [6].

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Recently, again peoples were come back to herbal medicine due to its low side effect, low cost, as well as more effective [7]. India is a country having different climatic regions with a number of tribes or communities [8]. More than 70% of Indian population lives in rural areas and many of them reside in the forest area still now [9]. They are completely depended on the forest and has been used different plant parts as food, medicines, and in many other purposes for their daily livelihood [8].

Indigenous curative practices have been culturally accepted during all phases of human culture and environmental evolution. Traditional medicine is widely used for the treatment of various diseases and about 85% of traditional medicines are plant derived [10]. Medicinal plants have an ancient history in several indigenous communities, and are an important part for treating numerous diseases,

mostly to curve daily ailments and this practice of traditional medicine is based on hundreds of years of belief and observations [8]. In different region of India, each tribe are used different types of plants as medicine and also, they collect and preserve locally available wild and cultivated plant species and practices as herbal medicine to treat a variety of diseases and disorders. With enormously diversified ethnic groups and rich biological resources, India represents one of the greatemporia of ethnobotanical wealth [11].

As per Census 2020, about 705 tribal communities are living in India. Indigenous people have their distinct food systems, with several tribal foods adding to dietary diversity. These tribal communities live in environments characterized by defined regions with specific food habits, dialects, cultural homogeneity as well as unified social organization. Many of these tribal communities often reside in areas surrounded by lush green and dense forests, hills and rivers, and are hence exposed to a rich biodiversity, which they manage and utilize for food livelihood and income generation. The tribal people collect local foods from several food sources in the form of edible greens, including leaves, stems, shoots, flowers, fruits, bulbs, rhizomes *etc* [12].

Whereas, Bodos is the single largest tribal community in northeast India and Bodoland Territorial Region (BTR) geographical boundary lies between 26^0 7’12” N to $26^0$47’50” N Latitude and $89^0$47’40” E to $92^0$18'30" E Longitude towards the North Western part of Assam (https://bodoland.gov.in/aboutbtr). The total area is 8,970 km^2, with a population density of 350 per km^2. Nearly 88.6% of forests cover BTR. Bodos are the most dominant tribal population in this region. Around 90% of the population are Bodo tribes in this region, and 5% are other scheduled tribes, Rabha and Garo tribes. The official language of this region is Bodo. BTR is a mostly moist tropical region with various seasonal harbours and medicinal plants. Ninety-nine per cent of this region's ethnic tribal community depends on agricultural seasonally or annually available goods from natural forests. The leading principal food of this region is rice. BTR has rich heritage and culture, and the Bodo community has a unique language, tradition, custom, and many types of tribal dance forms and festivals. Bodos divide the festivals into two categories: (a) religious festivals and (b) seasonal festivals. The religious festivals are- Kherai, Garza, Salami hwnai, Gwrlwiborainai, and Dwi Sarnai Janai. Whereas, the seasonal festivals are Bwisagu, Amtishua, and Domashi festival. The Bwisagu is the most prominent festival of the Bodo tribe, which grazes the hearts of all people of the community in this religion.

Domashi is celebrated in January, Bwisagu is celebrated in the month of April, and Amtishua is celebrated in the month of July. However, the major festival is the Rongjali Bwisagu festival. This festival is celebrated from mid-April to the last day of April. This springtime festival marks the beginning of the new year related to agriculture and religion. In this festival, people worship God named Bathowbwrai, Gila Dambra, Kuria Bwrai, Shib Bwrai, etc. Bwisagu festival is primarily based on agriculture and is celebrated with pomp and gaiety. It is the festival of joy with the cultural milieu of the people living in the region. The first day of the RongjaliBwisagu Festival is called MwswoTukwinaiBwisagu (cow bath bwisagu). From the next day, Bodo people collect a total of 101 plant species for making herbal food recipes from the forest or nearby areas in the morning.

They consume pork as their traditional meat and use pork blood. They enjoy the local rice wine along with herbal food recipes made from medicinal plant species. There were two types of rice wine: Jwogisi (wet rice wine) and Jwogwran (dry rice wine). Another wine, locally known as MaibraniJwopinai (adopted rice beer), was made with sweet rice. This MaibraniJwo (Rice beer) is the sweetest and finest wine of the region, only made by Bodo women almost six months before the festival. In a world where modern medicine often takes centre stage, it is easy to overlook the profound healing properties of nature's pharmacy, i.e. medicinal plants. Across cultures and centuries, humans have turned to the bountiful offerings of the plant kingdom to alleviate ailments and promote wellness. While these medicinal plants offer a treasure trove of health benefits, it is essential to approach their use with caution. Nature's remedies can be potent allies on the journey to wellness when used wisely and in harmony.

Keeping all the above point of view, present study was carried out to estimate the nutritional values of all the plants, which are used for the preparation of herbal food recipes during the festive season.

MATERIALS AND METHODS:

Collection of Plants, Identification, and Preparation of Samples: The study was conducted in the month of April, 2024 during the Rongjali Bwisagu festival. For this study, 101plant samples (i.e., different parts, including young leaf, stem, rhizome, flowers, and roots) were collected from BTR region, Assam, India, which are used for the preparation of herbal food recipes. All the plants were by identified Dr. Pravat Kumar Das, Research Associate in Taxonomy, SOA University, Bhubaneswar, Odisha, India.

These plant samples were washed properly under running tap water to remove soil and dust particles followed by chopped into small pieces, and dried under shade condition at room temperature. Then, all plant samples were powdered separately and used for nutritional analysis.

Medicinal uses Data Collection: Out of 101 plants, 53 plants have been used for medicinal purposes. Thus, the medicinal uses data of these plants were collected from the literature documented earlier.

Preparation of Herbal Recipe: About 101 plants were used for the preparation of herbal recipes by Bodo tribal during Rongjali Bwisagu festival were given details i.e., the quantities and plant parts used for the preparation of herbal recipes.

Nutritional Analysis:

Elemental Analysis: Elements content was estimated using the standard protocoled described by Naik *et al* [13]. In briefly, about 0.2 g of powder samples of all the plants were taken separately to PTFE vessels for digestion through an advanced microwave digestion system (Milestone Ethos Easy, Italy). Microwave digestion was carried out mixing with a mixture of concentrated acid i.e. 6 mL nitric acid and 2 mL hydrogen peroxide. Then, the digested sample was collected by rinsing with double distilled water to the digestion vessels followed by filtered using glass filter. Finally, the obtained sample solution was volume makeup to 100 mL and used for the estimation of different elements content including, calcium (Ca), iron (Fe), and zinc (Zn)by Inductive Coupled Plasma-Optical Emission Spectrophotometer (ICP-OES).

Estimation of vitamins: Vitamins, including A, B_1, B_3, B_6, B_9, and C of 101 plants (which are used for the preparation of herbal recipes) were estimated using the standard protocol reported by Okwu and Josiah [14], Adegbaju *et al* [15], and Naik *et al*.[13] with slightly modification.

Estimation of Fat: About 2 g of each plant powder samples was taken for the estimation of total fat content. The total fat content was estimated using the standard protocol described by Afuape *et al.* [16]. Samples were enfolded in filter paper and kept in a lipid-free thimble and added to the extraction tube.

A pre-weighed clean beaker (M1) having100 mL of petroleum ether was fitted to the apparatus, and then the water and heater were turned on to start the extraction process. After five rounds of siphoning, ether was allowed to evaporate and the beaker was disconnected before the last siphoning.

The extract was concentrated to dryness in a water bath, oven-dried at 50-60 ºC and then the beaker was reweighed (M2). Finally, the percentage of fat was determined using the equation i.e.,

$$\% \text{ of fat} = (M2 - M1/ \text{ weight of plant sample}) \times 100$$

Estimation of Protein and Energy: Total protein contents and energy of plant samples were estimated using the standard protocol described by by Sadasivam and Manickam [17] with slightly modification.

RESULTS AND DISCUSSION: BTR has a rich reservoir of wild herbs and medicinal plant species adapted to the local natural ecosystems and holds exceptional cultural significance among the Bodo tribe.

The Bodo communities have utilized this recipe for their food and livelihood for generations. A total of 101 plant species were used to prepare the herbal recipe by the Bodo tribe during the Rongjali Bwisagu Festival. The list of plant species and the parts used are shown in **Table 1**, and various leafy plant specimens are shown in **Fig. 1**.

