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Ethnobotanical Study of Plants Used in Muslim (Pangal/Meitei Pangal) Community Folk-Lore (Folk-Songs and Folk-Proverbs) in Manipur, India

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Abstract

The logical ethnobotanical study of Muslim (Pangal/Meitei Pangal) community is about the plants used by persons of this group in their folk-lore for their usage of plants as medicines, foods, tools, socio-religious functions and cultivation of plants. The plants have been studied during a period from July, 2012 to December, 2016 at Thoubal District, Imphal East District, Imphal West District, Chandel District and Bishnupur District in Manipur state, India, by a technique of multistage sampling. The checking of plants used in folk-songs and folk-proverbs has been measured by testing of a hypothesis. It has been found that the plants used in both the variables (folk-songs and folk-proverbs) are not much different considering useful aspects of plants in different categories of medicinal (M), Food and beverages (FB), Material culture (MC), Socio-religious and cultivated aspects of plants. The test has been found to be significant because the calculated value (0.118) of Chi-square (χ^2) is less than the table value (9.488). The studied plants belong to 29 families, 44 genera and 46 species.

Keywords

Ethnobotany, Folk-Songs, Folk-Proverbs, Foods, Medicines, Socio-religious, Manipur, Hypothesis, Chi-square (χ^2)

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1. Introduction

Ethnobotany is the logical study of plants used by ethnic communities in their folk-lore, medicines, food and beverages, tools, socio-religious aspects and cultivation of plants. Ethnobotany is the scientific study of plant lore and agricultural customs of a people [1]. The words 'Ethnic' denotes a racial or national or tribal group and 'community' means a group of people united by shared interests, religion, nationality etc [2]. The study of relationship between man and his ambient vegetation is obviously a very broad field, including many aspects of botany and many other disciplines, so there is a worldwide resurgence of interests in ethnobotanical studies among botanists, anthropologists, palaeobotanists, linguists, folklorists, vaidyas, hakims etc [3]. It was noted, "ethnobotanists can play very useful roles in rescuing the disappearing knowledge and returning it to local communities" [4].

The growing recognition of the need to change current dietary patterns and the value of traditional food was noted [5]. The wild edible plants were reported in one of the early research in India [6]. Many varieties of horticultural plants were under the shadow of threatened plants [7]. The tribals of Madhya Pradesh used plants as folk medicines, musical instruments, basketry and agricultural implements [8] and social beliefs [9]. Foods and medicines used by tribals of northeastern region were reported [10]. The various researchers from Manipur reported on edible wild plants [11], plants used as tools [12], cultivated plants [13] and medicinal plants [14-18]. However, the study of plants in bio-folklore

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(folksongs and folkproverbs) with biostatistical expression is one under-research area.

Folklore study in relation to man-plant interaction is observed in some records [19-21]. Thus, the Muslims (Pangal/Meitei Pangal) of Manipur, a small state in the northeast India, speak Manipuri language (a Tibeto-Burman language) as their mother tongue. In Manipur, there is a way of speaking with proverbs having reference of plants. The study of proverbs helps us to understand useful aspects of various plants used in folk-proverbs [22]; such study from Manipur state, India, is rare.

Likewise, having sung many of plants in their folk-songs, the Muslims (Pangal/Meitei Pangal) in Manipur are a part of "oneness of culture in India that is an evidence of oneness of our country" [23, 24]. Their folk-songs were not wholly detached from the mainstream of the folk culture of Manipur [25]. The state has unique flora from time immemorial, the people of Manipur believed that these were reflected in their folk-songs too. Their agricultural and horticultural activities are also reflected in their folk-songs [24]. "On the whole the record of folk songs and the associated plants by Indian ethnobotanists are not many" [26], such study is uncommon. That is why the present study "Ethnobotanical study of plants used in Muslim (Pangal/Meitei Pangal) Folk-lore (folk-songs and folk-proverbs)" in Manipur , India" was taken up during a study period from July, 2012 to December, 2016.

The following hypothesis was intended to test during the study:

H_0: There is no difference between the various uses of the plants mentioned in Folk-songs and Folk-proverbs.

H_1: There is difference between the various uses of the plants mentioned in Folk-songs and Folk-proverbs.

2. Methodology

2.1. Statistical Tools Used for Analysis

2.1.1. Tabulation

The presentation of data by means of tables was made. The upper part, footnote of the table was provided a title and its number and sources of the data respectively. The column and rows were fitted with box heads, nature of the rows and figures.

2.1.2. Bar Diagram and Pie Chart to Show the Results of the Study

Simple Bar diagram expressed the magnitude of frequencies in discrete statistical data in visual comparisons. Pie chart showed different angles of qualitative characters highlighting their comparative differences and

2.1.3. Chi-square (χ^2) Test

It is the most widely used non-parametric test of significance. The Chi-square test is appropriate for situation in which a test for differences between samples is required [27]. Chi-square test is used to compare more than two variables for a randomly selected data. The test is used to test if the two variables are statistically associated with each other significantly. The observed values represent the numbers of plants used in folk-songs and folk-proverbs (Tables 3, 4 and 5). The expected frequencies are calculated based on the conditions of null hypothesis. The rejection of null hypothesis is based on the differences of actual value and expected value. In the present study the researcher calculated characteristic of attributes of having discrete variables by using chi-square test. The most suitable test for the envisaged hypothesis was to apply, Chi-square test [28, 29]. The following formula was used to calculate Chi-square (χ^2) test for independence of attributes.

