



Preference of Underutilized Vegetables in Traditional Manipuri Cuisine: Delicacy and Health Benefits

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ABSTRACT

The North Eastern region of India comprising of eight states namely Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Tripura and Sikkim, is one of the richest reservoirs of different underutilized vegetable crop species (UVCS). These underutilized or underexploited plants are used or consumed in many forms as raw or cooked by the local people. As differed from the other parts of the country, the underutilized vegetable species are found abundantly in this part of the region and it forms an important part of the local food and cuisines. Various delicacies and products are prepared comprising of the various UVCS along with meat and fish. Apart from the nutritional value, these UVCSs are used for medicinal purposes, for income generation and poverty alleviation. Some of these crop species may be widely distributed globally, but are restricted to a more local production and consumption system. With good adaptation to often marginal lands, they constitute an important part of the local diet of communities providing valuable nutritional components, which are often lacking in staple crops. The local delicacies prepared from UVCS are a must in the everyday lives of the people and sometimes it is even more prominent and important than the standard staple crops and vegetables. Here, an effort has been made to list out the various underutilized crop species and the delicacies prepared from them by the local people of Manipur. Research attentions and interests should be taken in these underutilized crops for exploring new food crops and also food security of the country.

1. Introduction

Vegetables are important sources of protective foods, which are highly beneficial for the maintenance of good health and prevention of diseases (Sheele *et al.*, 2004; Nnamani *et al.*, 2007). They account for about 10% of the world higher plants often regarded as weeds. Some indigenous leafy vegetables grow in the wild and are readily available in the field as they do not require any formal cultivation. Many of them are resilient, adaptive, and tolerate adverse climatic conditions more than the exotic species (Raghuvanshi, 2001). Although they can be raised comparatively at lower management cost and on poor marginal soil, they have remained underutilized, due to lack of awareness of their nutritional values in favour of the

exotic ones (Chweya *et al.*, 1999; Odhav, 2007). Indigenous leafy vegetables represent inexpensive but high quality nutritional sources for the poor segment of the population especially where malnutrition is wide spread as in some part of the underdeveloped countries in particular. Leafy vegetables are rich sources of carotene, ascorbic acid, riboflavin, folic acid and minerals like calcium, iron and phosphorous (Nnamani *et al.*, 2007). George (2003) stated that even though the bulk of their weight is water, leafy vegetables represent a veritable natural pharmacy of minerals, vitamins and phytochemicals. Community-based seed conservation and multiplication has been used in the Philippines as an approach to enhance the adoption of nutrient-dense traditional vegetables and to generate additional farm income (Ebert *et al.*, 2013).

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Apart from their commercial, medicinal and cultural value, traditional vegetables are also considered important for sustainable food production as they reduce the impact of production systems on the environment. Many of these crops are hardy, adapted to specific marginal soil and climatic conditions, and can be grown with minimal external inputs (De la Peña *et al.*, 2011; Hughes *et al.*, 2013). Value addition by applying appropriate production and postharvest techniques ensures that high quality produce reaches the market and satisfies consumer expectations. In Eastern Africa and Southeast Asia selected traditional vegetables are becoming an increasingly attractive food group for the wealthier segments of the population and are slowly moving out of the underutilized category into the commercial mainstream (Weinberger, 2007). Attracted by the strong market demand, seed companies are beginning to explore and develop these popular crops, thus strengthening the formal seed sector (AVRDC, 2008). Diversity of agro-climate distribution across the length and breadth of our nation has great impact on crop diversity resulting food diversity. Food diversity affects eating habit of the people living in different agro climatic conditions. The North Eastern Region especially Manipur, located in the eastern Himalayan ranges endowed with rich biodiversity is the home of colourful ethnic communities following different food habits. People living in the hill and valley have rich traditional knowledge of plants and herbs which are edible, with their direct impact on health benefits; they have a tradition of eating raw leaves, young inflorescences, and tender stalks as nutrient supplement in their diets. Traditional knowledge of eating raw plants by inhabitants of Manipur as medicinal or health supplement in their diet is an age old practice. Different underutilized vegetables are used for preparation of delicious dietary items. Some of them are winged bean (*Tengnomanbi*), sword bean (*Tebi*), Rhizome of lotus (*Thambou*), arrowhead (*Koukha*), fermented and non-fermented bamboo shoot (*Usoi/ soibum*), Foxnut (*Thangjing*) *etc.* Our recent study was carried out keeping in mind the importance of underutilized plants and its economic values in the state of Manipur.