FIG. 1: VARIOUS (25) LEAFY PLANT SPECIMENS USED IN THE HERBAL RECIPE

TABLE 1: LIST OF PLANT SPECIES USED FOR THE PREPARATION OF HERBAL RECIPE

Sl. no.	Botanical Name	Family	Local Name	Parts used	Other uses
1.	*Allium sativum*	Liliaceae	Sambram gupur	Bulb	Medicine
2.	*Alpinia nigra*	Zingiberaceae	Tarai	Stem	Medicine
3.	*Alternanthera philoxeroides*	Amaranthaceae	Sibung	Stem	Vegetable
4.	*Allium cepa*	Liliaceae	Sambram gwja	Bulb	Vegetable
5.	*Aloe vera*	Liliaceae	Aloe vera	Leaves	Medicine
6.	*Alternanthera sessilis*	Amaranthaceae	Ha-galdeb	Leaves	Vegetable
7.	*Amaranthus spinosus*	Amaranthaceae	Kudunageder	Leaves	Medicine

8.	*Amorphophallus sylvaticus*	Araceae	Olodor	Petiole	Vegetable
9.	*Andrographis paniculata*	Acanthaceae	Kalmigh	Leaves	Medicine
10.	*Antidesmaacidium*	Phyllanthaceae	Lapasaiko	Leaves	Vegetable
11.	*Artocarpus heterophyllus*	Moraceae	Khantal	Young fruit	Fruit edible
12.	*Argyreia nervosa*	Convolvulaceae	Thunthini	Leaves	Vegetable
13.	*Argyreia speciosa*	Convolvulaceae	Mandia mwigong	Leaves	Vegetable
14.	*Azadirachta indica*	Meliaceae	Neem	Leaves	Medicine
15.	*Bambusa balcooa*	Poaceae	Awa Mewai	Young shoot	Vegetable
16.	*Basella alba*	Basellaceae	Mwikrai	Stem	Vegetable
17.	*Benincasa hispida*	Cucurbitaceae	Kumbra	Fruit	Vegetable
18.	*Bidens Pilosa*	Asteraceae	Dao-meoai	Leaves	Medicine
19.	*Boerhaaviadiffusa*	Nyctaginaceae	Laije	Leaves	Vegetable
20.	*Brassica nigra*	Brassicaceae	Mula	Leaves	Vegetable
21.	*Calamus erectus*	Arecaceae	Raidwng	Stem	Vegetable
22.	*Casearia glomerata*	Balsaminaceae	Dauphenda	Leaves	Vegetable
23.	*Centella asiatica*	Apiaceae	Manimunigeder	Leaves	Medicine
24.	*Chrysanthemum coronarium*	Asteraceae	Na dewna	Leaves	Vegetable
25.	*Chenopodium album*	Chenopodiaceae	Butua	Leaves	Vegetable
26.	*Cinnamomum tamala*	Lauraceae	Tespar	Leaves	Spice
27.	*Clerodendrum viscosum*	Verbenaceae	Mwkhwna	Leaves	Medicine
28.	*Costus speciosus*	Costaceae	Buri-tokon	Young shoot	Vegetable
29.	*Colocasia esculenta*	Araceae	Taso	Stem	Vegetable
30.	*Corchorus capsularis*	Tiliaceae	Fatw	Leaves	Vegetable
31.	*Croton caudatus*	Euphorbiaceae	Jou bishi	Leaves	Medicine
32.	*Cucurbita maxima*	Cucurbitaceae	Jwgwnat	Stem	Vegetable
33.	*Curcuma longa*	Zingiberaceae	Haldwi	Rhizome	Spice
34.	*Dillenia indica*	Dilleniaceae	Taigir	Fruit	Vegetable
35.	*Diplazium asperum*	Woodsiaceae	Dhingkia	Frond	Medicine
36.	*Drymaria cordata*	Caryophyllaceae	Jabshri	Leaves	Vegetable
37.	*Drymariadiandra*	Caryophyllaceae	Khawasang	Leaves	Medicine
38.	*Duchesnea indica*	Rosaceae	Gorai lwdwi	Leaves	Fruit edible
39.	*Enhydra fluctuans*	Asteraceae	Alangshi	Stem	Vegetable
40.	*Eryngium foetidum*	Apiaceae	Gongardunjia	Leaves	Spice
41.	*Euphorbia hirta*	Euphorbiaceae	Nashraikhoro	Leaves	Medicine
42.	*Fagopyrum esculentum*	Polygonaceae	Dhemsi	Leaves	Vegetable
43.	*Ficus semicordata*	Moraceae	Thaikhro	Leaves	Vegetable
44.	*Ficus auriculata*	Moraceae	Dumbrukaosa	Leaves	Medicine
45.	*Garcinia acuminata*	Clusiaceae	Tekra	Fruit	Medicine
46.	*Hedyotis corymbose*	Rubiaceae	DeushriAthing	Tender shoot	Medicine
47.	*Hemidesmus indicus*	Rubiaceae	Parukia	leaves	Vegetable
48.	*Hibiscus sabdariffa*	Malvaceae	Mwita gwja	Leaves	Medicine
49.	*Houttuynia cordata*	Saururaceae	Maisundri	Stem	Medicine
50.	*Hydrocotylsibthorpioides*	Apiaceae	Mani munifisa	Leaves	Medicine
51.	*Justicia adhatoda*	Acanthaceae	Basigigupur	Flower	Vegetable
52.	*Kalanchoe pinnata*	Crassulaceae	Path gaja	Leaves	Medicine
53.	*Lagenaria siceraria*	Cucurbitaceae	Lao	Stem	Vegetable
54.	*Lasia spinosa*	Areceae	Sibru	Stem	Medicine
55.	*Lawsonia inermis*	Lythraceae	Jentoka	Leaves	Medicine
56.	*Leucas plukenetti*	Lamiaceae	Kangsia	Leaves	Medicine
57.	*Linderniaruellioides*	Scrophulariaceae	Daria	Leaves	Medicine
58.	*Lippia geminate*	Verbenaceae	Onthai- bajab	Leaves	Medicine
59.	*Litsea salicifolia*	Lauraceae	Dighloti	Leaves	Medicine
60.	*Luffa acutangular*	Cucurbitaceae	Jingka	Stem	Vegetable
61.	*Luffa cylindrica*	Cucurbitaceae	Fwrla	Fruit	Vegetable
62.	*Lygodiumflexuosum*	Lygodiaceae	KopouDhengkia	Frond	Medicinal
63.	*Mangifera indica*	Anacardiaceae	Taijwo	Young fruit	Fruit edible
64.	*Mentha spicata*	Lamiaceae	Podina	Leaves	Medicine
65.	*Melastomamalabathricum*	Melastomataceae	Thangkubergao	Leaves	Medicine
66.	*Melothria heterophylla*	Cucurbitaceae	Daokakamplai	Leaves	Medicine
67.	*Momordica charantia*	Cucurbitaceae	Udasi	Fruit	Vegetable

68.	*Monochoria hastata*	Pontedariaceae	Meteka	Inflorescence	Vegetable
69.	*Moringa oleifera*	Moringaceae	Swrjina	Leaves	Vegetable
70.	*Morus indica*	Moraceae	Gongartaisib	Leaves	Fruit edible
71.	*Murrayakoenigii*	Rutaceae	Nwrsing	Leaves	Medicine
72.	*Musa balbisiana cola*	Musaceae	Thalir daoka	Inflorescence	Medicine
73.	*Mussaendaroxburghii*	Rubiaceae	Sukloti	Leaves	Medicine
74.	*Nelumbo nucifera*	Nelumbonaceae	Podum pool	Root stalk	Vegetable
75.	*Nyctanthes arbor-tristis*	Nyctaginaceae	Sewali bibar	Leaves	Medicine
76.	*Nymphaea nouchali*	Nympheaceae	Toblobibar	Root stalk	Vegetable
77.	*Oldenlandia corymbose*	Rubiaceae	Tuntini	Leaves	Medicine
78.	*Oroxylum indicum*	Bignoniaceae	Kharo kandai	Frond	Medicine
79.	*Oxalis corniculate*	Oxalidaceae	Singri	Leaves	Medicine
80.	*Oxalis debilis*	Oxalidaceae	Singri lota	Leaves	Vegetable
81.	*Paederiafoetida*	Rubiaceae	Kipi bendwng	Leaves	Medicine
82.	*Phlogacanthustubiflorus*	Acanthaceae	Basikhor	Flower	Vegetable
83.	*Phyllanthus emblica*	Phyllanthaceae	Amlai	Fruit	Medicine
84.	*Plectranthusternifolius*	Lamiaceae	Jwglaori	Leaves	Vegetable
85.	*Portulaca oleracea*	Portulacaceae	Hangswgarma	Leaves	Vegetable
86.	*Pouzolzia zeylanica*	Urticaceae	Sam-louthi	Leaves	Medicine
87.	*Premna herbacea*	Verbenaceae	Kheradapin	Leaves	Medicine
88.	*Prunus jenkinsii*	Rosaceae	Pwnelbifang	Fruit	Fruit edible
89.	*Psidium guajava*	Myrtaceae	Sungpram	Leaves	Fruit edible
90.	*Pteris ensiformis*	Pteridaceae	Dingkhiamwigong	Young frond	Vegetable
91.	*Sarcochlamys pulcherrima*	Urticaceae	Adung-umra	Leaves	Medicine
92.	*Smilax perfoliate*	Smilacaceae	Assugurbendwng	Tender shoot	Vegetable
93.	*Solanum torvum*	Soalanaceae	Kuntainara	Fruit	Medicine
94.	*Solanum Nigram*	Soalanaceae	Mwisungkha	Leaves	Vegetable
95.	*Solena amplexicaulis*	Cucurbitaceae	Lwnthimwigong	Young leaves	Vegetable
96.	*Spilanthes paniculata*	Asteraceae	Ushumwi	Leaves	Medicine
97.	*Stellaria media*	Caryophyllaceae	Nabiki	Leaves	Medicine
98.	*Stephania japonica*	Menispermaceae	Dibaolu	Leaves	Medicine
99.	*Vitex negundo*	Verbenaceae	Nishinda	Leaves	Medicine
100.	*Vitis repanda*	Vitaceae	Dausrem	Leaves	Medicine
101.	*Zingiber officinale rose*	Zingiberaceae	Haijeng	Rhizome	Medicine

