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## Utilization of Three Species *Ocimum* in Traditional Balinese Medicine, *Usadha Bali*

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### ABSTRACT

<sup>13</sup> *Ocimum* plants have the characteristic form of fragrant smell on the leaves. Three species of *Ocimum* namely *Ocimum basilicum* L., *Ocimum tenuiflorum*, and *Ocimum gratissimum* have many benefits in the Balinese people. *Ocimum basilicum* L is usually used as a spice in cooking because it can eliminate the fishy smell in fresh fish, and can be eaten as fresh vegetables. Whereas *Ocimum tenuiflorum* is usually used as a ritual plants in Hinduism, and *Ocimum gratissimum* is usually used as a medicinal plant. In Balinese traditional medicine, *Usadha Bali*, the plant are used as medicinal plants. Utilization of *Ocimum basilicum* L is mentioned in the manuscript of *Usadha Punggung Tiwas*, *Usadha Tuwa* as a drug in dealing with stiff muscle, vomiting blood, the placenta cannot get out, *tamba rasa* (rheumatism). Whereas *Ocimum tenuiflorum* is mentioned in manuscript of *Usadha Rare*, *Usadha Tiwang*, *Usadha Tuwa*, *Punggung Tiwas*, *Taru Pramana*, and *usadha Caturkahuripan*, which are used in dealing with *mokan* (neoplasm), *tiwang*, *tuju* (rheumatism), *pamali* (someone have sick but have inscrutable in medically), have no appetite, thrush and fever, coughing, asthma, worms in children, eye pain, constipation, flatulence, blurred eyes, the midriff ache, inflammation. *Ocimum gratissimum* is mention in manuscript of *Punggung Tiwas*, *Usadha Tiwang*, and *usadha Rare* which are used in dealing *banta*, coughing, *tiwang*, *gering baya*, and inflammation. Those plant are used in the form of a mixture with various other ingredients, and also can be used in the form of fresh or already in the boiled form.

*Keywords: Usadha Bali, Ocimum basilicum* L. *Ocimum tenuiflorum, Ocimum gratissimum* Medicinal Plants

### INTRODUCTION

Plants have long been used as medicinal materials throughout the world, even the fossil record shows that plants were used at least in the mid-Paleolithic era, which is around 60,000 years ago (Solecki, 1975). Knowledge of traditional Balinese medicine, *Usadha Bali*, is mentioned in an ancient manuscript known as *Lontar*. *Usadha* comes from the word *Usadhi* which means medicinal plants (Nala, 1992). There are many *Lontar usadha*, e.g. *Punggung Tiwas*, *usadha Tuwa*, *usadha Rare*, *usadha*

*Tiwang*, *usadha Caturkahuripan*. The *Lontar* contains various species of medicinal plants.

In practice, traditional Balinese medicine, *Usadha Bali*, uses various species of medicinal plants. The medicinal plants are used individually or in mixture form of several species of medicinal plants. Its use can be in fresh or boiled form. One of the medicinal plants used in *Usadha Bali* is the genus *Ocimum*. This study aims to explore the medicinal plant of genus *Ocimum* in

traditional Balinese medicine, Usadha Bali.

## 2 METHODS

This research uses the literature method. The unit of analysis is the manuscript of Lontar Usadha. Total of 11 manuscript of Lontar Usadha have been traced. These Lontar has been translated from Balinese script to Latin script. Among of them are; *Kaputusan Taru Pramana* (Bugbug Village, Karangasem District, Karangasem Regency, rewritten by I Dewa Ayu Puspita Padmi, Jl. Untung Surapati, Gg. Flamboyan No 2 Karangasem, December 31, 1995), *Usada Taru Pramana* (book written on balinese script, owned by Wayan Catra, Pandak Gede, Kediri Tabanan, rewritten and typed by A.A. Ketut Rai on September 4, 1993), *Tutur Taru Pramana* (book written on balinese script, owned by I Ketut Sengod, Pidpid kaler, Abang, Karangsem, rewritten and typed by Ida I Dewa Gde Catra, Jl. Untung Surapati, Gg. Flamboyan No. 2 Karangasem on December 10, 1990), *Usada Tuwa* (No. III.d.97, collected by Kirtya, from Singaraja, rewritten on 12 October 1949, by Ktut Kaler, checked by Pt. Geria), *Usada Tuwa* (No. III.d.290, collected by Kirtya, from Akah (kelungkung), rewritten on 2 September 1949, by I Mangku Resi Kadjeng, checked by I Wajan Mendra), *Usada Tjaturkauripan* (No III.d 270, collected by Kirtya from Tegaldjadi (Tabanan), received on 27 December 1929, rewritten on 16 February 1950, by Putu Geria,