General computing formula for Chi-square,

$$\chi^2 = \sum (O_i-E_i)^2/E_i$$

With (r-1) (c-1) degrees of freedom

Where, O_i = Observed frequency

E_i = Expected frequency

r = number of rows and

c= number of columns

2.2. Data Collection: Primary Sources

The planned methodology aimed to collect maximum information in a modified "proforma for field work" [30] by using multistage sampling technique The sample size of 110 male (65.69%) and 62 female (36.04%) from 38 places (Thoubal District), 5 places (Imphal East District), 2 places (Imphal West District), 2 places (Chandel District) and 5 places (Bishnupur district) were randomly selected from Muslim community households of some villages and urban areas. The informants included *Maiba/Maibi* (Traditional healers) (9.88%), Bamboo based Artisans (12.20%), Students (11.62%), Imams and Cultivators (4.65%), Government Employee (12.20%), Cultivators or Farmers (33.13%), Business class (5.23%) and Jobless (11.04%).

2.3. Data Collection: Secondary Sources

The study of folk-songs [31-33] and folk-proverbs [22, 34, 35] were taken to find the usages of plants in categories of study i.e. Medicinal (M), Food and beverages (FB), Material culture (MC), Socio-religious (SR) aspects of plants and Cultivation of plants (CP). The techniques of field visits [36],

collection of plants [37], herbarium preparation [38] were consulted.

2.4. Study of Plants

The morphological study of plants followed the Bentham and Hooker's Classification system. The comparisons of plants were carried out at Gauhati University, Botanical Survey of India (BSI), Shillong and Kolkata. The herbariums of plants were submitted to Dept. of Botany, University of Science & Technology, Meghalaya.

3. Results

The plants used in folk-proverbs (Table 1) useful in various aspects are summarised as the following-

(1) *Food and Beverages: Alocasia macrorhizos* (L) G. Don. (cooked leaf, stem and corm), *Areca catechu* L (stimulatory), *Averrhoa carambola* L, *Rhus chinensis* Mill., *Grewia microcos* L, *Meyna spinosa* Roxb. ex Link., *Tamarindus indica* L (fruits eaten with chilli powder and salt), *Bambusa kingiana* Gamble (fresh and fermented bamboo shoot used to prepare curry); *Capsicum frutescens* L (preparation of chilly chatani); *Curcuma longa* L. (leaf cooked with small fish); *Ipomoea batatas* L (boiled root eaten); *Musa balbisiana* Colla (shoot and inflorescence used to make curry); *Nelumbo nucifera* Gaertn. (rhizome and ripe fruits are eaten); *Nymphae pubescens* Willd. (young stem and leaves are eaten), *Oryza sativa* L (staple food), *Piper betle* L (leaves are masticatory), *Riccia natans* L (duck food), *Saccharum officinarum* L (a thick syrup called Chuhi is made).

(2) *Medicinal plants: Alocasia macrorhizhos* (L) G. Don. (bee sting), *Areca catechu* L (tonsillitis), *Averrhoa carambola* L, *Tamarindus indica* L ((kidney stone), *Capsicum frutescens* L (burns), *Curcuma longa* L (skin antiseptic), *Imperata cylindrica* (L) Raeusch (anthelmintic), *Musa balbisiana* Colla. (skin allergy), *Oryza sativa* L (dog bite) and *Piper betle* L (anthelmintic).

(3) *Material culture: Bambusa kingiana* L (making of spread-sheet, fodder basket, ropes and soil carrier basket), *Gossypium arboreum* L (making cloth), *Imperata cylindrica* (L) Raeusch., *Oryza sativa* L (roofing, mattress), *Ricinus communis* L (making threads), *Tamarindus indica* L (hammer) and *Meyna spinosa* Roxb. ex Link (making shampoo).

(4) *Socio-religious functions: Areca catechu* L (gift to guests), *Bambusa kingiana* Gamble (used in grave cover process), *Musa balbisiana* L (flag post), *Oryza sativa* L (staple food) and *Piper betle* L (areca nut and this leaf is commonly eaten in social functions).

(5) *Cultivated Plants: Alocasia macrorrhizos* (L.) G. Don., *Capsicum frutescens* L, *Ipomoea batatas* L, *Saccharum officinarum* L (growing in the fields and home gardens), *Gossypium arboreum* L, *Musa balbisiana* Colla., *Areca catechu* L, *Averrhoa carambola* L, *Bambusa kingiana* Gamble (fields and homestead forests), *Eupatorium birmanicum* DC (gardens), *Grewia microcos* L, *Piper betle* L, *Tamarindus indica* L. (homestead forests), *Imperata cylindrica* (L) Raeusch (fields), *Nelumbo nucifera* Gaertn. (ponds and lakes) and *Riccia natans* Corda (ponds).

Table 1. Folk-Proverbs and transliteration, botanical names, families and vernacular names of plants.