Herbal plant families encompass diverse botanical treasures, each with unique characteristics and contributions to culinary, medicinal, and aromatic realms. From the aromatic leaves of the Lamiaceae family, including mint and basil, to the pungent aromas of the Alliaceae family, represented by garlic and onion, herbal plants offer a rich tapestry of flavours and fragrances. Whether it is the immune-boosting properties of Asteraceae herbs and the digestive benefits of Apiaceae members, or the anti-inflammatory powers of Zingiberaceae, each family tells a story of nature's abundance and human ingenuity. Through these herbal foods, people connect with the earth's bounty, nourishing body and soul with the gifts of the plant kingdom. In this herbal food recipe, the family Cucurbitaceae represents the highest number of plants with eight species; Rubiaceae with five species; Moraceae, Asteraceae, and Verbenaceae with four species; Liliaceae, Zingiberaceae, Amaranthaceae, Acanthaceae, Apiaceae, Carryophyllaceae, Lamiaceae, with three species. Araceae, Convolvulaceae, Phyllanthaceae, Nyctaginaceae, Euphorbiaceae, Lauraceae, Rosaceae, Oxalidaceae, Verticaceae, and Soalanaceae 2 species of each. The remaining 35 families represent only one species each **Fig. 2**.

Bodoland Territorial Region (BTR) is an essential area of the Indian mega diversity Centre. The indigenous tribes of this area believed that these ingredients could give them strength and destroy viruses. This recipe preparation is rich in phytochemicals and helps to protect from different diseases. Since immemorial, the tribals were very knowledgeable about using these medicinal plants for the recipe. The details of plant parts used in this recipe are shown in **Fig. 3.** Most plant parts include leaves, fruits, and stems. These 101 plant species are significant for preventing various human health diseases and have been used for making herbal recipes since immemorial.

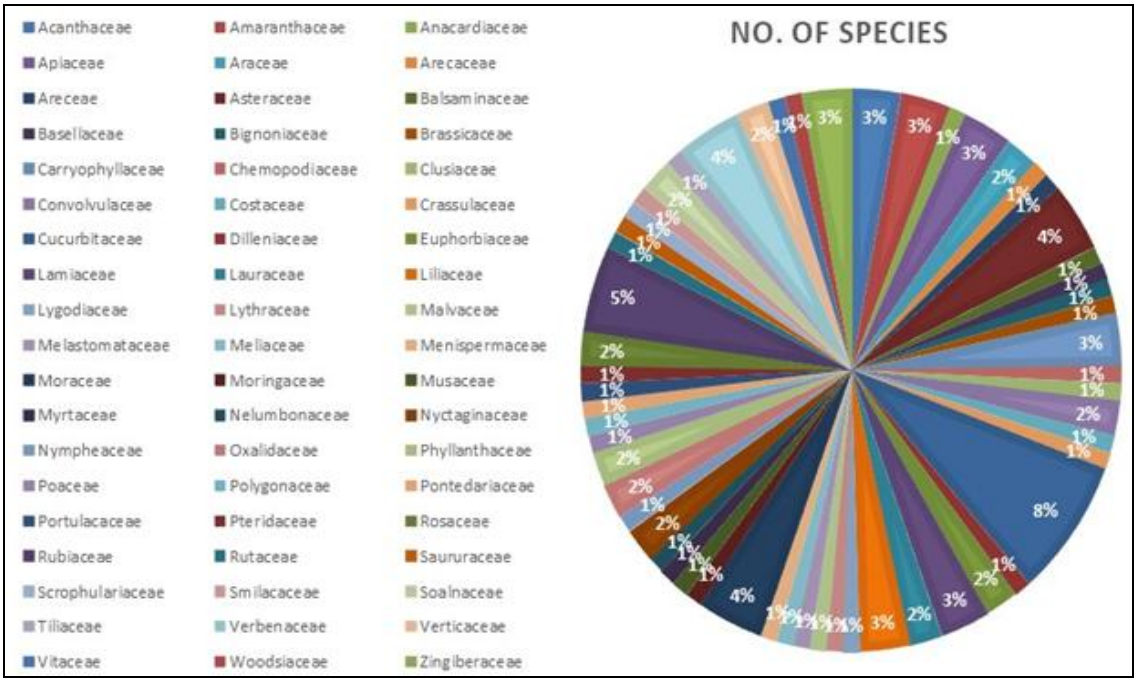

FIG. 2: FAMILY WISE AND TOTAL NUMBER OF SPECIES

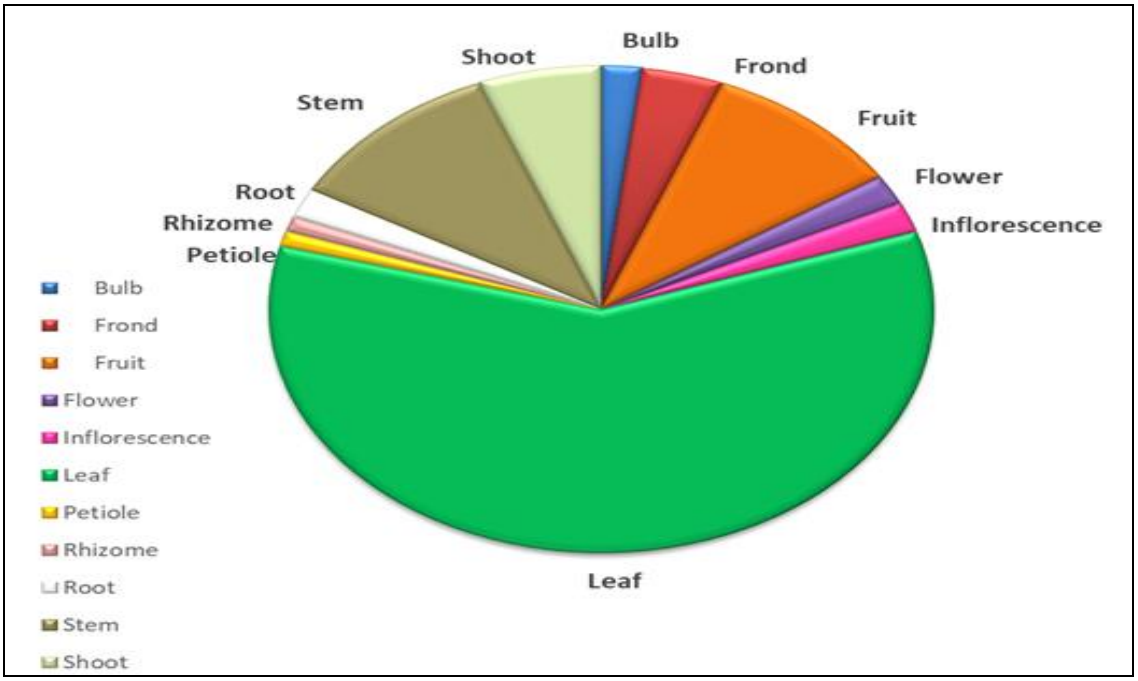

FIG. 3: PLANT PART USED AND NUMBER OF SPECIES

Plants have been used for medicinal purposes for centuries across various cultures worldwide [8]. Their therapeutic properties of medicinal plants are attributed to bioactive compounds, such as alkaloids, flavonoids, terpenoids, and phenolics. Alkaloids, characterized by their nitrogen-containing structures, exhibit diverse physiological effects, including potent analgesic properties, antimicrobial activity against pathogens, and central nervous system stimulation [7]. Flavonoids, prominent in fruits and vegetables, boast antioxidant and anti-inflammatory properties, crucial for reducing oxidative stress, supporting cardiovascular health, inhibiting cancer cell growth, and protecting brain cells from neurodegenerative diseases [13]. Terpenoids in essential oils and plant resins contribute aromatic flavours and possess anti-inflammatory, antimicrobial, analgesic, and stress-relieving properties, providing relief from pain, combating inflammation, and promoting relaxation [18]. Phenolic compounds act as antioxidants, mitigating

oxidative damage, reducing inflammation, supporting cardiovascular health, and regulating blood sugar levels for individuals with diabetes.