checked by K. Kaler). *Oesada tiwang* (No. 1016, collected by Kirtya, from Boesongbio (Pengastoelan), received on April 10, 1933, typed 12 December 1941, by Ni Made Tirta, checked by Ketut Kabir), *Usada rare* (No III.d.1017, collected by Kirtya, from Buleleng, received on April 10, 1933, rewritten on October 22, 1949, by Ktut Kaler, checked by Pt. Geria), *Usada rare* (No. 2239.III.d, collected by Kirtya from Singaraja, rewritten on 30 June 1949 by Ktut Kaler, checked by Pt. Geria), *Usada rare* (No. III.d.1015, collected by Kirtya, received on April 7, 1933, from Bungkulan, rewritten on December 23, 1949, by Ktut Kaler, checked by Pt. Geria), *Poenggoeng Tiwas* (No. 2260, Collected by Kirtya, from Singaraja, received on March 24, 1941, typed June 27, 1941 by Goesti Njoman Ngoerah Prongot, checked by I Kt. Badoeng). Documents were analyzed qualitatively, medicinal plant species were recorded. The data is then analyzed descriptively.

## RESULT

Three species of *Ocimum* are mentioned in the traditional Balinese medicine, Usadha Bali, namely *Ocimum basilicum* L, *Ocimum tenuiflorum*, and *Ocimum gratissimum*. Utilization of *Ocimum basilicum* L is mentioned in the manuscript of *Usadha Punggung Tiwas*, *Usada Tuwa*. These plants are used as a drug in dealing with stiff muscle, vomiting blood, the placenta cannot get out, *tamba rasa*

(rheumatism). They are used in the form of a mixture with various other ingredients (Table 1).

*Ocimum tenuiflorum* is mentioned in manuscript of *Usadha Rare*, *Usada Tiwang*, *Usada Tuwa*, *Punggung Tiwas*, *Taru Pramana*, and *usadha Caturkauripan*, which are used in dealing with *Tiwang bragenjang*, *mokan* (neoplasm), *tuju* (rheumatism), coughing, *pamali* (someone have sick but have inscrutable in medically), *Tamba*

*rasa* (rheumatism), eye pain, have no appetite, thrush and fever, Inflammation, asthma, worms in children, constipation, flatulence, blurred eyes, the midriff ache (Table 2).

*Ocimum gratissimum* is mention in *Lontar Punggung Tiwas*, *Usadha Tiwang*, and *usadha Rare* which are used to treat *banta*, cough, *tiwang*, *gering baya*, and inflammation (Table 3).

Table 1. Utilization of *Ocimum basilicum* in Balinese Traditional Medicine and other medicinal plants as a mixture.

Diseases	The mixture	Lontar
Stiff muscle	<i>Umbi sungsang, Ocimum basilicum L, sari kuning</i>	<i>Poenggoeng tiwas</i> (No. 2260)
<i>Tamba rasa</i> (Rheumatism).	<i>Solanum verbascifolium, Blumea balsamifera (L.) DC, Ocimum basilicum, Streblus asper Lour. katrangan, the spices,</i>	<i>Usada tuwa</i> No: III.d.97
vomiting blood	<i>Zingiber officinale Roxb., Ocimum basilicum L, Cynodon dactylon (L.) Pers, Aleurites moluccanus (L.) Willd, Curcuma demostica.</i>	<i>Usada tuwa</i> No: III.d.97
The placenta cannot get out	<i>Ocimum basilicum L, Zingiber officinale Roxb, vineger,</i>	<i>Usada tuwa</i> No: III.d.97

Table 2. Utilization of *Ocimum tenuiflorum* in Balinese Traditional Medicine and other medicinal plants as a mixture.

