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Research Article

### A REVIEW ON MEDICINAL AND CULINARY USES OF *LINDERNIA PUSILLA* (Willd) (PLANT 1 WILANDAVENNA) AND *LEUCAS BIFLORA* (Vahl) (PLANT 2 WILANDAVENNA)

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#### ABSTRACT

Two medicinal plants that is *Lindernia pusilla* and *Leucas biflora* are known as Wilandavenna by Sri Lankan traditional physicians. *Lindernia pusilla* (Family: Linderniaceae, Sinhala Name: Plant 1 Wilandavenna, English Name: Common pimperial, Common Name: Tiny slitwort) mostly grows in wet and dry areas of all provinces of Sri Lanka. *Leucas biflora* (Family: Lamiaceae, Sinhala name: Plant 2 Wilandavenna, Common Name: Two flowered Leucas) is widespread on road embankments, waste places, patanas and forests of the lowlands and uplands. Therapeutic usages of these plants are scarcely known and such information is hard to find. Hence, the present study was undertaken to collect scattered knowledge on medicinal uses of these plants. Details were gathered from traditional and Ayurvedic physicians, medical books and through the internet. Entire plant of *L. pusilla* (Plant 1 Wilandavenna) and *L. biflora* (Plant 2 Wilandavenna) are used internally and externally to treat various ailments. *L. pusilla* (Plant 1 Wilandavenna) used in Vamana Karma specially in natural and artificial poisoning by traditional physicians. Other Asian countries it used to promote the breast milk and finger nail infections. Use of *L. biflora* (Plant 2 Wilandavenna) in Vamana Karma is not known to Sri Lankan traditional physicians, but it is used to wounds, headache, conjunctivitis, nasal bleeding and white discharge. Both plants are used as a vegetable. Phytochemicals and scientifically proven bio-activities of genus *Lindernia* and *Leucas* are found through literary studies, but authors are not able to find details of *L. pusilla* (Plant 1 Wilandavenna) and *L. biflora* (Plant 2 Wilandavenna). The plants belong to genus *Lindernia* contains terpenes (hexatriacontane, lupeol and betulin) and anti-inflammatory, analgesic, antitumor activities have been scientifically proven. The plants of genus *Leucas* contain lignans, flavonoids, coumerins, steroids, terpenes, fatty acids, and aliphatic long chain compounds. Anti-inflammatory, analgesic, antidiarrhoeal, antimicrobial, antioxidant and insecticidal activities have been reported through researches. It can be concluded that both plants *L. pusilla* (Plant 1 Wilandavenna) and *L. biflora* (Plant 2 Wilandavenna) have multifaceted medicinal values but *L. pusilla* (Plant 1 Wilandavenna) is used in Vamana Karma in Sri Lankan traditional medicine.

**Keywords:** *Lindernia pusilla*, *Leucas biflora*, Wilandavenna, Sri Lankan Traditional Medicine, Vamana Karma.

#### INTRODUCTION

In Sri Lankan traditional medicine, various categories of plants are described and “Venna” is one of them<sup>1</sup>. Wanavasa Nigantu mentions a category of plant named as “Venna”. Seven plants named Pusvenna (*Uraria lagopoides*), Kimbulvenna (*Persicaria barbata* (L) or *Persicaria attenuate* (R.br), Wilandavenna (*Lindernia pusilla*), Asvenna, (*Alysicarpus vaginalis* (L)), Mukunuvenna (*Alternanthera sessilis*), Makunuvenna (*Geophila repens* (L)) and Walavenna

(*Adiantum capillus* (L)) are included under the category “Venna”. In this study special attention was paid on the plant known as Wilandavenna in Sinhala language. It is called Wilandavenna because the flowers are white in colour and resemble the shape of Wilanda [Popped rice] when bloomed. Wilandavenna is mainly used in Vamana Karma<sup>2</sup> in Sri Lankan traditional medicine. Therapeutic usage of this plant is scarcely known to Sri Lankans. Hence the present study was undertaken to identify the herbs named as Wilandavenna and collect the medicinal uses of these plants.