2. Study Area

The present survey was carried out in Imphal valley which is located at 23°45' N to 25°00'N and 93°43'E to 94°15' covering with an area of 1843s q.km comprising of four districts (Imphal East, Imphal West, Thoubal and Bishnupur) inhabited by *Meitei* community (Figure. 1). The average altitudes of the valley is about 750m above MSL and represent a typical subtropical zone with cool,

dry winter, a warm summer and a moderate monsoon season. The rainfall ranges from 933 mm in the valley to 2593 mm in the hills. The temperature ranges from a minimum of sub-zero to 36°C. The natural vegetation accounts for 64 per cent of the total geographical area and the prevailing agro-climatic zones have indeed shelters a rich natural underutilized fruit species, medicinal and aromatic plants and underutilized vegetables scattering in undulated hilly terrain. These underutilized fruits, vegetable and medicinal plant species have been the principal source of nutritional food for the local people and also a rich source of ingredients of natural herbal shampoo. The present work was based on the methological field survey conducted during the year 2013 to 2014. Local people of 30-75 age group of both genders are interviewed (using standard questionnaires) on the different types of plants parts they been used for generations and benefit they obtained from the underutilized vegetables. The specimens of the plants are collected and identified on the basis of vernacular name, regional floras and published literatures (Deb, 1961; Hore, 1998; Jain *et al.*, 1977 and Singh *et al.*, 2003). They are enumerated alphabetically with common name, scientific name, local name, family, habit of the plants and its part used.

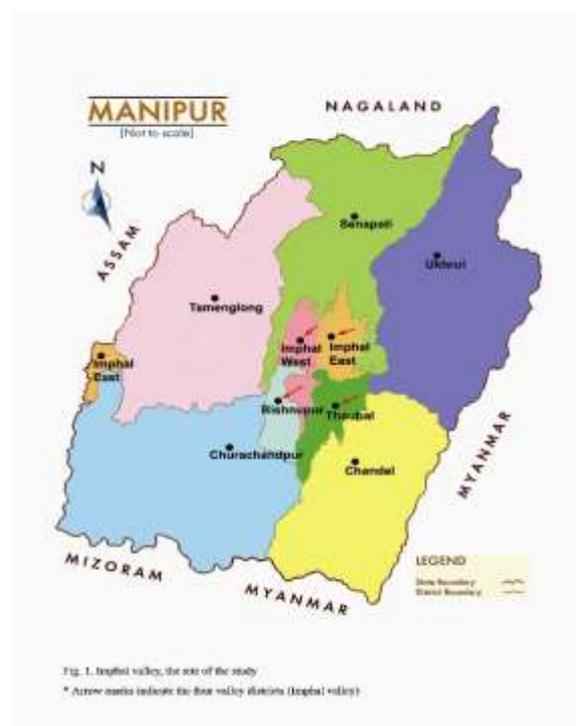


Figure 1. The site of survey, Imphal valley (Arrow marks indicate the four valley districts)

3. Different uses of underutilized vegetables in local cuisine

During the survey, altogether 31 underutilized vegetable plants belonging to 29 genera and 20 families were identified

from different valley of Manipur inhabited by the Meitei community. The different traditional Manipuri cuisines prepared from different underutilized vegetables by the local people from time immemorial are documented as below.

Singu: It is a typical Manipuri salad prepared by mixing finely chopped raw vegetables with salt, red chilli, roasted sesame powder, roasted pea powder (Besan). It is originated from Meitei community of Manipur but well eaten by the sibling communities of the state. Singju is of two types - without fermented fish and with fermented fish. The former type is mainly served at ritual occasions, ceremonial, traditional and customary festive feast while the latter type is for home consumption. Singju has been the all time favourite side dish for meals and as afternoon or evening snacks too. Though this is a popular food item, it remains as an underutilised food due to its little or lack of commercial market. Variety of green vegetables are used to prepare different / recipe of singju. Some of the vegetables which are commonly used for preparing singju are Lotus Rhizome (Thambou), unripe papaya, winged bean, cabbage, sword bean, banana flower (laphutharo), water parsley, tender shoots of pea, water mimosa, stink bean, etc. The chopped vegetables are mashed along with chillie, besan, salt etc.