Diseases	The Mixture	Lontar
<i>Tiwang bragenjang</i>	<i>Tournefortia sarmentosa Lam, Coleus scutellarioides, Ocimum tenuiflorum, Ocimum gratissimum, Foeniculum vulgare.</i>	<i>usada tiwang</i>
<i>Mokan</i> (neoplasm),	<i>Ocimum tenuiflorum, Styrax benzoin, Santalum album L., Citrus aurantifolia.</i>	<i>usada tiwang</i>
<i>Tuju uci-uci</i> (rheumatism)	<i>Blumea balsamifera (L.) DC, Coleus scutellarioides, Ocimum tenuiflorum, Curcuma purpurascens Blume, Tamarindus indica.</i>	<i>usada tiwang</i>
Coughing	<i>Ocimum tenuiflorum, Cocos nucifera, Allium cepa, Kaempferia galanga L.</i>	<i>usada tiwang</i>

Diseases	The Mixture	Lontar
<i>Pamali kabebeng</i> (someone have sick but have inscrutable in medically)	<i>Ocimum tenuiflorum</i> , <i>Cordyline fruticosa</i> , <i>Aleurites moluccanus</i> (L.) Willd.	usada tiwang
<i>Tamba rasa</i> (rheumatism)	<i>Streblus asper</i> Lour, <i>Ocimum tenuiflorum</i> , <i>Oryza nivara</i> , <i>Foeniculum vulgare</i> .	(usada tuwa III.d 97
Eye pain	<i>Piper betle</i> L. <i>Ocimum tenuiflorum</i> , <i>Coleus scutellarioides</i> , <i>Areca catechu</i> .	(usada tuwa III.d 97
Have no appetite	<i>Blumea balsamifera</i> (L.) DC., <i>Alstonia</i> <i>scholaris</i> (L.) R. Br., <i>Coleus</i> <i>scutellarioides</i> , <i>Ocimum tenuiflorum</i> , <i>sarilungid</i> .	Usada Tuwa (No. III.d. 290)
<i>Tuju maluung awaknia kabeh</i> (rheumatism)	<i>Piper betle</i> L., <i>Elephantopus scaber</i> , <i>Ocimum tenuiflorum</i> , red saliva after eating betel.	Usada Tuwa (No. III.d. 290)
Thrush and fever	<i>Blumea balsamifera</i> (L.) DC., <i>Coleus</i> <i>scutellarioides</i> , <i>Ocimum tenuiflorum</i> , <i>Cocos nucifera</i> L, <i>Sarilungid</i> , <i>Coriandrum</i> <i>sativum</i> L, <i>Foeniculum vulgare</i> , <i>Alyxia</i> <i>stellata</i> Auct non R&S.	Usada Tuwa (No. III.d. 290)
<i>Awak bangsel</i> (inflammation)	<i>Blumea balsamifera</i> (L.) DC., <i>Alstonia</i> <i>scholaris</i> (L.) R. Br., <i>Curcuma</i> <i>purpurascens</i> Blume, <i>Ocimum tenuiflorum</i> , <i>Coleus scutellarioides</i> , <i>Cocos nucifera</i> L, The spices	Usada Tuwa (No. III.d. 290)
Coughing	<i>Ocimum tenuiflorum</i> , <i>Cocos nucifera</i> L, <i>Kaempferia galanga</i> L, <i>Allium cepa</i> , kayu <i>sam-sam</i> .	Punggung tiwas
<i>Panjakinja</i> (inflammation)	<i>Ocimum tenuiflorum</i> , <i>Coleus</i> <i>scutellarioides</i> , <i>Alpinia galangal</i> , kayu <i>nasi</i> , <i>Pterocarpus indicus</i> , <i>Curcuma</i> <i>demostica</i> , <i>Curcuma purpurascens</i> Blume, <i>Kaempferia pandurata</i> Roxb, <i>Tamarindus</i> <i>indica</i> , <i>Alyxia stellata</i> Auct non R&S, <i>gantilungid</i> , <i>Zingiber zerumbet</i> , coconut oil.	Usada rare 1017
Worms in children	<i>Ocimum tenuiflorum</i> , <i>Vernonia</i> <i>cinerea</i> L, <i>yeh tuak manis</i> , <i>trikatuka</i> ( <i>Allium sativum</i> L, <i>Acorus calamus</i> , <i>Cryptocarya massoy</i> (Oken) Kosterm.).	Usada rare 1015
Asthma	<i>Alstonia scholaris</i> (L.) R. Br., <i>alpinia</i> <i>galangal</i> , <i>Ocimum tenuiflorum</i> , <i>Ketan</i> <i>gadjih</i> , <i>Alyxia stellata</i> Auct non	Caturkahuripan

