



Usada Taru Premana: The Balinese Ethnopharmacopoeia

I Wayan Muderawan^{1*}, Made Kurnia Widiastuti Giri², Gede Agus Beni Widana³

^{1,3}Department of Chemistry, Faculty of Mathematics and Natural Sciences, Universitas Pendidikan Ganesha, Singaraja, Bali 81117 Indonesia.

²Study Program of Medicine, Faculty of Medicine, Universitas Pendidikan Ganesha, Singaraja, Bali 81117 Indonesia

ABSTRACT: Traditional Balinese Medicines (TBM) have been written in Balinese palm leaves manuscripts using Balinese transcripts since a long time ago, known as *Lontar Usada Taru Premana* (UTP). *Lontar UTP* which well deserves the label of Balinese Ethnopharmacopoeia since it lists traditional medicinal plants together with a description of their characteristics, properties, formulation, methods of uses, prescriptions, and applications. This research aims to describe diversity of medicinal plants, their properties, formulation, methods of uses, and application in treatment of illnesses and diseases according to *Lontar UTP*. This research is descriptive qualitative research using library research method. The research subject was the *Lontar Usada Taru Premana* (UTP) manuscript which had been translated from Balinese script to Latin script. Three versions of the *Lontar UTP* manuscripts were used, namely: *Lontar UTP* from Puri Saren Kauh, Payangan, Gianyar, number IIIId.12/1854, belonging to Gedong Kirtya Singaraja Bali, *Lontar UTP* from Banjar Satria, Negara, belonging to the Bali Cultural Documentation Office, Bali Province, and *Lontar UTP* from Kerambitan, Tabanan, number IIID.5823, belonging to Gedong Kirtya Singaraja Bali. The objects of research were the contents of the lontar, namely the types of plants, plant parts and their characteristics, formulation, methods of uses and their application. A total of 214 plant species are used in TBM including 169 main plants and 45 additional plants. The plant parts used for medicines were roots, rhizomes, stem, barks, sap, leaves, shoots, flowers, and fruit or seed, and their properties were commonly classified into hot or warm (*panes* or *anget*), cool (*tis* or *dingin*), and lukewarm (*dumelada*). The plants were used for making around 180 formulas and used them into various forms of medicines such as *loloh*, *boreh*, *simbuh*, *oles*, *tempel*, *tutuh*, and other to treat around 84 types of illnesses and diseases caused by both natural and supernatural powers.

KEYWORDS: ethnopharmacopoeia, *lontar Usada Taru Premana*, Traditional Balinese Medicine, traditional medicinal plant, herbal medicine

INTRODUCTION

Traditional Balinese Medicine (TBM) as well as Balinese treatment have been written in Balinese palm leaves manuscripts since a long time ago. It is called *Lontar Usada Taru Pramana* which explain about how to heal diseases traditionally and how to make traditional medicine with medicinal plants and spices. It becomes a unique side of Balinese because when people have moved to modern treatment, they still love their traditional treatment.

For several millennia, Traditional Medicinal Plants (TMPs) or herbal medicines have been used by man, in general, and by Balinese people in particular for the purposes of healing. All people have considered these

plants as a part of their traditional medical heritage. In the history of medicine, plants represent a very important aspect and natural sources of modern medicines.

In Bali, the science of medicine or traditional Balinese medical system (to distinguish it from modern medical) by using herbs, *mantra* and Balinese scripts is known as *Usada*. *Usadha* for Balinese Hindu is the science of traditional medicine that has been passed down from generation to generation and has become local wisdom. The term *Usada* is derived from Sanskrit word, *osadha* or *ausadha*, used in Ayurveda which means the herb is used as medicine.^{1,2} The source of *Usada* is *Ayurveda*.³ Some content of *Usada* manuscripts in Bali was probably taken from treatment teachings in India. It was predicted that along with the development of Hinduism in Bali on the 5th century, this *Usada* was also widespread.