Proverbs and transliteration	Botanical names, Families and Vern. Names
Ahing amma tumdaraga *Heitup* masung amatasu phang-ee (Ahing ama- one night, tumdaraga-not sleeping, *Heitup*- edible fruit, masung-piece, amatasu- even if one, phang-ee- obtained/achieved)	*Grewia microcos* L (Tiliaceae); *Heitup*
Angao *Phou*-shu chara nongkannei (Angao-seemingly mad, *Phou* shu-grinding paddy grain, chara-one meal, nongkhannei-fills stomach)	*Oryza sativa* L (Poaceae); *Phou*
Ee nana yatpa khayat-tasu shangom mapanga chiniga chai laina yatpa khayatpu chara henba hounabra (*Ee* nana-with reed leaf, yatpa-carved or marked, khayattashu-to such a mouth, shangom mapanga- with cream milk, chiniga –also with sugar, chai-eat, laina-by God, yatpa-marked, khayatpu-also such mouth, chara-one meal, henba-starving, hounade-impossible)	*Imperata cylindrica* (L.) Raeusch. (Poaceae); *Ee*.
Ekai khangdagi *Kang* kotli (Ekai-blushing face, khangdagi-to bear with, *Kang*-free floating plant, kotli-to pick up)	*Riccia natans* L.; Syn.: *Ricciocarpus natans* Corda (Ricciacea); *Kang*
Erujadana *Heibi* teiba (Erujadana - without bathing, *Heibi*- edible fruit plant, teiba- smearing or rubbing)	*Meyna spinosa* Roxb. Ex. Link. Syn.: *Vangueria spinosa* (Roxb. Ex.link) Roxb. (Rubiaceae); *Heibi*
Eshing lui lude *Tharo* marida khang-ee (Eshing-water, lui-deep, lude- shallow, *Tharo*- water lily, marida-to petiole, khang-ee- understand)	*Nymphae pubescens* Willd. (Nymphaceae); *Tharo*
Heinoujom yumbal telanga yahip (*Heinoujom*-carambola fruit, yumbal- way of living, telanga- kite, yahip- way of sleeping)	*Averrhoa carambola* L (Oxalidaceae); *Heinoujom*
Kwa matap amana chin pie (*Kwa* matap-areca nut and betel leaf with lime over the leaf, amana- with only one, chin-mouth, pie-curly or bent/satisfied)	*Areca catechu* L (Arecaceae); *Kwa* and *Piper betle* L (Piperaceae); *Kwa mana*
Laphoi charingeida khangdraga *Thambou* charakpada khang-ee (*Laphoi*- banana, charingeida- while eating, khangdraga- no sign, *Thambou*-rhizome of water lily, charakpada-on eating, khang-ee- come to public)	*Musa balbisiana* Colla. (Musaceae); *Laphu* and *Nelumbo nucifera* Gaertn.; (Nelumbonaceae); *Thambal*
Lawai *Langthrei* khongnembi thoudok khuding yaoganbi (lawai- village, *Langthrei*- a plant of cultural importance, thoudok-occasions, khuding-each, yaoganbi-much wanted)	*Eupatorium birmanicum* DC. (Asteraceae); *Langthrei*

Proverbs and transliteration	Botanical names, Families and Vern. Names
Manana *Heimang* shaba (Manana-with leaf, *Heimang*- edible fruits of varnish tree, shaba- substitutes).	*Rhus chinensis* Mill.; Syn.: *Rhus semialata* Murray (Anacardiaceae); *Heimang*
Morok metpada jat taba (*Morok*-chilli, metpada- to prepare a local 'chatani', jat taba- lowering standard).	*Capsicum frutescens* L (Solanaceae); Morok.
Mangda *Mangra* tanba (Mangda-in dreams, *Mangra*- sweet potato, tanba- to dig)	*Ipomoea batatas* L (Convolvulaceae); *Mangra*
Okchinda *Pan* thaba (Okchinda-to a mouth of pig, *Pan* –giant taro, thaba- cultivation)	*Alocasia macrorhizos* (Mart.) Griseb; Syn.: *Alocasia indica* (Lour) Schott. (Araceae); *Pan*
Ū - leitaba lamda *Kege* na yumbi ōi. (Ū - tree, leitaba - not available, lamda - to a country, *Kege* na - with castor plant, yumbi - house post, ōi - substitute)	*Ricinus communis* L (Euphorbiaceae); *Kege*
Sagol mamang punjao pubi nungshit mairam *Lashing* kappi (Sagol - horse, mamang - in front, punjao - big earthen pot, pubi - she carries, nungshit – wind, maram - way, *Lashing* - cotton, kappi - processing of cotton fibre)	*Gossypium arboreum* L (Malvaceae); *Lashing*
Sanagi mahut *Yaingang* na shilli (Sanagi-of gold, mahut-in place of, *Yaingang* na- with turmeric, shilli- replaces)	*Curcuma longa* L. (Zingiberaceae); *Yaingang*
Yongna *Chu* konbagum konba (Yong-na-by a Monkey, *Chu* -Sugar cane, konbagum- if very fondly holding, konba-embrace)	*Saccharum officinarum* L (Poaceae); *Chu*
Samu maya thindorakpa *Mange* thenguna yeishinba yade (Shamu - elephant, maya - trunk, thindorakpa - stretching, Mange - tamarind tree, thenguna - with hammer, yeishinba - recoil, yade - not allowed)	*Tamarindus indica* L (Fabaceae); *Mange*
Waton na wanglaga Kwakna phamdek-ee (*Waton* na-top of bamboo, wanglaga- being tall, Kwakna- by a crow, phamdek-ee- lowers it by sitting).	*Bambusa kingiana* Gamble; (Poaceae); *Watangkhoi*

Sources of folk-proverbs: *Secondary data* [24-35]
Sources of plants: *Primary data*

Table 2. Muslim (*Pangal/Meitei-pangal*) Folk-song, transliteration and associated plants (Botanical names, families and vernacular names).