## MATERIALS AND METHODS

Details were gathered from traditional and Ayurvedic physicians, medical books and through the internet search. The herbs known by the name Wilandavenna, fresh plants were collected from north central province and western province of Sri Lanka. These plants were authenticated from National Herbarium, National Botanical Garden, Peradeniya, Sri Lanka and Bandaranayke Memorial Ayurvedic Research Institute, Nawinna, Sri Lanka. Medicinal uses, Phytochemicals and scientific proven bioactivities of the plants were collected from Ayurvedic and traditional physicians, medical books and internet.

## RESULTS

According to the present study, there are two plants known by the name Wilandavenna. Their names are *L. pusilla* (Plant 1 Wilandavenna) and *L. biflora*. (Plant 2 Wilandavenna).

### Descriptions of *L. pusilla* (Plant 1 Wilandavenna), *L. biflora* (Plant 2 Wilandavenna) in Sri Lankan Traditional Medicine:

In Sri Lankan traditional medicine, distribution, morphology,

and medicinal uses of Wilandavenna are described in Wanavasa Nigantu with verses written in Sinhala language.

#### a) Distribution of Wilandavenna:

- “Owitty welwala kotanat atte”

In Wanavasa Nigantu, it is described that Wilandavenna grows in the paddy fields or watery areas.

#### b) Morphology of Wilandavenna:

- “Kola samagama ae podi wel atte”

It means that it has small leaves and creeping stem.

- “Wilanda lesata ae mal hataganna”

It means that its flowers are like Wilanda [Popped rice].

- “Wilandavenna nama danaganna”

This means that “Hence it is known as Wilandavenna”.

#### Plant identification:

The two plants known by the name of Wilandavenna that is *L. pusilla* and the *L. biflora* are identified and authenticated by Mrs. A.M.A.S Attanayake, Deputy Director, National herbarium, Department of National Botanical Gardens, Peradeniya, Sri Lanka and Mrs. Sudeepa Sugatadasa, Scientist, Division of Botany, Bandaranayke Memorial Ayurveda Research Institute, Nawinna, Sri Lanka.



Figure 1: *L.pusilla* (Plant 1 Wilandavenna) - Species from Wariyapola, Sri Lank

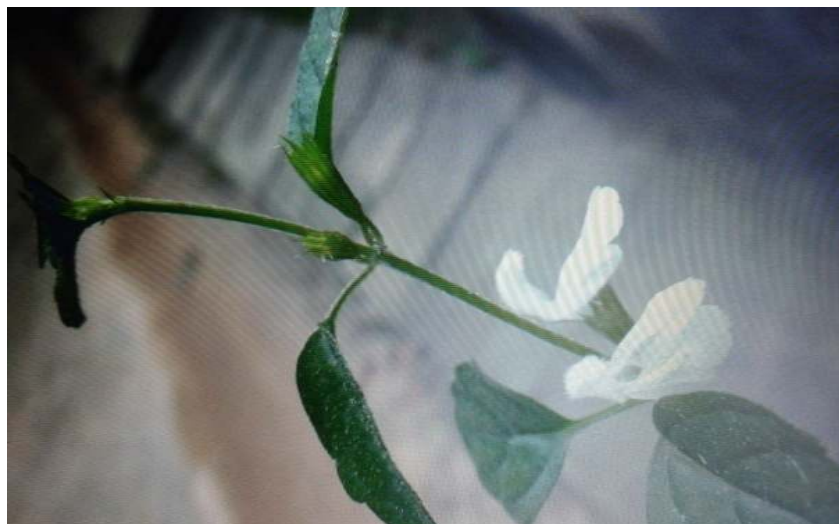


Figure 2 : *L.biflora* (Plant 2 Wilandavenna) – Species from Borella, Sri Lanka

**Scientific classification of *L.pusilla* (Plant 1 Wilandavenna) and *L.biflora* (Plant 2 Wilandavenna):**  
 Scientific classification of both plants are given below (Table 1)<sup>3</sup>.