Together, these bioactive compounds play vital roles in promoting overall health and well-being, emphasizing the importance of consuming various plant-based foods to harness their collective medicinal benefits. Incorporating alkaloid-rich herbs, flavonoid-packed fruits and vegetables, terpenoid-containing essential oils, and phenolic-rich nuts and seeds into this herbal recipe can provide a comprehensive approach to maintaining health and preventing chronic diseases [19, 20].

By understanding and leveraging these plant-derived compounds' medicinal properties, individuals can naturally optimize their health and vitality. The 101 plant species (shown in **Table 2**) have been used to make herbal recipes since immemorial by Bodo tribal during RongjaliBwisagu festival in Assam.

TABLE 2: THE MEDICINAL VALUES OF PLANT SPECIES

S. no.	Plants Name	Therapeutic Uses	References
1.	*Allium sativum*	Anti-inflammatory potential, Anti-fungal Potential, Anti-Cancer Potential, Anti-diabetic Potential, Wound Healing Potential, Anti-Hypertensive Potential.	21
2.	*Alpinia nigra*	Anti-cancer, Anti-diabetes, Anti-fungal, Anti-bacterial, Anti-bronchitis, Anti-inflammatory, Anti-rheumatic ailment, and astonicum.	22
3.	*Aloe vera*	Anti-bacterial Effect, Anti-microbial Effects, Anti-fungal Effect, Anti-viral Effect, Anti-inflammatory Effect, Moisturizing and Anti-aging Effect, Detoxifying Effect.	23
4.	*Amaranthus spinosus*	Laxative, diuretic, anti-diabetic, anti-pyretic, anti-snake venom, anti-leprotic, anti-gonorrheal, expectorant and relieve breathing in acute bronchitis.	24
5.	*Andrographis paniculata*	Cold, Fever, Laryngitis, malaria, dysentery and diarrhea, antibacterial, anti-inflammatory and hypertension.	25
6.	*Azadirachta Indica*	Ulcers, Ringworms, Diabetes, Fever, Filaria, Anthelmintic, Piles, Skin disease and Ulcers, Wound, Leprosy, Anti- hysteric remedy.	26
7.	*Bidens pilosa*	Arterial hypertension, ulcers, diabetes, anti-cancer, and allergies.	27
8.	*Centella asiatica*	Antidiabetic, Antioxidant, Neuroprotective, Anti-inflammatory, Antifungal, Antibacterial.	28
9.	*Clerodendrum viscosum*	Antioxidant, Anthelmintic, Anticonvulsant, Anti-snake venom, Anti-inflammatory.	29
10.	*Costus speciosus*	Anti-diabetic, anti-inflammatory, anti-microbial, antioxidant, anti-dyslipidemia and anti-cancer.	30
11.	*Croton caudatus*	Liver diseases, fever and sprains.	31
12.	*Curcuma longa*	Cancer, diabetes, Arthritis, diarrhea, inflammation, psoriasis, hepatobiliary diseases, gastric and peptic ulcers.	32
13.	*Diplazium asperum*	Diabetes, smallpox, asthma, diarrhea, rheumatism, dysentery, headache, fever, wounds, pain, measles, hypertension, constipation.	33
14.	*Drymariadiandra*	Cold, headache, coryza, bronchitis, aching, inflamed, or painful parts.	34
15.	*Euphorbia hirta*	Cough, coryza, bronchitis, and asthma, dysentery, jaundice, pimples, gonorrhea, digestive problems and tumors.	35
16.	*Ficus auriculata*	Antioxidant, antibacterial, hepatoprotective, histopathological, anticancer, antidiabetic, and anti- inflammatory.	36
17.	*Garcinia acuminata*	Refreshing drinks and cure dysentery.	37
18.	*Hedyotiscorymbose*	Viral infections, cancer, skin ailments, appendicitis, hepatitis, eye diseases and bleeding.	38
19.	*Hibiscus sabdariffa*	Anti-hypertensive, anti-dyslipidemia, hypoglycemic, anti-anemic, anti-oxidant, anti-inflammatory, and anti-xerostomia.	39
20.	*Houttuynia cordata*	Inflammation, cancer, viruses, bacteria, hyper glycaemia, and obesity.	40
21.	*Hydrocotyl sibthorpioides*	Dysmenorrhea and Carbunculosis, Soothing pain, Hepatitis Infection, Herpeszoster infection, Psoriasis, throat pain, jaundice, whooping cough, rheumatalgia, dysentery, edema, fever.	41
22.	*Kalanchoe pinnata*	Anti-diabetic, anti-neoplastic, antioxidant, immunomodulation, anti-lipidaemic, anti-allergic.	42
23.	*Lawsonia inermis*	Leprosy, Skin diseases, Amentia, jaundice, Dysentery, Diarrhea, Intermittent fevers, Antipyretic.	43

24.	*Lasia spinosa*	Rheumatoid arthritis, inflammation of the lungs, bleeding cough, hemorrhoids, intestinal diseases, stomach pain, and uterine cancer.	44
25.	*Leucas plukenetti*	Snake bite, Psoriasis, jaundice, dyspepsia, inflammation, bronchitis, asthma, headache, diaphoretic, laxative, anthelmintic.	43
26.	*Lippiageminata*	Gastric illnesses, diarrhea, fever, asthma, and cough.	45
27.	*Linderniaruellioides*	Dysentery, Urinary troubles, Jaundice, Bruises boils, wounds, Snake bite and Dog bite, Dysmenorrhea, Menoxenia, Injuries, Detoxification.	47
28.	*Litsea salicifolia*	Pulmonary inflammatory, Chronic, Wound healing, Asthma.	48
29.	*Lygodium flexuosum*	Jaundice, dysmenorrhea, wound healing and eczema.	49
30	*Melastoma malabathricum*	Diarrhoea, dysentery, hemorrhoids, cuts and wounds, toothache, and stomachache.	50
31	*Melothria heterophylla*	Diabetes, renal, ischemia, atherosclerosis, pulmonary pathological states, inflammatory diseases, and cancer.	51
32	*Mentha spicata*	Skin disease, throat ailments, digestive, diabetes, antidiabetic, antimicrobial, antiparasitic, anticancer, antioxidant.	52
33.	*Morus indica*	Anti-bacterial, anti-fungal, anti-hypoglycaemic, anti-hypolipidemic, hepatoprotective, anti-diabetic, anti-cancer, anti-pyretic, high antioxidant, and anti-inflammatory properties.	53
34.	*Murrayakoenigii*	Obesity, Cardio Vascular diseases, cancers, diabetes, anticancer, diabetic, antitumor, anti-inflammatory, antidiabetic, and antioxidant.	54
35.	*Musa balbisiana cola*	Contraceptive, dysentery, tonic, cough, and heal gastritis, gout, jaundice, treat infertility in women, and intestinal worm infection.	55
36.	*Mussaenda roxburghii*	Anti-cancer, antioxidant, and protective drugs.	56
37.	*Nyctanthes arbortristis*	Anti-helminthic, anti-pyretic, rheumatism, and skin ailments.	57
38.	*Oldenlandia corymbosa*	Gastric irritation, jaundice, liver complaints, skin diseases, cough, bronchitis, necrosis, clear heat and toxins.	58
39.	*Oroxylum indicum*	Jaundice, arthritic and rheumatic, gastric ulcers, tumors, diabetes and diarrhea and dysentery.	59
40.	*Oxalis corniculata*	Wound healing, anti- microbial, diuretic, nephrotoxicity, Cardioprotective, Steroidogenic, hypolipedemic, antioxidant, hypolipidemic, anti-diarrhoeal, hepatoprotective, antidiabetic, anticancer, antinociceptive, antiulcer, antifungal, antiepileptic, anxiolytic, and anti-inflammatory.	60
41.	*Paederiafoetida*	Bone fractures, body ache, flatulency, cancer, toothache, pneumonia, typhoid, pain, dysentery, diarrhea, stomach-ache, wounds, itches, asthma, coughs, diabetes, constipation, rheumatoid arthritis epatic disorders.	61
42.	*Phyllanthus emblica*	Cure sore throat, hypertension, dropsy, and hepatitis, malaria, jaundice, and renal calculus.	62
43.	*Pouzolzia zeylanica*	Skin diseases, gangrenous ulcers, sores, boils, dysentery, syphilis, and gonorrhea.	63
44.	*Premna herbacea*	Fever, cholera, rheumatism, asthma, dropsy, and cough.	64
45.	*Psidium guajava*	Gastrointestinal, vomiting, diarrhea, wounds, caries, and cough.	65
46.	*Sarcochlamys pulcherrima*	Anti-diarrheal, antimicrobial.	66
47.	*Solanum torvum*	Anti-microbial activity, Anti- ulcer activity, Anti-inflammatory activity, Analgesic, Anti-oxidant activity, Nephroprotective activity, Cardio-protection & treatment of heart related diseases.	67
48.	*Spilanthes paniculata*	Rheumatism, fever, Diuretics, flu, cough, rabies diseases, Tuberculosis, antimalarials, Antibacterials, skin diseases, Local anesthetics digestive, and snake bite.	68
49.	*Stephania japonica*	Pain, inflammation, rheumatism, cancer, bone fracture and fever.	69
50.	*Stellaria media*	Obesity, diabetes, dermal infections, inflammation, gastric ulcers and stomach cramps.	70
51.	*Vitex negundo*	Anti-inflammatory, antimicrobial, antioxidant, antidiabetic, anticancer.	71
52.	*Vitis repanda*	Boils wounds, piles, asthma, digestive, troubles, cough and loss of appetite.	72
53.	*Zingiber officinale rose*	Carminative, Pungent, stimulant, indigestion, stomachache, malaria and fevers, gastric, abdominal pain, anorexia, arthritis, atonic dyspepsia,	73