Eromba: It is one of the most popular dishes of Manipur. It is a type of chutney made with boiled vegetables mashed with chilli, potato and fermented fish. It can be made with any vegetables depending on our culinary imagination like Stink bean eromba, colocasia eromba, bamboo shoot

eromba, broad bean eromba, etc. To make it tastier, it is garnished with herbs like Chinese chive, coriander leaves, lemon basil, chameleon leaves and roots and many more. It can also be prepared without fermented fish by using fried chillie, fried chives, onions etc.

Paknam: It is a type of pancake prepared by using besan along with a mixture of hooker chives (Maroinapakpi), young banana inflorescence, pea flour, wild coriander and fermented fish, salt, chilli and spices. All the content are mashed properly and the pea flour (besan) is added into it, which should be mixed thoroughly and placed in one or two layers of turmeric leaves, final wrapping can be done by using banana leaf. The whole content is baked on a hot pan and a light weight is placed upon it. After 30 to 45 minutes it imparts a typical flavour which indicates the product is cooked. Instead of this, it can be cooked in steam, the preparation can be sealed in a small tiffin box and put inside pressure cooker for up to 3 whistles and then pan roast until it turn to somewhat brown. Paknam can also be prepared by using tree mushroom (Kanglayan) instead of the vegetables.

Khoukha Bora/ Koukha Kanghou (Arrowhead fritters /fried):

Arrowhead is the edible tuber of the arrowhead plant which grows in rice field and swamps. In Manipuri cuisine, it is eaten stir fried (koukha kanghou) or as fritters (koukha bora). It is prepared by frying the arrowhead dipped in besan paste. It is famous for its taste and delicacy in every local markets and small hotels (Figure. 2).



Figure 2. Varieties of delicacies prepared from underutilized vegetables by the Meiteis

(a) Mixed vegetable singju (b) Lotus Rhizome singju (c) Stink bean singju (d) Stink bean Eromba (e) Banana inflorescence Eromba (f) Paknaam (g) Arrowhead fritters mixed with Chinese chive (h) Indian pennyworth kangshu (i) Kangsoi (j) Usoi ooti (k) Chagempomba

Kangshu: *Kangshu* is another typical traditional food which is popular in Meitei community. Indian Penny worth (*Peruk*) is cooked in pressure cooker up to 2 whistles and squeezed dry to remove water and mashed with boiled roasted dried yellow peas and mix with fermented fish, red chilli and salt. *Kangshu* can be prepared with non-fermented bamboo shoot (*Ushoi kangshu*), *wendlandia paniculata* (*U-thummana khangsu*) etc. (Figure 2).

Kangsoi: It is a mixture of various boiled vegetable along with fermented fish, dried fish, chillies and salt, Chinese chive, hooker chives. Various underutilized vegetables are used in preparation of *kangsoi* such as *P.olygonium orientale* (*yellang*), *Persicaria posumba* (*kengoi*), *Stellaria media* (*Yerum keirum*), etc. *Kangsoi* is generally an important and daily consumed cuisine in Manipuri house hold (Figure 2).

Ooti: *Ooti* is a very well known cuisine of Manipur, cooked and consumed in every house. It is cooked using non fermented bamboo shoot (*Ushoi*) along with dried yellow peas after soaking it overnight. Chinese chives, salt, chilli. Sodium bicarbonate is one of the compulsory ingredients in the preparation of *ooti* for its flavour. Another kind of *ooti* is *ooti asaangba* (*green ooti*) which is prepared with rice and colocasia leaves. One should keep in mind that stirring with spoon during the whole process of preparation should not be done as it will render the *ooti* lack of taste (Figure. 2).

Chagem Pomba :*Chagem pomba* is also one of the important dishes of manipuri's which is prepared by mixing varieties of vegetables , dried fish, fermented fish, salt,

chilli, turmeric powder, bay leaf, muatard oil chinese chive, cut rice and fermented soybean. Some vegetables which are used in preparation of *Chagempomba* are water mimosa, mustard leaf, pea tips, stink bean, broad bean, and pea. Cut rice and fermented soybean is compulsory to put in preparation of *chagempomba*. Cut rice is called *chagem* in Manipuri, from which it derives its name, *chagempomba* (Figure. 2). The list of underutilized vegetables consumed by Manipuri people as raw or cooked along with their scientific names, uses as delicacy and health benefits are given in table 1 and figure 3. The family dominance and the % of plant parts as usage are presented in figure 4 & 5 for a better knowledge of the preference of underutilized crops in this region.