Diseases	The Mixture	Lontar
	<i>R&amp;S, Tamarindus indica, Cocos nucifera L, salt,</i>	
Asthma	<i>Aleurites moluccanus (L.) Willd., Moringa oleifera lamk, Pluchea indica (L.) Less. Ocimum tenuiflorum, Curcuma purpurascens blume, Syzygium aromaticum, Ketan gajih, Cocos nucifera L, Tamarindus indica, Carum capticum benth, Nigella sativa l., Sari jenar, salt.</i>	Caturkahuripan
Flatulence	<i>Citrus hystrix d. C, Alpinia galangal, Curcuma purpurascens blume, Ocimum tenuiflorum, Coleus scutellarioides, Allium cepa, coconut oil.</i>	Usada Caturkahuripan
Blurred eyes	<i>Curcuma demostica, Aleurites moluccanus (L.) Willd, Ocimum tenuiflorum, salt.</i>	Caturkahuripan
Asthma	<i>Alpinia galangal L, Alstonia scholaris (L.) R. Br. Ocimum tenuiflorum, Duhi aruman, Alyxia stellata auct non r&amp;s, Sugar, salt.</i>	Caturkahuripan
The midriff ache	<i>Ocimum tenuiflorum , Piper betle L, Curcuma demostica, Plumeria rubra L.</i>	Caturkahuripan
Asthma	<i>Aleurites moluccanus (L.) Willd , Moringa oleifera Lamk, Pluchea indica (L.) Less. Ocimum tenuiflorum, Curcuma purpurascens Blume, Syzygium aromaticum, ginten ireng, ketan gajih, Cocos nucifera L, Tamarindus indica, sari jenar, salt</i>	Caturkahuripan
Constipation	<i>Ocimum tenuiflorum, blood of chicken, Curcuma demostica, honey, Santalum album L.</i>	Taru pramana

Table 3. Utilization of *Ocimum gratissimum* in Balinese Traditional Medicine and other medicinal plants as a mixture.

Diseases	The Mixture	Lontar
Banta	<i>Citrus maxima (Burm.f.) Merr, Ocimum gratissimum, Allium sativum L, Acorus calamus, Cryptocarya massoy (Oken) Kosterm</i>	(Punggung tiwas 2260)
cough	<i>Ocimum gratissimum, Murraya paniculata (L.) Jack, kayu padi, kayu pamor, Piper betle L, Alpinia galangal L, Curcuma demostica, the spices,</i>	Punggung tiwas 2260
Tiwang bragenjang	<i>Tournefortia sarmentosa Lam., Coleus scutellarioides</i>	Usada Tiwang (No. 1016)
	<i>Ocimum tenuiflorum, Ocimum gratissimum,</i>	

Diseases	The Mixture <i>Foeniculum vulgare</i> .	Lontar
Gering baya	<i>Ocimum gratissimum</i> , <i>Allium sativum</i> L, <i>Acorus calamus</i> , <i>Cryptocarya massoy</i> (Oken) Kosterm.	Usada Tiwang (No. 1016)
Inflammation	<i>Ocimum gratissimum</i> , <i>Saccopetalum horsfieldie</i> <i>Erythrina variegata</i> , <i>Kaempferia galanga</i> L.	Usada rare 2239 III. d

## DISCUSSION

*Ocimum* plants have the characteristic form of fragrant smell on the leaves. There are three species *Ocimum* used in traditional Balinese medicine, Usadha Bali, namely *Ocimum basilicum*, *Ocimum tenuiflorum*, and *Ocimum gratissimum*. *Ocimum basilicum* L is usually used as a spice in cooking because it can eliminate the fishy smell in fresh fish, and can be eaten as fresh vegetables. Whereas *Ocimum tenuiflorum* is usually used as a ritual plants in Hinduism, and *Ocimum gratissimum* is usually used as a medicinal plant. These plants are used in the form of a mixture with various other ingredients, and also can be used in the form of fresh or already in the boiled form.

*Ocimum basilicum* has been used in medicine throughout the world to treat various symptoms of the disease such as breast cancer (Torres et al., 2018), ward off anxiety and depression in Alzheimer's disease conditions (Gradinariu et al., 2015) (Ayuob et al., 2018), acts as an antimicrobial especially against *Staphylococcus aureus*, *Klebsiella pneumoniae* and *Bacillus subtilis* (Vadivel, 2011), has cardiogenic and adrenergic effects (Muralidharan & Dhananjayan, 2004). Ethylacetate, n-butanol, and water extracts from the leaves of *Ocimum basilicum* have strong

antioxidant activity (Kaurinovic et al., 2011), and have the potential to be anti-malaria (Akono Ntonga et al., 2014).