	bleeding, cancer, chest congestion, colic, colitis, common cold, cough, cystic, fibrosis, diarrhea, difficulty in breathing, dropsy, fever, flatulent, disorders of gallbladder, hyperacidity, sickness, nausea, sore throat.

Herbal foods, also known as herbal cuisine or herbal-infused dishes, refer to culinary creations incorporating herbs and plants known for their medicinal, aromatic, and flavour-enhancing properties. These dishes provide nourishment and offer potential health benefits associated with the herbs used. When incorporating fresh, high-quality herbs to maximize the flavors and nutritional benefits of the food and enhance the health-immunity properties of herbal cuisine. Here, for the prepare this herbal recipe, the required ingredients were one kg of pork, about 50mL of pork blood along with 101 aforesaid plants species. The approximate quantity of ingredients is listed in **Table 3.** The preparation steps and the final prepared foods are shown in **Fig. 4** and **5**, respectively.

TABLE 3: QUANTIFICATION OF INGREDIENTS USED FOR PREPARATION OF HERBAL RECIPE

Sl. no.	Botanical name	Quantity
1.	*Allium sativum*	Fresh leaves =30g and Bulb paste =30g
2.	*Allium cepa*	Fresh leaves and bulf =50g
3.	*Alpinia nigra*	Rhizome paste =30 and Stem matchsticks =40g
4.	*Alternanthera philoxeroides*	Fresh leaves =20g and Stems =30
5.	*Aloe vera*	Fresh leaves =20g
6.	*Alternanthera sessilis*	Fresh leaves =20g
7.	*Amaranthus spinosus*	Fresh leaves =20g and Stem =20g
8.	*Amorphophallus sylvaticus*	Fresh Young leaves/petiole =80g
9.	*Andrographis paniculata*	Fresh leaves =20g
10.	*Antidesma acidium*	Fresh leaves =40g
11.	*Artocarpus heterophyllus*	Young fruit =50g
12.	*Argyreia nervosa*	Fresh leaves =30g
13.	*Argyreia speciosa*	Fresh leaves = 20g
14.	*Azadirachta indica*	Fresh leaves =30g
15.	*Bambusa balcooa*	Young shoot =80g
16.	*Basella alba*	Fresh leaves and stem =40g
17.	*Benincasa hispida*	Fruit =100g
18.	*Bidens Pilosa*	Fresh leaves =30g
19.	*Boerhaavia diffusa*	Raw leaves =40g
20.	*Brassica nigra*	Young leaves =30g
21.	*Calamus erectus*	Stem matchsticks=30g, young shoots =30g, Rhizome paste =30g
22.	*Casearia glomerata*	Young Leaves and stem =50g
23.	*Centella asiatica*	Fresh leaves =20g
24.	*Chrysanthemum coronarium*	Fresh leaves =10g
25.	*Chenopodium album*	Young fresh leaves =20g
26.	*Cinnamomum tamala*	Dried tejpat leaves =15g
27.	*Clerodendrum viscosum*	Young fresh leaves =15g
28.	*Costus speciosus*	Young shoot =45g
29.	*Colocasia esculenta*	Young green leaves =20g and soft stalk stem =10g
30.	*Corchorus capsularis*	Young green leaves =25g
31.	*Croton caudatus*	Young fresh leaves =10g
32.	*Cucurbita maxima*	Young green leaves =15g
33.	*Curcuma longa*	Rhizome paste =20g
34.	*Dillenia indica*	Fleshy sepals =20g
35.	*Diplazium asperum*	Young Frond =30g
36.	*Drymaria cordata*	Fresh Leaves and Young stem =20g
37.	*Drymariadiandra*	Fresh leaves =20g
38.	*Duchesnea indica*	Fruits =5g and Fresh young leaves =10g
39.	*Enhydra fluctuans*	Fresh new leaves =10g and Stem =10g
40.	*Eryngium foetidum*	Young fresh aromatic leaves =10g
41.	*Euphorbia hirta*	Young Leaves and Young shoot =25g
42.	*Fagopyrum esculentum*	Fresh young leaves =10g
43.	*Ficus semicordata*	Fresh Leaves =30g

44.	*Ficus auriculata*	Young shoot and Leaves and Fruits =35g
45.	*Garcinia acuminata*	Fruit =15g
46.	*Hedyotiscorymbosa*	Tender shoot =10g
47.	*Hemidesmus indicus*	Young tender leaves =24g
48.	*Hibiscus sabdariffa*	Young fresh leaves =15g and fruits =20g
49.	*Hibiscus sabdariffa*	Young fresh leaves =15g and fruits =20g
50.	*Hydrocotylsibthorpioides*	Row leaves =10g
51.	*Justicia adhatoda*	Fresh flower =10g
52.	*Kalanchoe pinnata*	Fresh leaves =5g
53.	*Lagenaria siceraria*	Fruit =30g and stem =10g
54.	*Lasia spinosa*	Young fresh leaves =10g and stem =20g
55.	*Lawsonia inermis*	Young green leaves =5g
56.	*Leucas plukenetti*	Green leaves =7g
57.	*Linderniaruellioides*	Green leaves =6g
58.	*Lippiageminate*	Fresh leaves =20g
59.	*Litsea salicifolia*	Green young leaves =9g
60.	*Luffa acutangula*	Young fruit =40g and stem =10g
61.	*Luffa cylindrica*	Young Fruit =30g
62.	*Lygodiumflexuosum*	Young frond =15g
63.	*Mangifera indica*	Young fruit =20g
64.	*Mentha spicata*	Green fresh leaves =5g
65.	*Melothria heterophylla*	Young fruit and leaves =15g
66.	*Melastomamalabathricum*	Young fresh Leaves =10g
67.	*Moringa oleifera Moringa*	Leaves =15g and fruits =20g
68.	*Morus indica*	Green young leaves =5g
69.	*Monochoria hastata*	Inflorescence = 40g
70.	*Momordica charantia*	Fruit and young fresh Leaves=20g
71.	*Murrayakoenigii*	Green leaves =30g
72.	*Musa balbisiana cola*	Inflorescence =40g
73.	*Mussaendaroxburghii*	Fresh leaves=15g
74.	*Nelumbo nucifera*	Root stalk=10g
75.	*Nyctanthes arbor-tristis*	Young fresh leaves=10g
76.	*Nymphaea nouchali*	Root stalk=30g
77.	*Oroxylum indicum*	Fresh flower and young frond =20g
78.	*Oxalis corniculata*	Raw leaves=7g
79.	*Oldenlandia corymbose*	Fresh leaves and Stem=18g
80.	*Oxalis debilis*	Fresh leaves=25g
81.	*Paederiafoetida*	Fresh leaves=25g
82.	*Phlogacanthustubiflorus*	Fresh flower=25g
83.	*Phyllanthus emblica*	Young fruit=10g
84.	*Plectranthusternifolius*	Fresh leaves=20g
85.	*Portulaca oleracea*	Tender=12g
86.	*Pouzolzia zeylanica*	Young leaves and young stem=20g
87.	*Premna herbacea*	Fresh leaves and young shoot=40g
88.	*Prunus jenkinsii*	Young fruit=10g
89.	*Psidium guajava*	Young green leaves=9g
90.	*Pteris ensiformis*	Young frond=25g
91.	*Sarcochlamys pulcherrima*	Young fresh leaves=10g
92.	*Smilax perfoliate*	Tender shoot=20g
93.	*Solanum Nigram*	Young fresh leaves=10g
94.	*Solanum torvum*	Young green fruits=35g
95.	*Solena amplexicaulis*	Young leaves and shoot=12g
96.	*Spilanthes paniculata*	Fresh leaves and young shoot and flower = 20g
97.	*Stellaria media*	Fresh leaves and young stem=15g
98.	*Stephania japonica*	Young leaves=15g
99.	*Vitex negundo*	Fresh leaves=21g
100.	*Vitis repanda*	Fresh leaves=22g
101.	*Zingiber officinale rose*	Fresh rhizome paste=25g
	Weight of total plant parts	= 609g