**Table 1: Scientific classification of *L.pusilla* (Plant 1 Wilandavenna) and *L.biflora* (Plant 2 Wilandavenna)**

Botanical Name	<i>L. pusilla</i> (Wild)	<i>L. biflora</i> (Vahl)
Sinhala Name	Plant 1 Wilandavenna	Plant 2 Wilandavenna
English Name	Common pimperial	—
common Name	Tiny Slitwort	Two flowered Leucas
Kingdom	Viridiplantae	Viridiplantae
Phylum	Streptophyta	Streptophyta
Sub class	Asterides	Asterides
Order	Lamiales	Lamiales
Family	Linderniaceae,	Lamiaceae
Genus	<i>Lindernia</i>	<i>Leucas</i>
Species	<i>pusilla</i>	<i>biflora</i>
Species Authority	(Wild) Bold	(Vahl)

**Synonyms of *L.pusilla* (Plant 1 Wilandavenna) and *L. biflora* (Plant 2 Wilandavenna):**

Synonyms of *L.pusilla*<sup>4</sup>. (Plant 1 Wilandavenna) and *L. biflora*<sup>5</sup> (Plant 2 Wilandavenna) are described in the following table (Table 2).

**Table 2: Synonyms of *L. pusilla* (Plant 1 Wilandavenna) and *L. biflora* (Plant 2 Wilandavenna)**

Synonyms of <i>L. pusilla</i> (Plant 1 Wilandavenna)	Synonyms of <i>L. biflora</i> (Plant 2 Wilandavenna)
<i>Lindernia caespitosa</i> (Blume) Panigrahi. <i>Lindernia hirta</i> (Cham. & Schltld.) Pennell <i>Lindernia laxa</i> (Benth.) Mukherjec. <i>Lindernia stellarifolia</i> . <i>Graiola pusilla</i> . <i>Torenia hirta</i> . <i>Vadellia scabra</i> (Benth).	<i>Leucas procumbens</i> Desf. <i>Nepeta indica</i> Burm. <i>Phlomis biflora</i> (Vahl). <i>Phlomis biflora</i> <i>Blandina biflora</i>

**Morphology of (*L.pusilla*) Plant1 Wilandavenna (*L.biflora*) Plant 2 Wilandavenna:**

Morphological description on stem, leaves and flowers are available in texts.

Morphology of (*L.pusilla*) Plant 1 Wilandavenna and (*L.biflora*) Plant 2 Wilandavenna<sup>6</sup> are given in table 3.

**Table 3: Morphology of (*L.pusilla*) Plant 1 Wilandavenna and 2 (*L. biflora*) Plant 2 Wilandavenn Proven bioactivities of *L. pusilla* (Plant 1 Wilandavenna) and *L.biflora* (Plant 2 Wilandavenna)**

<i>L. pusilla</i> (wild) Plant 1 Wilandavenna	<i>L. biflora</i> (vahl) Plant 2 Wilandavenna
<b>Stem:</b> Stem prostrate, branches often widely spreading from the root-stock, or prostrate at base, then ascending up to about 25 cm, with long internodes, hispidulous.	<b>Stem:</b> Herb with a perennial <b>Stem</b> often procumbent,
<b>Leaves:</b> Leaves ovate to orbicular-ovate, 0.6-1.7x 0.5 – 1.4 cm, truncate at base, obtuse at apex, crenate-serrate, with prominent nerves beneath, scab rid on both surfaces; petioles 1-3 mm long.	<b>Leaves:</b> Leaves broadly ovate, petioles 5-6 mm long, slender, verticals lax distant, ovate lanceolate or ovate-deltoid, 1.5-5.2x1.1-2.3cm, truncate or rounded at base, acute or obtuse, coarsely crenate - serrate, finely scabrid – hirsute above, densely hirtellous or finely tomentose beneath; much branched, with the branches to 1.2m long, acutely 4-angular, finely or densely pubescent wit retrorse hairs, internodes to 10 cm long.