Muslim Folk-songs	Transliteration	Botanical name, family and vernacular name
Kumsi *Kumna* tangle/Kumphu lingba angangdu kanano? /Kumphu lingba angangdu/*Sagol hidak* mapan chinbani/*Kekru* Dolai tongbani....	This year the produce of *Kumna* leaf is scanty/Who is that child? /Taking care of *Kumphu* (earthen pot)/It is the child who looks after the pot/Who embellishes flower of *Sagol hidak*/Riding palanquin made of *Kekru*.....	*Strobilanthes flaccidifolia* Nees; Syn.: *Strobilanthes cussia* (Nees) Kuntze (Acanthaceae); K*um*; *Datura stramonium* L (Solanaceae); *Sagol hidak*; *Sapindus trifoliatus* L (Sapindaceae); *Kekru*
Tamgi Khunu maingouba/Ipalgi louchi louyada/Chekla Chaktabiranu/"*Tera* khadabu loungakpi/…..	Valley pigeon who has fair complexion/Don't visit nearby Uncle or Father's agro-field to eat paddy grains/ "O girl who looks after the crop under *Tera* plant/……	*Bombax ceiba* L (Malvaceae); *Tera*
Nabnei shumai mathoubom/Thelong mata phabada/*Laphu* haroi yungledo/*Lahpu* haroi khudingda/Taojing heinou manana/*Changbi* kuyomnakhare/….	In your Uncle or Father's courtyard/That is well levelled/Made the *Laphu Changbi* plant standing/Over each *Laphu*/With the *Heinou* plant leaves/Main pillar is decorated/ ….	*Mangifera indica* L (Anacardiaceae); *Heinou; Musa balbisiana* Colla (Musaceae); *Laphu Changbi*
Thanga ningol kada/Numidang Tandan pairiba, karino? /"*Chakpi Uchan* meirani/Numidang kangbi khonnoubi phabani".....	What's that firefly? /Flying in the room of my beloved/ "It's the flame of (Chakpi, Chandel district) pine tree lighted/To catch sweet-singing night mosquitoes".....	*Pinus griffithii* McClell (Pinaceae); *Uchan*
Loktak epom mathakta/Mapan ngouna shariba, karino? /"*Heikak* kumnang tabini/Kalengi thammei oinasu kumshatli"...	What is that white flower? /With the waves of Loktak lake/"*Heikak,* that's black/It gives flower near the end of summer"....	*Trapa natans* L (Trapaceae); *Heikak*
Loibi mangai leibana/Panthou Hao karubana/Poirei chingmai ngallibi/Huining *Lashing* popchaobi/Haosham thanna lourakle/Tabu thanna purakle.....	At a far place in the hill/My father paid visit to his tribal friend/He brought *Haosham* (basket of tribals)/ and *Tabu* (valley basket) full of *Lashing* plant/*Lashing* of big kind /That is the light of a far hill slope....	*Gossypium arboreum* L (Malvaceae); *Lashing*
Chingda shatpa *U-Thambal*/Thambalgi mapao lougeda lakpadi/Mapu-o panba Thambal-dum oiramle.....	I came to ask about the tree lotus /That blooms in the land of hill/But tree lotus turned out to be pollinated.....	*Magnolia macrophylla* L. (Magnoliaceae); *U-Thambal*
Chigonglei pambi Yaimabi (female human being)/Nabangi Kharai thonganda/ *Chigonglei* nachom paiduna leplammu/…	Yaimabi, the second daughter of a family who adores *Chigonglei*/ Stay standing with a garland of *Chigonglei* /At your fathers' house gate.....	*Acacia farnesiana* (L) Willd.; (Fabaceae); *Chigonglei*
Sana *Shangbrei* makhongda/Lindu charang leibani, shokkani/..	In the place where *Shangbrei* plant (shine like gold) /There is rattlesnake, it will hurt you/ …	*Pogostemon cablin* (Blanco) Benth. Syn: *Pogostemon purpurascens* Dalz. (Lamiaceae); *Shangbrei*
Hada *Kusum* shak-henbi/Leirang Leikhal sudana/Sanouna khoidana lengliba/Karigi Leirang parengno? /"Leirang-na leikhal yamlaga/Leiyetna-ni keeduna/Naitom leidi *Kusum-lei*/.....	O handsome *Kusum*/What kind of garland are you making?/Absenting other kinds of flowers/In that lovely garland/Many a kind of flowers may create trouble/ In winning the heart of my darling/As such, I am making this lovely garland/Only with *Kusum* flower/....	*Carthamus tinctorius* L (Asteraceae); *Kusum-lei*
Khoinou eta tabara/*Heirangkhoi* heimei tabido/Taojing mapan sahoure/….	My friend, are you listening? *Heirangkhoi* plant of end season/ It bears a fruit (comparing a foetus)/..	*Garcinia xanthochymus* Hook.ex. T. Anderson (Clusiaceae); *Heirangkhoi*