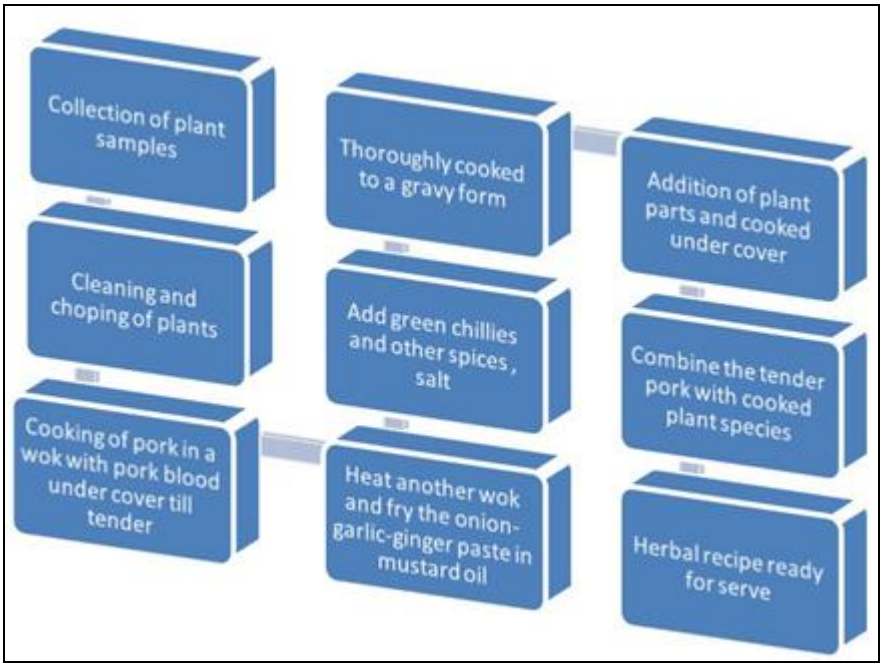

FIG. 4: FLOWCHART FOR PREPARATION OF HERBAL RECIPE

FIG. 5: PREPARATION OF HERBAL RECIPE

This study compiled the nutritional values of 101 plant species consumed by the Bodo tribe during the Rongjali Bwisagu festival. Herbal recipes with nutritional values estimated were documented in **Table 4**. Medicinal plants offer a multifaceted approach to health and well-being, providing therapeutic compounds and essential nutrients crucial for optimal bodily function. These plants

are rich sources of vitamins, minerals, and antioxidants, which play pivotal roles in supporting various physiological processes. For instance, leafy greens were abundant in vitamin A, C, and B complex and minerals, such as iron and calcium, promoting overall vitality and immune function.

TABLE 4: NUTRITIONAL VALUES OF 101 PLANT SPECIES PER 100G

Botanical name	Energy (Kcal)	Protein (g)	Fat (g)	Ca (mg)	Iron (mg)	Zinc (mg)	Vit C (mg)	B1 (mg)	B2 (mg)	B3 (mg)	B6 (mg)	B9 (µg)	Vit A (µg)
Allium sativum	78	16	0.12	16	5.20	4	31.2	0.63	0.96	0.952	0.59	0.72	31.2
Alpinia nigra	-	11	4.4	14	9	21.1	11.9	25	0.05	0.5	5	-	-
Alternanthera philoxeroides	15	16	-	-	-	5.53	6	-	-	9	-	-	0.03
Amaranthus spinosus	27	4	0.6	-	0.65	3	68	1.3	4.24	1.54	2	6	34
Artocarpus heterophyllus	93	2	0.6	30	1.9	0.43	12.0	0.2	35.7	4	0.329	6	30
Azadirachta indica	4.6	12	2.89	18	0.13	0.12	0.075	3.7	3.51	16	100	-	-
Allium cepa	40	1	0.1	23	0.21	0.255	6.60	0.046	0.027	0.116	0.12	19	2
Aloe vera	4	2	1.83	25	64	-	1.16	-	-	-	-	-	-
Alternanthera sessilis	2.57	2.09	0.73	-	14.3	-	-	-	12.6	-	-	-	4.33
Amorphophallus sylvaticus	-	-	0.105	8	3.43	4.19	-	-	-	-	-	-	-
Andrographis paniculata	2.5	-	0.9	-	-	-	40	10	-	-	20	-	-
Argyreia nervosa	-	-	-	-	-	-	-	0.3	0.4	-	-	-	-
Argyreia speciosa	-	3.10	2.3	-	-	-	-	-	-	-	-	-	-
Antidesma acidium	29.48	-	2.09	3	-	-	11.39	1.1	-	5	-	-	20
Bambusa balcooa	27	2.5	0.6	1.2	0.50	1.1	1	0.15	0.07	0.6	0.24	7	20
Basella alba	19	7.00	0.3	11	1.2	0.43	74	0.05	0.16	0.5	0.24	-	26
Benincasa hispida	6	0.30	0.02	30	0.20	0.6	13	0.04	-	-	11.3	1	16
Bidens pilosa	-	15	7	-	15	19	63	0	0	56	0.201	-	2.2
Boerhaavia diffusa	-	5.76	1.61	-	97	21.8	45	0.24	22	97	-	-	0.91
Brassica nigra	26	10	-	-	0	-	-	-	-	-	0.397	-	9
Chrysanthemum coronarium	-	1.85	0.43	-	38.5	0	0.25	0	0.144	0.1	0.176	44	27
Calamus erectus	-	0.64	0.70	-	-	-	-	-	-	-	5	-	-
Casearia glomerata	0.225	-	-	-	-	-	6	-	-	-	-	-	-
Costus speciosus	-	18	-	-	46	-	-	0.10	5	0.09	3.0	7	-
Clerodendrum viscosum	12.29	-	4	-	-	-	31.25	0.1	-	-	-	-	0.67
Croton caudatus	-	-	-	-	0.136	-	-	-	-	4	-	-	-
Centella asiatica	32.0	1.8	0.9	24	3.8	3.2	7.7	0.09	0.19	0.8	0.78	-	0.39
Chenopodium album	43	4.2	0.35	31	2.78	51	80	14	0.44	1.2	0.274	30	11
Cinnamomum tamala	-	-	8.36	51	19.15	6.04	46	0.1	0.003	0.012	0.010	180	-
Colocasia esculenta	34	1.5	0.2	-	11	0.41	0.70	4.55	1.96	0.80	0.32	17	0.5
Corchorus capsularis	43	5.6	0.3	26	12	0.3	-	6.46	28	23.17	-	0.03	-
Cucurbita maxima	-	13	-	-	50	-	31	0.05	0.11	0.286	0.037	16	49.81
Curcuma longa	19	9	6.85	0.2	0.91	30	0.57	0.165	0.228	0.5	1.07	20	0
Drymaria cordata	-	20	-	12	7	10	-	0.02	1.3	20.57	6.36	-	-
Dillenia indica	59	0.8	5.64	16	11.75	-	0.004	0.22	0.98	1.352	0.02	20	-
Diplazium asperum	39	3.2	3.40	12	3.2	46	46	-	-	-	-	-	-
Drymaria diandra	-	15	0.32	-	-	1.44	-	1.2	1.3	16	1.7	-	-
Duchesnea indica	-	-	-	0.1	0.121	9.06	6.3	7.5	24	20	1.7	-	-
Enhydra fluctuans	-	19	-	-	6.38	1.7	42	1.8	0.76	6.192	1.3	-	-
Eryngium foetidum	23	2	0.52	67	0.02	4.5	32.33	0.8	-	-	11	-	16
Euphorbia hirta	-	18	-	8	-	0.01	80.2	6.67	5.02	-	20	-	-
Fagopyrum esculentum	11	22	-	-	2.3	3.46	0.71	-	-	-	-	2	0.3
Ficus semicordata	13	7.5	2.96	12	14	10	7.77	0.35	-	16	-	-	0.979
Ficus auriculata	12	2	1.71	51	-	-	-	-	-	0.8	-	-	-
Garcinia acuminata	-	4	-	1	-	1.36	0.61	18.00	-	20	1.2	-	-
Hibiscus sabdariffa	-	5	0.1	-	5	0.055	94	0.04	0.6	0.04	53.78	1	16
Houttuynia cordata	-	-	-	-	-	-	-	-	20.00	1.3	-	-	-
Hydrocotyl sibthorpioides	-	-	4	0	0.5	-	48	2.32	0.30	16	5	-	5.36
Hedyotis corymbose	-	-	8.9	5	22	2.64	2.701	1.2	0.012	8.45	1.1	-	-
Hemidesmus indicus	-	2.1	-	-	-	-	27.2	25.6	25.7	10.8	25	-	22.4
Justicia adhatoda	-	2.5	1.6	-	0.70	0.06	-	24	1.3	5.06	4.64	0.77	-
Kalanchoe pinnata	-	-	-	-	-	-	28	0.18	0.42	0.09	-	-	9
Lagenaria siceraria	14	-	0.2	0.01	-	6.5	10.1	0.029	0.022	0.32	0.04	1	-
Lasia spinosa	-	17	1.16	28	12	7.4	45	3	8	0.91	4.3	-	25
Lawsonia inermis	-	1.36	6	0.4	-	0.47	97	1.2	1.1	-	50	076	-
Leucas plukenettii	-	0.8	0.08	-	0.3	-	-	1.2	1.3	0.8	1.5	4	-
Lindernia ruellioides	-	1.3	1.2	-	11	-	-	1.2	-	-	9.50	-	-