**Flowers:** This plant is flowering throughout the year. Flowers 1-4 in axils of leaves. Pedicels 3-20mm long, slender, glandular-pubescent, longer  
**Calyx,** tube 1mm long, cleft to base, smooth, lobes lanceolate, 2-2.5x1mm, glandular without pilose.  
**Corolla** white; upper lip erect, 3mm long, 2-lobed at apex, dirty pale brown or mauvish-brown with purplish lines or pale mauve or pale blue; tube 4mm long continued down tube; lower lip 4-6 mm across, mid lobe broadly ovate, slightly larger than lateral ones, with a yellow blotch at base. Posterior filament 2mm long, anterior ones longer, geniculation at base; all glabrous, Hypogynous disk white, style glabrous; lamellae of stigma ciliolate at margins.  
**Capsule** globose. 3-4mm in diam, glabrous; seeds oblong-cuneiform, 0.5mm long, truncate at both ends, longitudinally alveolate, tawny.

**Flowers:** This plant is flowering throughout the year. Flowers 2-4 flowered (occasionally 6-flowered). Floral leaves subulate, to 2mm long, Pedicels 2-3cm long.  
**Calyx** tubular-campanulate, 6-8mm long, 10-nerved, the nerves prominent, finely or densely strigose; teeth 10, narrowly lanceolate, 2-4mm long, unequal, setaceous-auriculate.  
**Corolla** to 16 mm long, white; tube 7-8 mm long, glabrous without, villous annulated within towards middle; upper lip 6.5-7 mm long; lower one broadly ovate-oblong, 9-12 x 10 mm; palate distinctly bullate. Disk symmetrical.  
**Nutlets** ovoid, 2x1mm, smooth, pale brown.

**Distribution of *L. pusilla*<sup>7</sup> (Plant 1 Wilandavenna) and *L. biflora*<sup>8</sup> (Plant 2 Wilandavenna):**

a) Distribution of *L. pusilla* (Plant 1 Wilandavenna): *L. pusilla* grows in Indian continent, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Nepal, New Guinea, Philippines, Sri Lanka, Thailand, Vietnam East Asia and Malaysia. *L. pusilla* is a common plant in grassy bunds of paddy fields and along grassy borders of ponds or tanks in the wet and dry low lands and hill country up to 1000m. It is one of rice-field weeds in the Colombo and Gampaha Districts of Sri Lanka<sup>9</sup>. This plant is also found in Vavunia

District: Mullaitivu, Kurunagala District: Tittawela, Dewadduwa, Polonnaruwa District: Habarana, Bahirawagala, Rock Kalutara District: Kalutara, Matugama, Galle District: Wakwelle, Kottapitiya, Hambantota District: Yala, Ruhuna National Park, Mahamagulvihara, Rathnapura District: Elapata, Badulla District: Ella, Wakkumbura, and Batticaloa District: Kalkudah.

Worldwide geographical distribution of *L. pusilla* (Plant 1 Wilandavenna) is given below (Figure 3).



Figure 3: Worldwide geographical distribution of *L. pusilla* (Plant 1 Wilandavenna).

b) Distribution of *Leucas biflora* (Plant 2 Wilandavenna): *Leucas biflora* grows in South India and Sri Lanka. In Sri Lanka, it is widespread on road embankments, waste places, pastures and forests of the lowlands and uplands, from sea level to 2700m. This plant is found in Sri Lanka in Anuradhapura District: Ritigala, Kandy District: Kadugannawa, Nuwaraeliya District: Pidurutalagala, Ambawela Road, Horton

Plains, Haldumulla Road, Galle District: Pitiduwa, Habaraduwa, Hambantota District: Yala, Talgasmankade, Ruhunu National Park, Badulla District: Namunukula, Monaragala District: Bibile and Ampara District: east side of Ulpasse Wewa. Worldwide geographical distribution of *L. biflora* (Plant 2 Wilandavenna) is given below (Fig: 4).