Usada was written in Balinese scripts on palm leaves or “*lontar*” known as *Lontar Usada*.⁴ *Lontar Usada* is a reference or Balinese manuscript of healing science and practice originally from Bali using natural herbs as folk medicines.⁵ *Lontar Usada* has been used as a reference by practitioners of traditional Balinese medicine called *balian* or traditional healer to treat various illnesses and diseases. According to sources provided in *lontar* museum, Gedong Kirtya, Singaraja, Bali, there are seventy-eight types of *Lontar Usada* known in Bali. One of them is *Lontar Usada Taru Premana*,⁶ Figure 1. *Lontar Usada Taru Premana* or “*Pramana ning Taru*” that is, ‘the life force of plants,’ is the Balinese ethno-pharmacopoeia. It lists medicinal plants together with a description of their characteristics, properties, methods of uses, and applications to treat various illnesses and diseases. It contains traditional Balinese methods of illnesses and diseases treatment using plants as medicines or herbal medicines, as the name suggests, *Usada Taru Premana* (Balinese, *usada*: medicine, *taru*: plant, *premana*: vital force). This text is meant for the use of such *balian*, or healer, who assume that there are specific healing powers in a number of plants.

According to *Lontar Usada Taru Premana*, various illnesses and diseases can be treated with various types of plants. This paper discusses the types of medicinal plants, their properties, formulation, methods of uses, and application in treatment of illnesses and diseases according to *Lontar Usada Taru Premana*.

METHOD

This research is qualitative research using library research method. The research subject was the *Lontar Usada Taru Premana* (UTP) which had been translated from Balinese script to Latin script. In this study, three versions of the *Lontar UTP* transcripts were used, namely: (1) *Lontar Usada Taru Premana* transcript originating from Puri Saren Kauh, Payangan, Gianyar, number IID.12/1854, belongs to Gedong Kirtya Singaraja Bali⁷ (Version 1), (2) *Lontar Usada Taru Premana* manuscript originating from Banjar Satria, Negara, belongs to the Bali Cultural Documentation Office, Bali Province⁸ (Versions 2), and (3) *Lontar Usada Taru Premana* transcript originating from Kerambitan, Tabanan, number IID.5823, belongs to Gedong Kirtya Singaraja Bali⁹ (Version 3). While the object of research was the contents of the *lontar*, namely the types of plants used as traditional Balinese medicine including plant names, plant parts, plant properties, formulation, methods of uses, and the types of illnesses and diseases treated. The scientific names of plants in *Lontar Usada Taru Premana* manuscripts were searched using the Google Search Engine. Then, the data obtained were descriptively analyzed.



Figure 1. The original manuscript of *Lontar Usada Taru Premana* written in Balinese scripts

RESULTS AND DISCUSSION

There is a lontar text in Bali which well deserves the label of Balinese Pharmacopoeia since it lists traditional medicinal plants together with a description of their characteristics, properties, formulation, prescriptions, methods of uses, and applications for long time ago. This text is meant for the use of such traditional healers or *balian* who assume that there are specific healing powers in a number of plants. The text names these properties and mentions at the same time, as an example of their application, a disease or a group of symptoms against which the plant material can be applied in a particular way. This text is named *Usada Taru Pramana* or *Usada Pramana ning Taru*, that is, “the life force of plants.”

In the introduction section of *Lontar Usada Taru Premana* was described the treatise of a *dukun Sidi Wakia* (very powerful healer) named Mpu Kuturan. He can treat and cure various illnesses and diseases and has never failed while treating sick people, even if they are seriously ill. One day he was very disappointed because most of the patients he treated died. He "groaned" to bear the immeasurable shame, then the intention arose to meditate in the grave. After even one month and seven days (*salek sapta dina*) meditating at the cremation site, *Bhatari Durga* descended from heaven and was pleased to give a grace (*anugrah*). He heard a "word" (*sabda*) from *Betari Khayangan*, who questioned the problems he was facing. After conveying the problems faced, Mpu Kuturan was awarded the ability and knowledge to communicate with trees (*taru*), creeping plants (*lata*), grasses (*trena*), and shrubs (*gulma*) about their respective properties that can be used as medicinal ingredients. Then, the various types of plants come one by one to introduce their name, the parts that can be utilized, the properties, uses, and how to treat a type of illnesses or diseases. Here is the original snippet:

“Iki keputusan Taru Premana, duking atita hana anama Sang Prabu Mpu Kuturan, amalaku aduduku.”