Muslim Folk-songs	Transliteration	Botanical name, family and vernacular name
Thongjaorokki pakhang-o/Nangna ngarang haige-wa/Hairam-mone pakhang-o! /"Eina ngarang haige-wa/Eigina nongbrou khudopto pibiro/"Nang-gi nongbrou Khudopti/*Komla* houbi changjouda/*Champra* houbi hidenda/Ho, Laija eroi tambada tahoure".....	O lad from Thongjaorok (one village) Yesterday you wanted to say something/O Lad speak your mind/"Yesterday what I wanted to say was/Please return my finger ring that is glitter"/Your finger ring that is glitter/To the surface of water where *Komla* (*citrus*) grows/To the (boat) dock where Champra (*citrus*) grows/ Ho! It had fallen when I learned swimming.....	*Citrus reticulata* Blanco (Rutaceae); *Komla;* *Citrus limon* (L) Burm.f. (Rutaceae); *Champra*
Langban *Koukha* nungshibi/*Phou*-khong kada yetchabi/ Phukpirone heipal oina/Thabirone leiranglakta/Leiranglakta tharabadi/Khoimu toina engani / Khoimu toina ellabadi/Leirang leika phangani....	O lovely *Koukha* of (around September)/Always grow in the foot of the Paddy/ Pluck me as fruit/ Grow me among the flowers/If growing among the flowers/ Lest the bee visit very often/ If bee very often visits/ I will be pleased....	*Hedyotis auricularia* Roxb. (Rubiaceae); *Langban Koukha;* *Oryza sativa* L (Poaceae); *Phou*
Leichilna pomai tuba lam/*Charotna* mondum saba lam/Pamubi.....	O my dear/It is the land of cushion made of *Charot* /And fold of clouds in the sky.....	*Cymbopogon nardus* L (Poaceae); *Charot*
Waida kouba haiganu/Ngamdeda kouba shonganu/Ngasina koirou numitta/Ha Hei Hei Hai/He Hei Hei Hai/*Shebot*-ta *Mairen* tok-kummi/*Sougree*-da Ngakichou thakkummi....	In this very day/Don't say one is tired/That you are not able to do/expression of encouragement (twice)/It is like putting *Mairen* in the curry of *Shebot* /Adding *Ngakichou* (a fish) in the curry of *Sougree*....	*Luffa cylindrica* (L) M. Roem. (Cucurbitaceae); *Shebot*; *Cucurbita maxima* Duch. (Cucurbitaceae); *Mairen*; *Hibiscus cannabinus* L (Malvaceae); *Sougree*
Awangnabu lamdi lamnungshi/*Khamen*-lokki lokmai/*Pullei* houbina lokchap/*Yaipal* houbibu lokmang…/Haorougi khallei pheidomdi ashitpa…/*Hup*-chitki maranbu lanbada…../*Kabrang*-gi langdi *Kabrang* Lang/Muki langdi *muka* Lang/Langja langlam taranithoina…/Pakhang-gi tengna lang-maktabu thakpadi nungshiba…. /Pakhang-gi tengna langnadi kanba hen/Ningolgi samma pangalnadi sonbana../Pakhang-gi tengna lang yeithatpabu/Ngamdrene nungshiba.....	O lovely land in the north/In front of gorge where *Khamen* (eggplant) growing /In the rift valley where *Pullei* or *loklei* grows/In front of hill gorge where *Yaipal* (*Curcuma*) grows/Next to the place where *Hup* grows/…. O dear you build a trap/Made from threads spin from *Muka* or *Kabrang* plant /The trap that is made from twelve kinds of threads/O dear I am trapped in the net that is strong/But I am weak/And I can't get rid off.....	*Solanum melongena* L (Solanaceae); *Pangal Khamen;* *Alpinia allughas* (Retzius) Roscoe. (Zingiberaceae); *Pullei or Loklei;* *Curcuma angustifolia* Roxb. (Zingiberaceae), *Yaipal;* *Echinochloa stagnina* (Retz.) P. Beuv. (Poaceae); *Hup;* *Morus macroura* Miq. Syn. *Morus laevigata* Wall ex Brandis (Moraceae); *Kabrang or Muka*

Sources of folk-songs: *Secondary data* [31-33]
Source of plants: *Primary data*

The plants used in folk-songs (Table 2) found useful in various aspects are enumerated as the following-

Food and Beverages: *Alpinia allughas* (Retz.) Roscoe, *Curcuma angustifolia* Roxb., *Musa balbisiana* Colla, *Solanum melongena* L (preparation of one local culinary called Eromba); *Cucurbita maxima* Duch., (cooked with fermented bamboo); *Hibiscus cannabinus* L. (cooked with fermented fish); *Mangifera indica* L (raw and ripe fruit eaten with sugar, chilly and salt); *Luffa cylindrica* (L) M. Roem (cooked with dry fish); *Oryza sativa* L (human staple food and animal food); *Garcinia xanthochymus* Hook ex T. Anderson, *Citrus limon* (L) Burm. f., *Citrus reticulata* Blanco, *Trapa natans* L (raw and boiled fruits eaten) and *Echinochloa stagnina* (Retz.) P. Beuv. (animal food).