Conclusion

These underutilized vegetables are available freely or consumed in many forms as raw or cooked by the Meitei community in Manipur from time immemorial. They are used for various local delicacies preparation due to its medicinal value and good taste. However, little attention is paid on these crops and hence no proper scientific methods of nutritional and chemical profiling and agro techniques of these plants have not been worked out till now. Therefore, without further delay documentation should be done and conserved as a nutritional vegetable for the future generation.

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Figure 3. Some underutilized vegetables used in preparation of delicacies by the Meiteis (a) Winged bean (b) Arrowhead (c) Foxnut (d) Sword bean (e) Banana flower (f) Hooker chives (g) Chameleon plant (h) Chinese chives (i) Rhizome of lotus (j) Water mimosa (k) Stink bean (l) Non-fermented bamboo shoot (m) Rhizome of ginger lily (n) Bamboo shoot (o) Broad bean

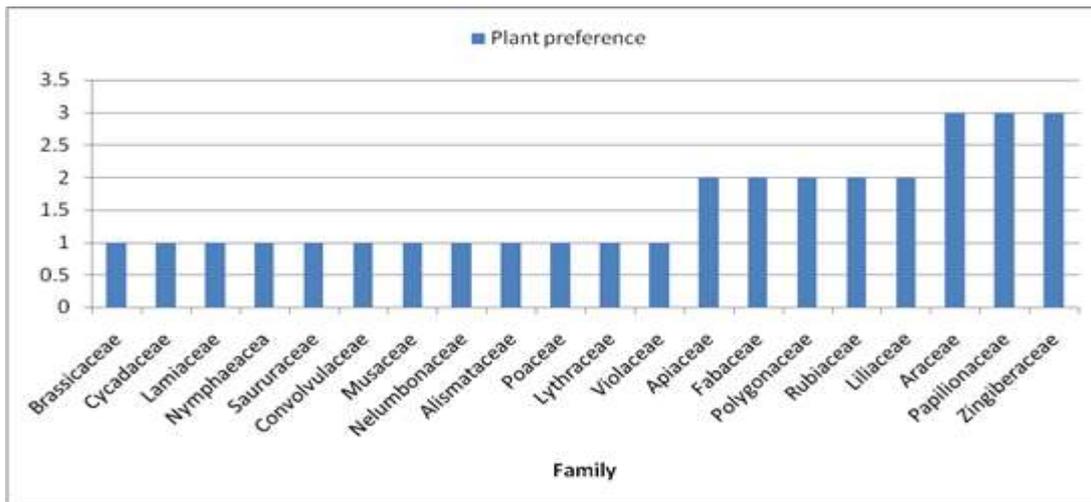


Figure 4. Family dominance curve of the plants

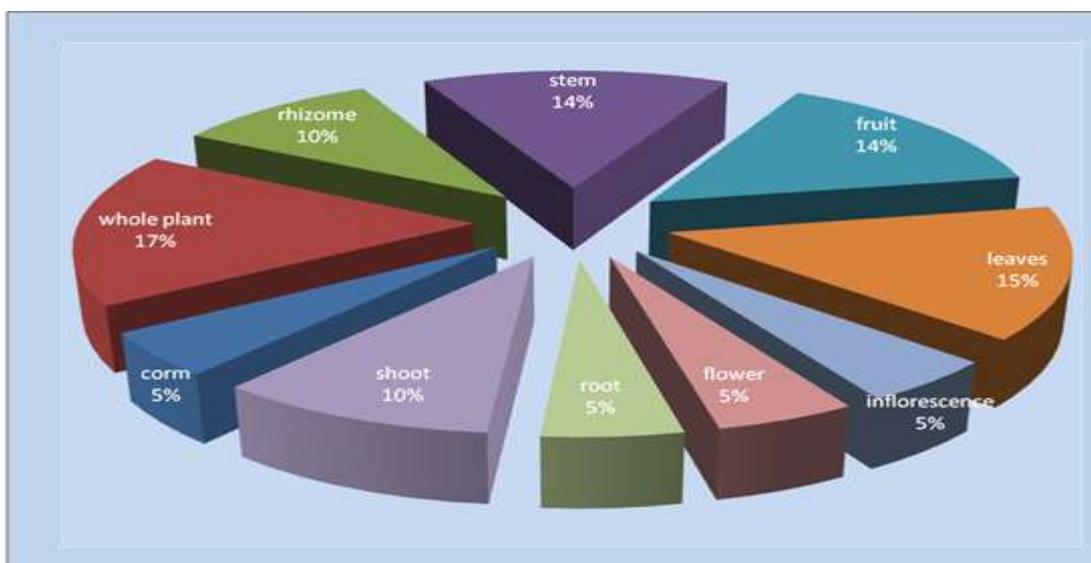


Figure 5. Percentage of plant parts as per usage

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Table 1. Common Underutilized vegetables of Manipur, their dietary uses and health benefits

| Sl. No | Scientific Name | Local name | Family | Parts uses | Dietary uses and preparation | Medicinal Values |
|--------|-----------------------------|---------------|---------------|-------------|--|--|
| 1 | <i>Alocasia macrorrhiza</i> | Singju-paan | Araceae | Corm | Corm cooked with fermented soybean. One of the important ingredients of <i>singju</i> . | Purify blood |
| 2 | <i>Allium hookeri</i> | Maroinapak pi | Liliaceae | Whole plant | Leaves are used in <i>paknam</i> , other Manipuri dishes and root are also used in fish curry. | Aphrodisiac |
| 3 | <i>Allium tuberosum</i> | Maroinakup pi | Liliaceae | Whole plant | Leaves are used in preparing fritter and can be used in different Manipuri dishes. | Aphrodisiac and diuretic. |
| 4 | <i>Alpinia nigra</i> | Pullei | Zingiberaceae | Rhizome | Rhizome used in eromba (used in religious ceremonies, symbolic of Manipuri New Year) | Carminative, aphrodisiac, tonic, diuretic, expectorant, appetizer and analgesic. Skin infections |

| | | | | | | |
|----|-----------------------------|--------------|----------------|---------------|--|--|
| 5 | <i>Alocasia indica</i> | Yendem | Araceae | Stem, rhizome | Whole plant can be used in <i>eromba</i> and <i>kangsoi</i> preparation. | Purify blood |