“Kunang pira laminira sida sidi angusadani, hana pwa masanya maneda bagya, sahananing wang kang tinambanan de Sang Prabu Mpu, hana sata Gananya, sawiji, tanana waras, nahan heto Sang Prabu Mpu Kuturan, ti saya mageleng ring angganya dawak, lan tan tuna kedwa anangunya saha ndewasraya ring setra luhuring pamuhunan, genep pwa salek sapta dina.”

“Tumurun Bhatara ring Khayangan, asung awawarah, lamakane ruh angarad atatana ri ya apaparan gunanya suwang-suwang. Wus mangkana, Sang Prabu Mpu Kuturan, teher angarad taru lata trena gulma, pratamanya datang pwa tang wreksa wandiri aturnya; “Inggih Ratu Sang Prabu punapi awinan I Ratu maswabawa kadi menggah, tur ngasengin kadi tityang.” Ngandika Sang Prabu: “Kēnē iba bingīn, wirēh awakē dadi balian, tan sidi negerang jani makeneh nakonang

		as <i>lulur</i> (body scrub) and then as <i>simbuh</i> (spit a medicine) on the face to treat edema facial.
2	Ancak (<i>Ficus religiosa</i>)	The flesh and leaves are cold. The barks are mixed with massoia aromatica (<i>Cryptocarya massoia</i>), nutmeg (<i>Myristica fragrans</i>), clove (<i>Syzygium aromaticum</i>) stalks, used as a scrub for fatigue.
3	Armawa (unknown)	The rot and leaves are warm. The flowers are mixed with incense (<i>Styrax benzoin</i>), honey, ivory coconut (<i>Cocos nucifera</i> var. <i>eburnea</i>) water, used as <i>tutuh</i> for sick people (sobbing) because of <i>kesisipan</i> of <i>Betara Guru</i> . <i>Kesisipan</i> or insertion is a warning by ancestors for negligence or mistakes made by their descendants.
4	Awar-awar (<i>Ficus septica</i>)	Hot flesh, lukewarmness leaves, hot barks, hot sap, and cool roots. The barks are mixed with honey ann sandalwood (<i>Santalum album</i> L.) water, then used as drink for rheumatic. Lukewarmness flesh, white and warm sap, and cool roots. All parts of the plant are added with roasted coconut and galangal (<i>Alpinia galanga</i>). The ingredient is extracted and the coconut cream is used as drink to cure gastroenteritis. The leaves until roots are hot, white sap and hot flesh, hot barks. The shoots are mixed with massoia aromaticum (<i>Cryptocarya massoia</i>) and red sulfur, the mixture was grinded until smooth, used as scrub on swollen part of the body due to being bitten by a striped scorpion.
5	Basa-basa (<i>Clausena sp</i>)	The roots to the leaves are warm, the bark is warm, mixed with astringent plants such as guava, used for gastroenteritis.
6	Base (<i>Piper betle</i>)	Hot meat, leaves and roots. The young leaves are mixed with black chicken eggs, honey, galangal (<i>Alpinia galanga</i>) seven slices, used as a medicine for malaise or fatigue.
7	Bawang Brahma (<i>Allium cepa</i>)	Cool flesh, lukewarmness leaves to roots, hot sap. The leaves of young shoots are mixed with <i>pulesari</i> (<i>Alyxia stellata</i>), roasted red onion (<i>Allium cepa</i> L.) in coals and coriander (<i>Coriandrum sativum</i>) eleven seeds, use as drops medicine in the nose, to cure epistaxis.
8	Bawang-Bawang (<i>Premna obtusifolia</i>)	Fress root, the sap that comes out of the bark and leaves are cold. A mixture of shallots (<i>Eleutherine palmifolia</i>), is used as a remedy for dysentery.
9	Belatung Gada (<i>Cereus peruvianus</i>)	The white flesh and latex are hot, mixed with <i>warangan</i> , arak, turmeric (<i>Curcuma longa</i> Linn. syn. <i>Curcuma domestica</i> Val) and <i>lempuyang</i> (<i>Zingiber zerumbet</i> L.), finely ground to cure leprosy. Used as scrub, in the morning and evening.
10	Belego (<i>Benincasa hispida</i>)	Cool fruit to roots, lukewarmness leaves. Fruit mixed with rock sugar, coconut water with reddish-green fibers and sandalwood (<i>Santalum album</i> L) powder is used as a drink to cure people who are unconscious or syncope accompanied by non-stop crying.
11	Belimbing (<i>Averrhoa carambola</i>)	Used as medicine to treat asthma. Leaves mixed with galangal (<i>Alpinia galanga</i>), turmeric (<i>Curcuma longa</i> Linn. syn. <i>Curcuma domestica</i> Val) three slices, used as spray. The skin is mixed with <i>temu tis</i> (<i>Curcuma purpurascens</i>