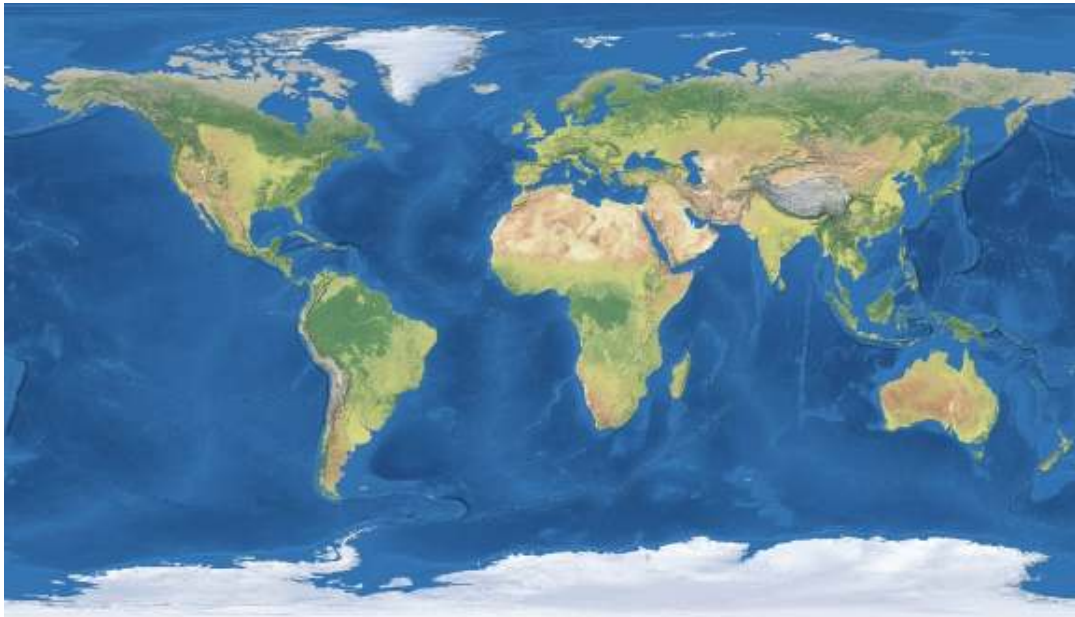


Figure 4: Worldwide geographical distribution of *L. biflora* (Plant 2 Wilandavenna)

**Ayurvedic pharmacodynamic properties *L. pusilla* (Plant 1 Wilandavenna) and *L. biflora* (Plant 2 Wilandavenna):**

Ayurvedic pharmacodynamic properties such as Rasa, Guna, Veerya and Prabhawa of *Lindernia Pusilla* and *Leucas biflora* are not found in authentic Ayurvedic texts.

**Medicinal uses of *L. pusilla* (Plant 1 Wilandavenna) and *L. biflora* (Plant 2 Wilandavenna):**

a) Medicinal uses of *L. pusilla* (Plant 1 Wilandavenna):

**To promote Breast milk**

Communities of Tinsukia District of Assam in India, decoction prepared with entire plant is given to women after childbirth to promote lactation<sup>10</sup>.

**To Infected fingernails**

The juice of the aerial parts of *Lindernia Pusilla*, mixed with turmeric (*Curcuma longa* L.) and heated with a little water. This preparation is applied to infected fingernails.

**Vamana Karma (As a therapeutic emesis)**

Sri Lankan traditional physicians use *L. Pusilla* (Plant 1 Wilandavenna) in Vamana Karma (to induce emesis) and the procedure of conducting Vamana Karma is described below. It should be noted that the method of performing Vamana Karma by Sri Lankan traditional physicians is different from Indian Ayurveda method.