Medicinal plants: *Acacia farnesiana* (L.) Willd (spine use as antiseptic), *Citrus limon* (L.) Burm f. (persistent cough); *Cucurbita maxima* Duch. (night blindness), *Datura stramonium* L (hallucinogenic); *Hedyotis auricularia* L (kidney stone); *Hibiscus cannabinus* L, *Mangifera indica* L (appetizer); *Magnolia macrophylla* L (madness); *Musa balbisiana* Colla (skin allergy); *Oryza sativa* L (dog bite), *Pogostemon cablin* (Blanco) Benth. (bathing of corpse) and *Sapindus trifoliatus* L (anthelmintic cum fever for children).

Material Culture: *Gossypium arboreum* L, *Bombax ceiba* L (making pillow, cloth), *Cymbopogon nardus* L (house wall), *Morus macroura* Miq. (making thread), *Oryza sativa* L. (making mattress), *Pinus griffithii* McClell (fire stimulant), *Pogostemon cablin* (Blanco) Benth (shampoo) and *Strobilanthes flaccidifolia* Nees (dye).

Socio-religious aspects: *Acacia farnesiana* (L) Willd (to pierce nasal edge), *Musa balbisiana* Colla (flag post), *Oryza sativa* L (food plate) and *Pogostemon cablin* (Blanco) Benth (religious bathing of dead bodies).

Cultivated Plants: *Carthamus tinctorius* L (ornamental plant growing in fields and gardens); *Citrus limon* (L) Burm. f., *Citrus reticulata* Blanco. *Garcinia xanthochymus* Hook.ex. T. Anderson, *Gossypiun arboreum* L, *Magnolia macrophylla* L, *Mangifera indica* L, *Musa balbisiana* Colla (homestead forest plants); *Cucurbita maxima* Duch., *Hibiscus cannabinus* L, *Luffa cylindrica* (L) M. Roem., *Morus macroura* Miq, *Solanum melongena* L (agro-fields, house gardens); *Oryza sativa* L (wet agro-fields), *Pogostemon cablin* (Blanco) Benth. (graveyards, house gardens, mosque campus); and *Trapa natans* L. (ponds, lakes).

Table 3. List of plants used in folk-proverbs and their potentials/utilities in different categories (FB, M, MC, SR and CP) of human affairs.

Plants used in Folk-proverbs	FB	M	MC	SR	CP
Alocasia macrorrhizos (L.) G. Don. (Araceae); MMA644	+	+	-	-	+
Areca catechu L (Arecaceae); MMA521	+	+	-	+	+
Averrhoa carambola L (Oxalidaceae); MMA622	+	+	-	-	+
Bambusa kingiana Gamble (Poaceae); MMA263	+	-	+	+	+
Capsicum frutescens L (Solanaceae); MMA636	+	+	-	-	+
Curcuma longa L. (Zingiberaceae); MMA309	+	+	-	-	+
Eupatorium birmanicum DC (Asteraceae); MMA405	-	-	-	-	+
Gossypium arboreum L (Malvaceae); MMA364	-	-	+	-	+
Grewia microcos L (Tiliaceae); MMA773	+	-	-	-	+
Imperata cylindrica (L) Raeusch (Poaceae); MMA491	-	+	+	-	+
Ipomoea batatas L (Convolvulaceae); MMA249	+	-	-	-	+
Musa balbisiana Colla. (Musaceae); MMA108	+	+	-	+	+
Nelumbo nucifera Gaertn. (Nelumbonaceae); MMA713	+	-	-	-	+
Nymphae pubescens Willd. (Nymphaceae); MMA412	+	-	-	-	+
Oryza sativa L (Poaceae); MMA298	+	+	+	+	+
Piper betle L (Piperaceae); MMA264	+	+	-	+	+
Rhus chinensis Mill. Syn.: *Rhus semialata* Murray (Anacardiaceae); MMA535	+	-	-	-	-
Riccia natans Corda, Syn.: *Ricciocarpus natans* L (Ricciaceae); MMA709	+	-	-	-	+
Ricinus communis L (Euphorbiaceae); MMA212	+	-	+	-	+
Saccharum officinarum L (Poaceae); MMA204	+	-	-	-	+
Tamarindus indica L (Fabaceae); MMA289	+	+	+	-	+
Meyna spinosa Roxb. Ex. Link. (Rubiaceae); MMA292	+	-	+	-	-

(+) means used and (-) means not used
(FB=Food and Beverages; M= Medicinal; MC= Material Culture; SR= Socio-religious; CP= Cultivated Plants).
Source: Primary data

Table 4. List of plants used in folk-songs and their potentials/utilities in different categories (FB, M, MC, SR and CP) of human affairs.