Litsea salicifolia	-	-	-	7	-	-	-	3.22	1.3	-	1.5	-	-
Luffa acutangular	22	-	-	-	0.36	0.2	12	-	-	0.26	-	-	-
Luffa cylindrica	1	1.4	0.15	-	-	-	12	0.342	0.2061	-	0.401	-	14
Lygodium flexuosum	11	3.78	0.10	2.6	-	-	21	-	-	0.8	-	-	-
Lippia geminate	-	5.08	-	-	-	11	12	0.1	0.08	0.8	1.3	4	11
Mentha spicata	-	1.75	3.20	12	11	49	4.6	1.2	0.18	0.948	0.041	3	-
Moringa oleifera	10	6.8	1.7	-	28	25	80	-	20.5	0.8	0.129	41	37
Morus indica	-	4.72	0.4	1.4	4	0.22	160	3	0.101	3.10	4	6	-
Murraya koenigii	9	7	2.43	19	12	2.46	0.04	0.89	25.68	2.73	0.1	93.9	6.04
Musa balbisiana cola	53	-	3.8	-	-	-	-	-	-	0.05	-	-	-
Mangifera indica	60	0.5	0.8	15	-	0.0024	54	28	38	0.2	0.05	0.1	0.38
Melastoma malabathricum	-	3.95	6.83	4	0.62	-	3.04	-	-	0.58	-	-	4.32
Melothria heterophylla	-	0.006	-	-	-	0.1	0.296	0.006	1.1	-	1.3	-	0.006
Momordica charantia	-	18	0.2	1	3	5	33	0.051	0.053	0.4	0.043	13	0.03
Monochoria hastata	-	-	0.1	-	-	37.8	1	1.2	0.2	-	-	-	-
Mussaenda roxburghii	-	-	-	32	-	5	7.64	-	-	-	1.5	-	-
Nelumbo nucifera	-	1.5	0.11	40	13	0.084	44	11	0.127	0.18	13	8	0.06
Nyctanthes arbor-tristis	-	-	-	-	6.20	-	-	-	4	16	6	-	-
Nymphaea nouchali	-	16.8	2.8	0.5	-	-	-	-	-	-	18.43	-	-
Oxalis corniculate	60	3.75	2.5	20	12	1.59	0.414	40.0	40.0	0.6	-	-	-
Oroxylum indicum	-	-	-	-	-	7.06	0.34	25.6	0.15	-	0.03	4.0	-
Oxalis debilis	-	2.3	0.8	13	8	-	-	-	-	-	2	0	-
Oldenlandia corymbose	-	13	5.96	-	-	5.3	22	-	2.37	-	-	-	-
Paederiafoetida	-	5	-	-	-	0.0020	50	0.09	0.1	16	5	4	-
Psidium guajava	18	9.73	0.62	16	0.3	3.31	77.5	0.1	0.04	2.90	0.11	49	21
Phlogacanthus tubiflorus	-	-	0.69	-	-	23.0	-	-	-	-	1.5	-	-
Phyllanthus emblica	-	2	2.0	2.03	1	2.5	150	28	0.3	0.40	72	-	29
Plectranthus ternifolius	-	-	-	-	-	0.379	-	-	-	0.52	-	-	0.013
Pteris ensiformis	-	4.4	2.47	-	-	-	-	1.2	1.6	16	1.7	-	-
Premna herbacea	7.76	15.38	2.3	-	0.798	4.36	-	0.1	0.08	8.45	2.49	5	-
Portulaca oleracea	30	2	0.1	65	2	0.17	21	0047	0.112	0.48	0.073	12	13
Prunus jenkinsii	46	-	-	-	-	30	8	1.2	1.3	-	-	-	-
Pouzolzia zeylanica	-	6	-	-	-	-	-	1.2	0.557	0.060	8.2	-	-
Solanum nigram	17	2.21	0.56	21	-	-	35	17.14	40	0.649	0.8	15	0.5
Sarcochlamys pulcherrima	57	15.60	-	11	-	-	-	16	-	-	-	-	-
Smilax perfoliate	-	-	-	-	-	-	0.03	-	1.7	16	1.5	40	-
Stellaria media	-	14	2.4	0	0	-	37	-	-	1.17	0	-	-
Spilanthes paniculata	35	6.54	-	0.4	15	12	39	18	0.1	4	1.7	7.59	7
Stephania japonica	-	1.5	4	0.56	13	-	-	-	3	-	-	-	-
Solanum torvum	-	2.4	0.278	0.47	77	21.46	37.4	0.08	0.17	0.594	0.08	15.0	0.078
Solena amplexicaulis	-	-	-	-	0.19	0.03	4.5	0.40	0.20	0.80	-	0.55	-
Vitex negundo	-	13.7	6.19	15	6.6	5.00	141	25.6	25.7	1.1	-	5	-
Vitis repanda	-	1.49	7.53	-	-	0.70	-	-	-	1	-	-	1.22
Zingiber officinale rose	-	1.70	2.1	34	1.8	16	1.036	2	3	0.75	0.626	-	1

Furthermore, medicinal plants often contain dietary fiber, which aids in digestion, regulates blood sugar levels, and supports heart health. Phytochemicals, including flavonoids, terpenoids, alkaloids, and phenolics, imbue these plants with potent antioxidant, anti-inflammatory, and antimicrobial properties, contributing to their therapeutic effects [76, 77]. Incorporating a diverse array of medicinal plants into one's diet enhances nutritional intake and harnesses their medicinal benefits for promoting longevity and vitality.

Moreover, some medicinal plants provide essential fatty acids, while others support gut health through prebiotic properties. By embracing medicinal plants' nutritional richness and therapeutic potential, individuals can cultivate holistic approaches to wellness that nurture both body and mind. The nutritional details of the 101 medicinal plant parts used for the recipe are detailed in **Table 4**.