The patient is made to drink 240ml of decoction of Kalashaka (*Murraya koenigi*) mixed with 5ml of cow's ghee in the morning for three days before Vamana Karma. On the 4<sup>th</sup> day morning Vamana Karma is carried out. Before Vamana Karma patient is made to carry out religious observances and the physician will chant traditional Mantras. Then both physician and the patient should sit with their backs to the direction where "Maru" (evil forces of death) is residing on that day. While maintaining their position Vamana Aushadha (emetic drug) prepared with *L. pusilla* (Plant 1 Wilandavenna) is administered to the patient orally. When the patient feels urge to vomit, King coconut water is given to the patient repeatedly. This is to support the act of vomiting. It is repeated

until the appearance of Pitta (bile) in the vomitus. During the process the patient may get loose motions few times. When Vamana Karma is completed patient is kept on close observation. The patient is given a special diet consisting of rice and green gram curry as lunch. Patient is advised against speaking loud, sitting or standing in one position for long duration, excessive walking and travelling, becoming excessively emotional, exposure to excessive cold, heat, dew, strong winds, losing sleep, sleeping during day time and to retain or provoke urges.

Vamana Aushadha (Emetic drug) with *L. pusilla* is prepared in the following manner. Thirty gm of fresh entire plant of *L. pusilla* (Plant 1 Wilandavenna) should be taken and pounded well. This is to be mixed with 750 ml of fresh cow's milk. Then the mixture should be strained seven times using a clean white cloth. While straining, physician should take seven steps forward and take three steps backward. The belief of Sri Lankan traditional physician is that the number of bouts of vomiting will be equal to the number of steps taken forward and the number of backward steps will be the number of times which purgation will occur.

The decoction of Kalashaka (*Murraya koenigi*) is prepared in the following manner. Sixty gm of fresh branches of Kalashaka (*Murraya koenigi*) are cut into small pieces and mixed with 1920ml of water. This mixture is boiled down into 240ml.

b) Medicinal uses of *L. biflora* (Plant 2 Wilandavenna):

Conjunctivitis, Nasal bleeding, White discharge<sup>11</sup>.

**Conjunctivitis**

Decoction of mature leaves is used as an eye drop twice a day in treatment of Conjunctivitis

**Nasal bleeding**

Mature leaves of *L. biflora* and entire plant of *Centella asiatica* are taken in to 1:2 proportion, cut in to small pieces and ground well. Then the juice is extracted. This juice is effectively used in treatment of Nasal bleeding

### White discharge

Chewing four to five leaves of *L. biflora* with one leaf of *Piper beetle* is beneficial for women suffering from white discharge.

### Headache

Two or three grams of fresh or air-dried aerial parts of the plant are boiled along with two liters of water in a closed container. The lid is slowly removed and the steam is inhaled once a day to relief from headache<sup>12</sup>.

### Skin diseases

The paste of whole plant is mixed with coconut oil and applied externally on affected areas of the body for 14 days in treatment of skin diseases<sup>13</sup>.

### Wound cleaning

Entire plant is boiled with water and this medicinal liquid is used to clean the wounds.

### Culinary uses of *L.pusilla* (Plant 1 Wilandavenna) *L.Biflora* (Plant 2 Wilandavenna):

a) Culinary uses of *L.pusilla* (Plant 1 Wilandavenna): Soerjani *et al.* (1987)<sup>14</sup> reported that it is used as a wild food plant. In Sri Lanka it is eaten as Mellum and prepared as follows. Tender stem and leaves are cut in to small pieces, mixed with scraped coconut, turmeric powder, lime juice and common salt. The mixture is heated in a pan while mixing until cooked.

The family of traditional physician and Specialist Medical Officer Bandara Menike, who works at Ayurvedic Teaching Hospital Borella, Sri Lanka, apply the juice of Wilandavenna, the patient who is injured eye by blunt thing, toxic teeth or parts of the insects. After the remaining parts of Wilandavenna keep on the injured eye and bandage it. After one day when it removes if blunt thing or any other parts is present inside the eye, it can be seen on those remaining parts of Wilandavenna. Sri Lankan traditional physicians, use Wilandavenna to cooke porridge for treating in traditional Mandam (Mal nutrition of children) Chikithsa<sup>15</sup>.

b) Culinary uses of *L. biflora* (plant 2 Wilandavenna): Sri Lankans eat this plant as Mellum. Preparation of Mellum is described above.