		Bl. syn. <i>C. soloensis</i> Val.) and coriander (<i>Coriandrum sativum</i>) five seeds, used as a traditional drink or <i>jamu</i> .
12	Belimbing Besi (<i>Averrhoa bilimbi</i>)	Lukewarmness roots and leaves, cool bark. The fruit is mixed with pepper (<i>Piper nigrum</i>) 11 seeds, used as drops for treating asthma.
13	Belimbing Manis (<i>Averrhoa carambola</i>)	The leaves and roots are hot, the bark is warm. A mixture of <i>lempuyang</i> (<i>Zingiber zerumbet</i> L.), garlic (<i>Allium sativum</i>) and sweet flag (<i>Acorus calamus</i>), is used as swap and spay medicine to cure pregnancy.
14	Bila (<i>Aegle marmelos</i>)	The flesh, leaves and sap are hot, lukewarmness roots. Mixed with of garlic (<i>Allium sativum</i>), sweet flag (<i>Acorus calamus</i>), vinegar, used as scrub in the morning and evening to treat edema lower extremities.
15	Bingin (<i>Ficus benjamina</i>)	Cannot be used as a medicine.
16	Bun Papron (<i>Arccangelisia</i>)	The fruit, roots, bark, leaves, sap, and flesh are hot. The fruit is mixed with massoia aromatica (<i>Cryptocarya massoia</i>) and betel (<i>Piper betle</i>) eleven pieces, crushed until smooth, used as a medicine for abnormal fontanel.
17	Bunut Bulu (<i>Ficus Glauca</i>)	The flesh, roots, leaves are hot, white sap. Eleven leaves mixed with garlic (<i>Allium sativum</i>) and sweet flag (<i>Acorus calamus</i>), for asthma medication.
18	Buyung-buyung Putih (<i>Vernonia cineria</i> L)	Hot flesh, warm leaves, cool bark, cool sap. The roots are mixed with massoia aromatica (<i>Cryptocarya massoia</i>), pepper (<i>Piper nigrum</i>) and roasted salt, used as a <i>simbuh</i> on the chest to treat epilepsy.
19	Cemara (<i>Casuarina junghuhniana</i>)	The flesh and hot leaves, lukewarmness root, for eye drops to treat <i>pengeger Jaran Goyang</i> (black magic) illness and to repay them. The leaves are mixed with three handfuls of compacted soil, finely ground for the medicine.
20	Cempaka Kuning (<i>Magnolia champaca</i>)	Hot flesh, bark and sap are lukewarmness. The stem powder is mixed with eleven slices of massoi aromatica (<i>Cryptocarya massoia</i>), sixteen seeds of pepper (<i>Piper nigrum</i>), turmeric (<i>Curcuma longa</i> Linn. syn. <i>Curcuma domestica</i> Val), galangal (<i>Alpinia galanga</i>), <i>temu tis</i> (<i>Curcuma purpurascens</i> Bl. syn. <i>C. soloensis</i> Val) and coriander (<i>Coriandrum sativum</i>), used as a spray on the legs and body to treat irritable syndrome.
21	Cenangga (<i>Milingtonia hortensis</i>)	Cool flesh and lukewarmness leaves, red sap. Can be used as a drink for fever.
22	Cendana (<i>Santalum album</i> L)	The flesh, leaves, and red sap are cool. Mixed it with rock sugar and used as a traditional drink to treat stomatitis on baby. Cool flesh, roots to leaves are also cool, red sap. The bark is mixed with <i>arak</i> (traditional Balinese alcoholic drink), used as scrub to cure smallpox or varicella.
23	Crangcang-kawat (<i>Asparagus sp</i>)	Warm flesh, roots to leaves are also warm. The leaves, sap and bark are mixed with ginger (<i>Zingiber officinale</i>), boiled, used to treat wounds and venereal diseases or syphilis.
24	Crement (<i>Phyllanthus acidus</i>)	Warm flesh, cool roots, white sap. The bark is mixed with coconut oil, crushed until smooth, then heated with coals, affixed to treat eczema.