The energy content of various herbal plant species varies, with *Artocarpus heterophyllus* young fruit boasting the highest energy content at 93 kcal, followed by *Allium sativum* Bulb with 78 kcal. In comparison, *Mangifera indica young fruit provides* 60 kcal of energy. *Dillenia indica* fruit offers 59 kcal, followed by *Sarcochlamys pulcherrima* leaves with 57 kcal and *Musa balbisiana cola* inflorescence with 53 kcal. These values indicate the calorie content per serving of each plant. A variety of plant sources offer significant protein content, providing viable options for those seeking

to incorporate more plant-based protein into diets. Among these, *the Enhydra fluctuans* stem stands out with an impressive 19 grams of protein per specified unit, followed by the *Lasia spin* system, 17 grams, and the *Nymphaea nouchali* root stalk, 16.8 grams. *Biden's pilosa, Drymaria cordata leaves,* and *Drymaria diandra* leaves offer 15 grams of protein each, while *Stellaria media* leaves provide 14 grams. *Vitex negundo* leaves contain 13.7 grams, *Cucurbita maxima stem,* and *Oldenlandia corymbose* leaves offer 13 grams, *Azadirachta indica* leaves contribute 12 grams, and *Alpinia nigra* stem has 11 grams. *Premna herbacea* leaves provides 10.38 grams of protein. *Sarcochlamys pulcherrima* leaves, and *Brassica nigra* leaves with 10.16 grams and 10 grams of protein, respectively. Incorporating these plant sources into one's diet can diversify protein intake and support overall nutritional needs.

The fat content varies across different plant species, with notable differences among them. *Hedyotis corymbose* tender shoot with a significant 8.9 grams of fat, followed by *Cinnamomum tamala* leaves at 8.36 grams and *Vitis repanda* leaves at 7.53 grams. *Bidens pilosa* leaves, and *Curcuma longa*rhizome contain approximately 7 grams of fat, while *Melastoma malabathricum* leaves and *Vitex negundo* leaves offer 6.83 grams and 6.19 grams, respectively. *Lawsonia inermis* leaves have a fat content of 6 grams, with *Oldenlandia corymbose* leaves just slightly lower at 5.96 grams.

From the recipe, approximately 856.87mg of calcium will be provided per 100gm servings. The calcium content varies among plant species, providing insights into potential dietary sources of this essential mineral. *Eryngium foetidum* leaves and *Portulaca oleracea* leaves lead the list with 67mg and 65mg of calcium, respectively, followed by *Cinnamomum tamala* leaves and *Ficus auriculata* leaves, each offering 51 mg. *Nelumbo nucifera* root stalk provides 40mg, while *Zingiber officinale* rose rhizome and *Mussaenda roxburghii* leaves offer 34mg and 32mg, respectively. *Chenopodium album* leaves contains 31mg, *Artocarpus heterophyllus* young fruit, and *Benincasa hispida* fruit offer 30mg of calcium. Understanding the calcium content of these plants ensures adequate intake of this vital mineral. The iron content varies across different plant species, providing valuable insights into potential dietary sources of this essential mineral. *Boerhaavia diffusa* leaves tops the list with an impressive 97mg of iron, followed by *Solanum torvum* fruit with 77mg. *Aloe vera* leaves contain 64mg of iron, *Cucurbita maxima* stem offers 50mg, and *Costus speciosus* young shoot provides 46mg. *Chrysanthemum coronarium* leaves with 38.5mg of iron, and *Moringa oleifera* leaves contains 28mg. The total amount of iron provided by this recipe was 709.105mg. Understanding the iron content of these plants can aid in dietary planning, especially for individuals looking to increase their iron intake as part of a balanced diet.

Like iron, zinc is another mineral essential microelement for humans. The zinc content varies among different plant species. *Chenopodium album* leaves the list with 51mg of zinc, followed by *Mentha spicata* leaves with 49mg and *Diplazium asperum* frond with 46mg. *Monochoria hastate* inflorescence provides 37.8mg of zinc, while both *Curcuma longa* rhizome and *Prunus jenkinsii* fruit offer 30mg each. *Moringa oleifera* leaves contains 25mg of zinc, and *Phlogacanthus tubiflorus* flower follows with 23mg. Understanding these plants' zinc content can benefit individuals seeking to incorporate adequate zinc into their diets for overall health and well-being. This herbal recipe provides 545.887mg of zinc as a whole.

The vitamin C content varies among plant species, offering insights into potential dietary sources of this essential antioxidant. *Phyllanthus emblica* fruit leads the list with a robust 115mg of vitamin C, followed by *Vitex negundo* leaves with 100mg and *Lawsonia inermis* leaves with 97mg. *Hibiscus sabdariffa* leaves provides 94mg of vitamin C, while *Euphorbia hirta* leaves and *Moringa oleifera* leaves offer 80.2mg and 80mg, respectively. *Chenopodium album* leaves contain 80mg of vitamin C. These plants can serve as excellent natural sources of vitamin C, contributing to overall health and well-being, mainly boosting the immune system and supporting various anti-cancer functions. For thiamin (Vitamin B1), *Portulaca oleracea* leaves lead with 47mg, followed by *Oxalis corniculate* leaves, *Mangifera indica* young fruit at 40mg and *Phyllanthus emblica* fruit at 28mg, with *Hemidesmus indicus* leaves providing 25.6mg. Regarding riboflavin (Vitamin B2), *Oxalis*

corniculata leaves, and *Solanum Nigram* leaves offer 40mg each. *Mangifera indica* young fruit provides 38mg, *Artocarpus heterophyllus* young fruit 35.7mg, *Corchorus capsularis* leaves 28mg, and *Hemidesmus indicus* leaves 25.7mg. *Boerhaavia diffusa leaves*, and *Bidens pilosa* leaves stand out for niacin (Vitamin B3) with 63mg and 56mg, respectively. While, *Corchorus capsularis* leaves, *Drymaria cordate* leaves, *and Duchesnea indica* leaves offer 23.17, 20.57, and 20mg, respectively. For folic acid (Vitamin B9), *Murraya koenigii* leaves tops with 93.9mg, followed by *Lawsonia inermis* leaves at 76mg, *Psidium guajava* leaves at 49mg, *Chrysanthemum coronarium* leaves at 44mg, and *Moringa oleifera* leaves at 41mg. Lastly, for pyridoxine (Vitamin B6), *Azadirachta indica* leaves lead with 100mg, followed by *Phyllanthus emblica fruit*, *Hibiscus sabdariffa leaves*, *Lawsonia inermis* leaves, and *Hemidesmus indicus* leaves at 72, 53.78, 50 and 25 mg, respectively. These plants offer significant amounts of essential vitamins Bcomplex, which are vital for overall health and proper bodily functions.

The vitamin A content varies among different plant species, providing *the Cucurbita maxima* stem with the highest with 49.81 International Units (IU) of vitamin A, followed by 37 IU in *Moringa oleifera* leaves, and 34 IU in *Amaranthus spinosus* leaves. *Allium sativum* bulb contains 31.2 IU of vitamin A, while *Artocarpus heterophyllus* young fruit and *Phyllanthus emblica* fruit offer 30 and 29 IU, respectively. *Chrysanthemum coronarium leaves* provide 27 IU of vitamin A, *Basella alba* stem contains 26 IU, *Lasia spinosa* stem follows with 25 IU. *Hemidesmus indicus* leaves and *Psidium guajava* leaves offer 22.4 IU and 21 IU, respectively. These plants can be valuable additions to the diet for those seeking to maintain healthy vision, skin, and immune function, as vitamin A plays a crucial role in various physiological processes. Incorporating them into the diet can contribute to meeting daily nutritional requirements for these essential vitamins.

CONCLUSION: The diversity of traditional health-beneficial foods in India reflects the rich tapestry of regional cuisines shaped by climate, culture, and agricultural practices. This study sheds light on the herbal recipes long used by the Bodo people in the Bodoland Territorial Region (BTR) of Assam, showcasing the enduring wisdom of indigenous knowledge. Each plant harbours phytochemicals that hold the potential to enhance human health, underscoring the importance of analyzing medicinal plants for their chemical constituents to improve well-being. We gain valuable insights into their therapeutic potential and nutritional value by analyzing the diverse array of phytochemicals, vitamins, and minerals present in these plants. From vitamin rich herbs to mineral packed roots, each plant contributes unique properties that can support human health and well-being. This exploration underscores the importance of harnessing traditional wisdom alongside scientific inquiry to unlock the potential of medicinal plants for promoting health and vitality. This exploration illuminates the profound relationship between traditional food practices and the holistic health of communities, offering valuable insights into the interconnection of culture, nature, and human wellness.

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