### Chemical Constituents of *L.pusilla* (Plant 1 Wilandavenna) *L.biflora* (Plant 2 Wilandavenna):

In the present study, details of phytochemicals of *L. pusilla* (Plant 1 Wilandavenna) and *L.biflora* (Plant 2 Wilandavenna) was not found through literary research. But the phytochemicals contain in the plants belongs to genus *Linderniaceae*, (earlier known as *Scrophulariaceae*<sup>16</sup> and *Leucas* (*Lamiaceae*) are given below.

a) Phytochemicals of *Lamiaceae*<sup>17</sup>: Phytoconstituents has been isolated from the leucas species are lignans, flavonoids, coumerins, steroids, terpenes, fatty acids, and aliphatic long chain compounds.

b) Phytochemicals of *Linderniaceae*<sup>18</sup>: Phytoconstituents has been isolated from th species of the *Lindernia* are terpenes (hexatriacontane, lupeol and betulin).

### Proven bioactivities of *L.pusilla* (Plant 1 Wilandavenna) and *L.biflora* (Plant 2 Wilandavenna):

In the present study, details of bioactivities of *L.pusilla* (Plant 1 Wilandavenna) and *L. biflora* (Plant 2 Wilandavenna) were not found through literary research. But the bioactivities plants

belongs to genus *Linderniaceae* and *Leucas* (*Lamiaceae*) are scientifically proven.

a) Proven bioactivities of genes *Leucas* (*Lamiaceae*): Anti-inflammatory, analgesic, antidiarrhoeal, antimicrobial, antioxidant and insecticidal activities have been reported in the extracts of the plants of *Lamiaceae*

b) Proven bioactivities of *Lindernia* (*Linderniaceae*): Anti-inflammatory, analgesic, antitumor have been reported in the extracts of the plants of family *Lindernia* have been reported.

## DISCUSSION

Wilandavenna is an effective medicinal plant used in Vamana Karma among Sri Lankan traditional physicians. According to this study two plants are used as Wilandavenna and these plants were identified as *Lindernia pusilla* (Plant 1 Wilandavenna) and *Leucas biflora* (Plant 2 Wilandavenna). Both plants are widely spread in Sri Lanka and other Asian countries.

In the present study, it was found that Sri.Lankan traditional physicians widely use *L. pusilla* (Plant 1 Wilandavenna) as an emetic drug in Vamana Karma but no evidence for use of *L.biflora* (Plant 2 Wilandavenna) as an emetic in Vamana Karma. Both plants preparations are used externally and internally in the form of fresh juice, decoction, porridge, oil, paste, and other combined preparations in treatment of different diseases. In Sri Lanka and Thailand, both plants are eaten as a vegetable.

Ayurvedic pharmacodynamic properties of *L.pusilla* (Plant 1 Wilandavenna) and *L. biflora* (Plant 2 Wilandavenna) are not mentioned in Ayurveda or traditional books.

*L.pusilla* (Plant 1 Wilandavenna) includes under the genus *Lindernia*. Anti inflammatory, analgesic and antitumor bioactivities of genus *Lindernia* are scientifically proven. *L.pusilla* (Plant 1 Wilandavenna) is used to promote the breast milk and also to treat finger nail infection.

*L. biflora* (Plant 2 Wilandavenna) include in to the genus *Leucas*. Anti inflammatory, analgesic, antitumor, antidiarrhoeal, antioxidant and insecticidal bio activities of genus *Leucas* are scientifically recorded. *L. biflora* (Plant 2 Wilandavenna) is used in treatment of headache, skin disease, nasal bleeding and white discharge.

## CONCLUSION

Sri Lankan traditional physicians use two plants as Wilandavenna and these plants are *Lindernia pusilla* (Plant 1 Wilandavenna) and *Leucas biflora* (Plant 2 Wilandavenna). *Lindernia pusilla* (Plant 1 Wilandavenna) is the only plant used in Vamana Karma by Sri Lankan traditional physicians. But both plants have effective medicinal usages in various ailments.

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