Diversity of Plants used in Folk-song	FB	M	MC	SR	CP
Acacia farnesiana (L) Willd. (Fabaceae); MMA529	-	+	-	+	-
Alpinia allughas (Retzius) Roscoe. (Zingiberaceae); MMA291	+	-	-	-	-
Bombax ceiba L (Malvaceae); MMA293	-	-	+	-	-
Carthamus tinctorius L (Asteraceae); MMA624	-	-	-	-	+
Citrus limon (L) Burm.f. (Rutaceae); MMA607	+	+	-	-	+
Citrus reticulata Blanco. (Rutaceae); MMA625	+	-	-	-	+
Cucurbita maxima Duch. (Cucurbitaceae); MMA267	+	+	-	-	+
Curcuma angustifolia Roxb. (Zingiberaceae); MMA614	+	-	-	-	-
Cymbopogon nardus L (Poaceae); MMA727	-	-	+	-	-
Datura stramonium L (Solanaceae); MMA268	-	+	-	-	-
Echinochloa stagnina (Retz.) P. Beuv. (Poaceae); MMA266	+	-	-	-	-
Garcinia xanthochymus Hook.ex. T. Anderson (Clusiaceae); MMA399	+	-	-	-	+
Gossypiun arboreum L (Malvaceae); MMA364	-	-	+	-	+
Hedyotis auricularia Roxb. (Rubiaceae); MMA417	-	+	-	-	-
Hibiscus cannabinus L (Malvaceae); MMA229	+	+	-	-	+
Luffa cylindrica (L) M. Roem. (Cucurbitaceae); MMA384	+	-	-	-	+
Magnolia macrophylla L (Magnoliaceae); MMA883	-	+	-	-	+
Mangifera indica L (Anacardiaceae); MMA362	+	+	-	-	+
Morus macroura Miq. Syn.: *Morus laevigata* Wall ex Brandis (Moraceae); MMA626	-	-	+	-	+
Musa balbisiana Colla (Musaceae); MMA108	+	+	-	+	+
Oryza sativa L (Poaceae); MMA298	+	+	+	+	+
Pinus griffithii McClell (Pinaceae); MMA162	-	-	+	-	-
Pogostemon cablin (Blanco) Benth. Syn.: *Pogostemon purpurascens* Dalz. (Lamiaceae); MMA705	-	+	+	+	+
Sapindus trifoliatus L. (Sapindaceae); MMA385	-	+	-	-	-
Solanum melongena L (Solanaceae); MMA636	+	-	-	-	+
Strobilanthes flaccidifolia Nees (Acanthaceae); MMA290	-	-	+	-	-
Trapa natans L (Trapaceae); MMA410	+	-	-	-	+

(+) means used and (-) means not used
(FB=Food and Beverages; M= Medicinal; MC= Material Culture; SR= Socio-religious; CP= Cultivated Plants); *Source: Primary data*

Table 5. Observed (O) values of plants in Folk-proverbs and Folk-songs.

Sl. No.	Categories of utilities of plants	Folk-proverbs (No. of plants) (O)	Folk-songs (No. of plants) (O)	Total ∑N
1	FB	19	14	33
2	M	10	12	22
3	MC	7	8	15
4	SR	5	4	9
5	CP	20	16	36
	Total	61	54	115

(FB=Food and Beverages; M= Medicine; MC= Material Culture; SR= Socio-religious; CP= Cultivated Plants)
Source: Primary data

Table 6. Chi-Square test for the test of the hypothesis.

Sl. No.	Expected Values (E_i)	(O_i-E_i)	(O_i-E_i)^2
1	E1=61x33/115= (17.50)	19-17.50= (1.5)	2.25
2	E2=61x22/115= (11.66)	10-11.66= (-1.66)	2.7556
3	E3=61x15/115= (7.95)	7-7.95= (-0.95)	-0.9025
4	E4=61x9/115= (4.77)	5-4.77= (0.23)	0.0529
5	E5=61x36/115= (19.09)	20-19.09= (0.91)	0.8281
6	E6=54x33/115= (15.49)	14-15.49= (-1.49)	2.2201
7	E7=54x22/115= (10.33)	12-10.33= (1.67)	2.7889
8	E8=54x15/115= (7.04)	8-7.04= (0.96)	0.9216
9	E9=54x9/115= (4.22)	4-4.22= (-0.22)	0.0484
10	E10=54x36/115= (16.90)	16-16.90= (-.90)	0.81
	∑E= 114.95		∑ (O_i-E_i)^2=13.5781

Result of Chi-square test, $\chi^2 = \sum (O_i-E_i)^2/E_i = 13.5781/114.95 = 0.118$

Calculated Value = 0.118

Degree of freedom = (c-1) (r-1)

= (5-1) (2-1)

= 4x1= 4

(c for column and r for row)

The table Value of Chi-square for 4 degrees of freedom at 5% level of significance is 9.488.

Table value (9.488) > Calculated value (0.118).

4. Discussion

4.1. Plants Used in Folk-Proverbs and Folk-Songs

The study of folk-proverbs and folk-songs reveals various utilities of plants in the community. It is noted, "folklore especially folk-songs, proverbs and tales have references to certain interesting properties on aspects of plants" [37]. The reference of plants in Manipuri folk-proverbs has been studied in the present research (Table 1). These plants have been found to be potentially useful as medicinal plants, food and beverages, tools, functionally used plants and cultivated plants (Table 2).

Likewise, the utilities of plants have been confirmed by studying Muslim folk-songs (Table 1). It was confirmed that such plants mentioned in folk-proverbs and folk-songs are cultivated in the region (Tables 3 and 4).

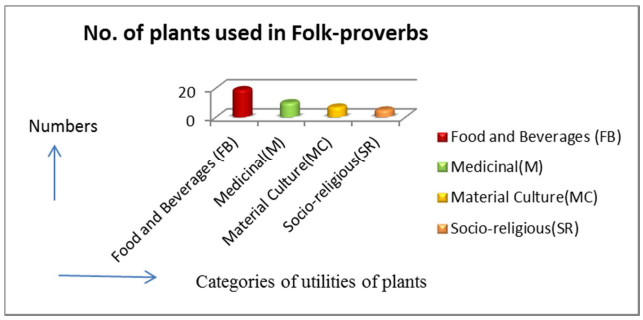

Figure 1. Potentials/Utilities of plants used in Folk-proverbs as Food and Beverages, Medicines and Material Culture

Source: Field Survey.