25	Damuh-damuh (<i>Peperomia pellucida</i>)	The flesh, leaves to roots are cold. The leaves are mixed with fennel onions (<i>Eleutherine palmifolia</i>), used as a scrub for postpartum.
26	Dangolo (unknown)	Flesh is cool, leaves are cool, barks are lukewarmness, roots are cool. 11 leaves are added with vinegar and galangal (<i>Alpinia galanga</i>) 5 slices for making juice, filtered and drunk it for diarrhea.
27	Dapdap (<i>Erythrina variegata</i>)	Cool flesh. The bark is mixed with eleven seeds of coriander (<i>Coriandrum sativum</i>), roasted salt, boiled with hot coals, filtered it, and taken as drink to cure dyspepsia.
28	Delima (<i>Punica granatum L</i>)	Lukewarmness flesh, cool roots, hot sap. The fruit is mixed with black hen's eggs, honey, and two slices of <i>temu tis</i> (<i>Curcuma purpurascens</i> Bl. syn. <i>C. soloensis</i> Val.), taken as drink to treat abdominal pain.
29	Gadung Kasturi (<i>Dioscorea pentaphylla</i>)	Hot flesh, roots and leaves are lukewarmness, warm bark. The sap is mixed with black chicken eggs, seaweed, trigona honey (<i>Trigona sp</i>), <i>temu tis</i> (<i>Curcuma purpurascens</i> Bl. syn. <i>C. soloensis</i> Val.) and seven coriander (<i>Coriandrum sativum</i>) seeds, used as a drink to treat asthma.
30	Galing-galing (<i>Cayratia trifolia</i>)	The flesh, leaves to roots are cold. The leaves are mixed with shallots (<i>Eleutherine palmifolia</i>) and the essence of hibiscus (<i>Hibiscus rosa-sinensis</i> L) flower, used as a scrub to treat dysentery.
31	Gamongan (<i>Zingiber zerumbet</i>)	The flesh, roots and leaves are warm. The tubers are mixed with coconut oil, roasted in hot ashes, placed as a medicine for trigger fingers.
32	Gatep (<i>Inocarpus fagiferus</i>)	The flesh and roots are cold, hot leaves. The bark is mixed with rock sugar, crushed until smooth, squeezed and filtered, the extract is drunk to cure dysentery.
33	Gedang (<i>Carica papaya L</i>)	Cool flesh, roots to leaves are hot. The sap is mixed with lime, used as medicine to cure snake bites.
34	Gendola (<i>Basella alba</i>)	Cool flesh and roots, red sap. The eleven pieces of leaves are mixed with vinegar and five slices of galangal (<i>Alpinia galanga</i>), used as a drink for treatment of diarrhea.
35	Ikuh Lutung Putih (<i>Acalipha hispida</i>)	Cool flesh, roots to leaves and white sap are warm. The shoots are added with fennel shallots (<i>Eleutherine palmifolia</i>), crushed until smooth, used as an ointment for loss of vision.
36	Ingan-ingan (<i>Flemingia congesta</i> Roxb)	If there is a child who is paralyzed, take the leaves and the branches to beat the feet of the child who is sick at morning and evening, I will fight the disease.
37	Jali (<i>Coix lacryma-jobi L</i>)	Lukewarmness meat, hot roots, leaves to bark are moderate. The roots are mixed with the essence of hibiscus (<i>Hibiscus rosa-sinensis</i> L) flower and <i>pulasari</i> (<i>Alyxia stellata</i>), used as drops medicine for loss of vision.
38	Jempiring (<i>Gardenia jasminoides</i>)	The flesh to roots are hot, sap and bark lukewarmness. Used as medicine for stiffness. The flowers are mixed with ashes from under the entrance to the room, sandalwood (<i>Santalum album</i> L.) powder and charcoal, used to make a cross on the forehead, after which it is sprinkled on the face.