*Ocimum tenuiflorum* (synonym: *Ocimum sanctum*) can also ward off anxiety and depression in Alzheimer's disease (Gradinariu et al., 2015). In the Ayurveda system, *Ocimum tenuiflorum* becomes the main herbal ingredient because it can overcome symptoms caused by physical, chemical, metabolic, and psychological stress through a unique combination of pharmacological actions. *Ocimum tenuiflorum* can protect organs and tissues due to chemical stress from industrial pollution and heavy metals, and physical stress due to prolonged physical activity, ischemia. *Ocimum tenuiflorum* can also overcome metabolic stress through normalization of blood glucose, blood pressure and lipid levels. Overcoming psychological stress because it has a positive effect on memory and cognitive function as well as through anxiolytic and anti-depressive properties (Cohen, 2014).

*Ocimum gratissimum* although proven to have a hypoglycemic effect in cases of diabetes mellitus with evidence of reduced fructosamine, but can trigger infertility in male rats that are aggravated by diabetes mellitus (Shittu et al., 2019). As an effective

chemopreventive agent against pulmonary adenocarcinoma (Kao et al., 2011).

*Ocimum basilicum* and *Ocimum gratissimum* contain phenol compounds mainly are chicoric, caftaric, caffeic, and rosmarinic (Casanova et al., 2016). *Ocimum basilicum* and *Ocimum tenuiflorum* also contain essential oils such as 1,8-cine<sup>12</sup>, linalool, eugenol (Akono Ntonga et al., 2014; Gradinariu et al., 2015), and contain  $\beta$ -elemene,  $\alpha$ -bergamote, bornyl-acetate, estragole (Gradinariu et al., 2015).

In traditional Balinese medicine, Usadha Bali, *Ocimum* is used to treat various types of diseases or symptoms of the disease. These diseases or symptoms can be categorized as medical or non-medical diseases. Medical illness is a disease whose symptoms and causes can be known medically such as vomiting blood, coughing, but non-medical illnesses, symptoms and causes are difficult to detect medically, such as *pamali* (someone have sick but have inscrutable in medically).

Traditional Balinese Medicine refers to the traditions, experiences, and hereditary skills of the Balinese people, both those that have not been recorded or that have been written in the *Lontar Usadha*, in education or training, and are applied in accordance with the norms prevailing in Balinese community (*Pergub Bali* No 55 of 2019 ). The practice of utilizing medicinal plants in traditional Balinese medicine, *Usadha* Bali, illustrates the complex relationship of knowledge, trust and utilization (*Corpus-Cosmos-Praxis*). The practice of utilizing medicinal

plants (*praxis*) is based on a strong belief system (*cosmos*) about illness or health and a system of knowledge (*corpus*) about plants. The Balinese believe that health and illness as an equilibrium of the *Panca Maha Bhuta*, the five elements in the body namely; liquid (*apah*), solid (*pertiwi*), wind (*bayu*), fire (*teja*), and soul (*akasa/ether*). On the basis of these beliefs, the treatment is carried out holistically by combining element of belief about health or illness (*cosmos*) and knowledge about medicinal plants (*corpus*) (Arsana, 2019).

The practice of traditional Balinese medicine combines medical and non-medical elements. Such treatment is widely known in the practice of cure<sup>10</sup> in the world. For example, Traditional Chinese Medicine (TCM), which is based on the concepts of *yin-yang* and *Wuxing* and uses a variety of herbs, has been a practice of traditional Chinese medicine<sup>11</sup> for thousands of years (Yuan et al., 2016). *Unani*, the practice of ancient Greek medicine based on the concept of four elements of humoral of hipocrates namely; blood (*dam*) which is hot and moist, *phlegma (balgham)* which is cold and moist, *safra* that is hot and dry, and *sauda* which is cold and dry. The equilibrium of nature of these elements (hot, cold, dry, and moist) then a person is said to be healthy (World-Health-Organization, 2010). *Kampo*, the practice of traditional Japanese medicine by combining mind and body as one unit, imbalance<sup>5</sup> of mind and body cause illness (Watanabe et al., 2011; Yakubo et al., 2014; Yuan et al., 2016). *Ayurvedic* system in India



with three elements, *Pitta-Kapha-Vata* (Ventegodt et al., 2007).

## CONCLUSION

There are three species of *Ocimum* used in traditional Balinese medicine, Usadha Bali, namely; *Ocimum basilicum* L, *Ocimum tenuiflorum*, and *Ocimum gratissimum*. The plant is used to treat disease or disease symptoms. The Balinese still believe in the traditional Balinese medicine system. The Balinese believe that health and disease due to an equilibrium of the five elements of the Panca Maha Bhuta, so the treatment is carried out holistically by combining elements of trust and knowledge.

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