| 6 | <i>Amomum aromaticum</i> | Namra | Zingiberaceae | Stem, rhizome | Rhizome as a constituent in the preparation of <i>eromba</i> . | Powder is taken to control high blood pressure. |
| 7 | <i>Canavalia cathartica</i> | Tebi | Papilionaceae | Fruit | Young pods are used in <i>singju</i> , <i>eromba</i> , <i>chagempombapreparati on</i> . | Anthelmintic or vermifuge. |
| 8 | <i>Cardamine hirsuta</i> | Chantrukmana | Brassicaceae | Stem, leaves | Whole plant except root is used in <i>singju</i> . | Diuretic, paste is applied on cut and injuries |
| 9 | <i>Centella asiatica</i> | Peruk | Apiaceae | Whole plant | Whole plants except root is used in preparation of <i>kangshu</i> , <i>simple boil</i> or eat as raw. | Expectorant and against cold & gastric. |
| 10 | <i>Colocasia esculenta</i> | Lam paan | Araceae | Stem, leaves | Corm and leaf cooked eaten as <i>ooti</i> . | Extract is tonic, given in cough and diabetes. |
| 11 | <i>Cycas pectinata</i> | Yendang | Cycadaceae | Leaves | Young shoot is used in preparation of <i>kangshu</i> | Against dysentery. |
| 12 | <i>Elsholtzia blanda</i> | Lomba | Lamiaceae | Inflorescence | Leaves and dried inflorescences are used in <i>singju</i> and <i>eromba</i> as raw. | Antipyretic, expectorant, against high blood pressure and menstrual disorder |
| 13 | <i>Euryale ferox</i> | Thangjing | Nymphaeaceae | Fruit | Fruit cooked eaten or raw in <i>eromba</i> . | Raw fruit eaten against diabetes; leaf petiole paste applied on burns and boils. |
| 14 | <i>Hedychium coronarium</i> | Lok-lei | Zingiberaceae | Rhizome | Rhizome is used in preparation of <i>eromba</i> . | Paste of rhizome is eaten against cough, fever; leaf extract is given against throat complaint. |
| 15 | <i>Houttuynia cordata</i> | Toningkhok | Saururaceae | Whole plant | Leaves are used in <i>singju</i> and <i>eromba</i> as raw | Anti-diuretic, against cholera & dysentery |
| 16 | <i>Ipomoea aquatica</i> | kolamni | Convolvulaceae | Stem, leaves | Shoot cooked eaten and used in preparation of <i>singju</i> . | Boiled leaf extract is used as ear-drop to treat ear-ache; leaf paste is applied on insect bite. |
| 17 | <i>Musa paradisiaca</i> | Laphu | Musaceae | Stem, flower | Young pseudo-stem is used in preparation of <i>eromba</i> . Banana flower is used in preparation of <i>paaknamand singju</i> . | Easy movement of bowel and against dysentery, diarrhoea, Cholera |
| 18 | <i>Nelumbo nucifera</i> | Thambal | Nelumbonaceae | Root, fruit | Young leaves are eaten as raw and lotus rhizome is one of the important ingredients in | Paste of petiole is applied on boils and burns. |