39	Jepun (<i>Plumeria alba</i>)	Warm flesh, warm leaves and sap, lukewarmness roots. The bark of the tree is mixed with quicklime or calcium oxide, used as a scrub for lower back pain or gout.
40	Jeruju (<i>Acanthus ilicifolius</i>)	The flesh, roots and leaves are cool. The roots and leaves are mixed with shallots (<i>Eleutherine palmifolia</i>), used as a scrub for treatment rheumatic.
41	Juwet (<i>Eugenic cumini</i> druse)	Warm flesh, cool roots. The bark of the tree is crushed so that it becomes a powder mixed with citrus <i>warangan</i> , placed on the wound, to cure venereal diseases (syphilis).
42	Kakara Manis (<i>Phaseolus oleracea</i> L)	The flesh until the roots are cool. The leaves mixed with roasted candlenut (<i>Aleurites moluccana</i> L.) and tamarind (<i>Tamarindus indica</i>), used for drinks, as a medicine for stomatitis.
43	Kalenco (<i>Diospyros malabarica</i>)	The flesh, leaves, sap and bark are hot. Lukewarmness roots are being mixed with garlic (<i>Allium sativum</i>), sweet flag (<i>Acorus calamus</i>) and vinegar, used to cure beri-beri disease (edema lower extremities).
44	Kaleyan (<i>Blighia sp</i>)	The root to leaves are lukewarmness, sap to bark are white. They mixed with galangal (<i>Alpinia galanga</i>) and turmeric (<i>Curcuma longa</i> Linn. syn. <i>Curcuma domestica</i> Val), used as a drink for gastro enteritis.
45	Kaliomba (<i>Ficus binendiski</i> L)	The roots and leaves are hot, white sap, cold flesh, and cool bark. The sap and bark are mixed with ingredients for <i>nginang</i> (chewing areca nuts), sulfur, and massoia aromatica (<i>Cryptocarya massoia</i>), and crushed them, then used as a scrub on the cheeks to cure pulpitis.
46	Kamurungan (<i>Gymnospetalum sp</i>)	Lukewarmness leaves and roots, hot tree sap and bark. The leaves are mixed with massoia aromatica (<i>Cryptocarya massoia</i>) and coriander (<i>Coriandrum sativum</i>), used as a sprinkling on the forehead to treat migraine.
47	Kangkag Yuyu (<i>Cyclea barbata</i>)	Hot flesh and leaves, sap and bark are also hot. The root is mixed with moon palm flowers, basil (<i>Ocimum basilicum</i>) and <i>lempuyang</i> (<i>Zingiber zerumbet</i> L.), used as a spray medicine for respiratory tract ailments.
48	Kapas (<i>Gossypium hirsutum</i>)	The seeds to leaves are lukewarmness, roots to sap are hot. The shoots are mixed with <i>temu tis</i> (<i>Curcuma purpurascens</i> Bl. syn. <i>C. soloensis</i> Val.), coriander (<i>Coriandrum sativum</i>) and added fresh coconut oil, used for treatment of palpitation.
49	Kapopoh (unknown)	Lukewarmness bark, hot leaves, tasteless roots. The barks are mixed with <i>pulasari</i> (<i>Alyxia stellata</i>) and garlic (<i>Allium sativum</i>), used as a flatulence scrub for pregnancy.
50	Kasa-kasa (<i>Anomum maximum</i> , Roxb)	Cool roots and leaves, lukewarmness sap. The root is crushed, mixed with chicken egg yolk, then used as scrubs for medicine for labor induction.
51	Kaselaguwi (<i>Sidar hombhifolia</i> L)	Cool stems can be used for drinks for neonatal care, the roots are used as scrubs.
52	Kecubung (<i>Datura metel</i>)	Hot flesh, sap to bark are also hot. The roots and leaves are mixed with water from an earthenware jug, used to treat hallucinations (magical diseases).
53	Kedongdong (<i>Spondias dulcis</i>)	Lukewarmness leaves and roots, hot sap and fruit. Crushed tree bark is mixed with turmeric (<i>Curcuma longa</i> Linn. syn. <i>Curcuma domestica</i> Val) and brown rice (<i>Oryza rufipogon</i>) water, placed on the wound to treat vulnus.