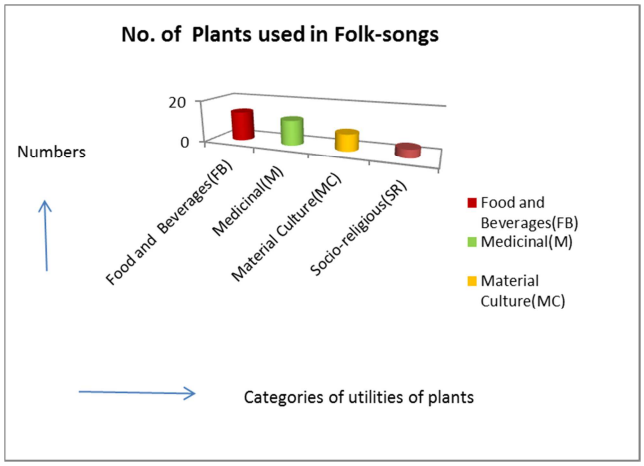

Figure 2. Potentials/Utilities of plants used in Folk-songs as Food and Beverages, Medicines and Material Culture.

Source: Field Survey

The plants used within the categories of medicinal and food and beverages are most commonly used by the community (Figures 1 and 2) followed by plants used in socio-religious scenario. The mention of different plants and their utilities in folk songs and folk proverbs reflect value users have laid on these plants traditionally.

It can be stated that man-plant interaction depicted a clear dependence of humans on plants to improve the general quality of life. On the contrary, there are some plants which are selectively avoided, for e.g. the seeds of the plant *Datura stramonium* L is avoided because they are known to be hallucinogenic (*ngaoba* or *tarang chatpa*). They act on the brain to cause delirium [39]. This is established within the scope of current research and finds similarity in "the tapping off heritage of ethnobotanical lore" [40].

The community grows *Shangbrei* [*Pogostemon cablin* (Blanco) Benth] in and around graveyards and houses; the leaves of which are boiled with plain water to wash the dead bodies. The application of perfume was regarded a *Sunnah* (following the life of prophet) and the process of extracting perfume was conducted in this act as a religious ritual called *Asiba-Erujabiba* (bathing of corpse). Hence, the plant *Pogostemon cablin* (Blanco) Benth. found significance in religious functions and thus found reference in Muslim folk-songs. The fruit of the plant *Sapindus trifoliatus* L (*Kekru*) is considered a good remedy to curb high temperature in children. Further research is warranted to understand the chemical composition and mechanism of healing action of some useful plants like *Imperata cylindrica* (L) Raeusch and *Sapindus trifoliatus* L. The plants such as *Sapindus trifoliatus* L (fruit used to cure fever), *Garcinia xanthochymus* Hook.f.ex T. Anderson (fruit eaten) and *Strobilanthes flaccidifolia* Nees (*Kum*) (leaf used to dye cloths) are rare plants [22].

Some plants such as *Heibi* (*Meyna spinosa* Roxb.ex Link.), *Mange* (*Tamarindus indica* L), *Heimang* (*Rhus chinensis* Mill.) bear edible fruits and are found in valleys and hills. These plants along with turmeric (*Curcuma longa* L.), sugarcane (*Saccharum officinarum* L*),* sweet potato (*Ipomoea batatas* L), banana (*Musa balbisiana* Colla), bamboo(s) shoot (*Bambusa kingiana* Gamble), chilly (*Capsicum frutescens* L) etc. are potential food plants and has economic value in the market. These plants also find reference in the spoken folk-proverbs of the community [22].

4.2. Hypothesis Testing

This hypothesis (H_0) has been applied to denounce any difference in usages of plants used in folk-songs and folk-proverbs. Folk songs and folk proverbs have made mention of plants which have been used by various ways by the community. Therefore, a null hypothesis is considered in this study that there is no difference in the utility of these plants that found mention in folk songs and proverbs. The current study results have been able to classify plants (that found reference in folk songs and proverbs) based on their utility/purpose: Food and beverages (FB), Medicinal (Med), Material culture (MC), Socio-religious aspects of plants (SR) and cultivated plants (CP). Testing of the hypothesis would help confirm if this difference in utility of plants as identified in study results is statistically significant. The expected (E) values have been calculated (Table 6) by using data (Table 5). The calculated value of Chi -square χ^2 is 0.118. The table value of χ^2 for 4 (four) degrees of freedom at 5% level of significance is 9.488. The hypothesis has been accepted because the calculated value of χ^2 (0.118) is much lower than the table value (9.488). So, it is concluded that there is no difference between the various uses of the plants studied in Folk-songs and Folk-proverbs.

5. Conclusion

The plants used in human language are of various uses. It tells us that useful plants cannot be forgotten. It is reflected in Manipuri (local language) to show that plants are indispensible in day to day life of Pangal/Meitei Pangal community of Manipur state, India. They are trying to cultivate useful plants at their surroundings. This has proved that Meitei Pangal community take interest in cultivation or ethno-domestication or conservation of plants.

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