| | | | | | | |
|----|------------------------------------|-----------------|---------------|-----------------|--|---|
| | | | | | preparation of <i>singju</i> . | |
| 19 | <i>Neptunia oleracea</i> | Esing-ekaithabi | Fabaceae | Whole plant | shoot cooked as <i>eromba</i> or eaten raw as <i>singju</i> . | Eaten raw in dysentery and intestinal infections. |
| 20 | <i>Oenanthe javanica</i> | Komprek | Apiaceae | Whole plant | Shoot and leaf is one of the best and preferred species used in the preparation of <i>singju</i> . | Boiled in little water and the filtrate is used as ear-drop to cure ear-ache. |
| 21 | <i>Parkia roxburghii</i> | Yongchak | Fabaceae | Fruit & flower | Young inflorescences and tender pods are used in <i>singju</i> . Mature pods are used in <i>eromba</i> . | Carminative & against piles |
| 22 | <i>Persicaria posumba</i> | Kengoi | Polygonaceae | Whole plant | used in preparation of <i>Kangsoi</i> | Eaten to cure diabetes, piles and intestinal disorder. |
| 23 | <i>Polygonum barbatum</i> | Yelang | Polygonaceae | Tender shoot | Used in preparation of <i>Kangsoi</i> and <i>eromba</i> . | Paste is taken to treat stomach disorder and dysentery. |
| 24 | <i>Psophocarpus tetragonolobus</i> | Teng-noumanbi | Papilionaceae | Fruit & roots | Young pods are used in preparation of <i>singju</i> , <i>eromba</i> , <i>chagempomba</i> . | Expectorant |
| 25 | <i>Sagittaria sagittifolia</i> | Koukha | Alismataceae | Corms | used in preparation of <i>bora</i> , <i>eromba</i> | Paste along with honey is given in cough. |
| 26 | <i>Bambusa</i> sps. | Usoi | Poaceae | Tender shoot | used in preparation of <i>ofkangshu</i> and <i>ooti</i> | Anthelmintic or vermifuge |
| 27 | <i>Sesbannia grandiflora</i> | Chuchurangmei | Papilionaceae | Tender shoot | Young pods and tender twigs are used in preparation of <i>singju</i> and <i>eromba</i> . | Expectorant, antipyretic & against diabetes |
| 28 | <i>Trapa natans</i> | Heikak | Lythraceae | Fruits | Fruit cooked eaten or as raw, petiole eaten as <i>eromba</i> and <i>singju</i> | Nutrition & tonic |
| 29 | <i>Meyna laxiflora</i> | Heibi | Rubiaceae | Fruits & leaves | Young leaves used in preparation of <i>singju</i> . | Anthelmintic or vermifuge |
| 30 | <i>Viola pilosa</i> | Huikhong | Violaceae | Shoot | shoots is used in preparation of <i>Kangshu</i> | Cooked and eaten to cure cough, running nose and stomach ulcer. |
| 31 | <i>Wendlandia glabrata</i> | Pheija | Rubiaceae | Inflorescence | Young shoots are used in preparation of <i>singju</i> as raw and cooked in preparation of <i>eromba</i> | Expectorant & against dysentery. |