54	Keladi (<i>Colocasia esculenta</i>)	The roots and sap are cold. The leaves and roots are mixed with onion (<i>Allium cepa</i> , L.), and tamarind (<i>Tamarindus indica</i>), used as scrubs to cure anxiety.
55	Keladi Gowak (<i>Alocasia macrorrhizos</i>)	Lukewarmness flesh, leaves to roots are cool. The sap is added with red rice (<i>Oryza rufipogon</i>) water, orange juice (<i>Citrus sinensis</i>) and quicklime or calcium oxide, used as scrubs to cure molluscum contagiosum.
56	Kelampwak (<i>Eugenia accuminatisima</i>)	Lukewarmness flesh, leaves, roots, sap are mixed with honey, used as a drink for malnutrition.
57	Kelasih (<i>Ocimum bacilicum</i> L)	The leaves to skin are cool, white sap, flesh and roots are also cold. The shoots are added with black chicken blood, turmeric (<i>Curcuma longa</i> Linn. syn. <i>Curcuma domestica</i> Val), sandalwood (<i>Santalum album</i>) and honey, used as drop medicine for dysentery.
58	Keliki (<i>Jatropha curcas</i>)	The root to leaves are hot, white sap, warm flesh. The bark is mixed with <i>majagau</i> (<i>Dysoxylum densiflorum</i>) powder, which is sprayed as a medicine for deafness. The leaves and roots are mixed with vinegar, pepper (<i>Piper nigrum</i>) and <i>temu tis</i> (<i>Curcuma purpurascens</i> Bl. syn. <i>C. soloensis</i> Val.), used as drops medicine for deaf or hearing loss. Hot flesh, cool leaves. The roots are mixed with tamarind (<i>Tamarindus indica</i>) and <i>temu tis</i> (<i>Curcuma purpurascens</i> Bl. syn. <i>C. soloensis</i> Val.), used to treat urinary tract infection. The leaves mixed with shallots (<i>Eleutherine palmifolia</i>) and used as scrubs.
59	Keliki Kita (<i>Ricinus communis</i>)	The roots and leaves are hot, the stems are cold. The sap is mixed with quicklime or calcium oxide, used to write on the fingernails of sick people, after which it is affixed to cure paronychia.
60	Kelor (<i>Moringa oleifera</i>)	Cool flesh, fresh red sap and hot roots. The leaves are mixed with lime (<i>Citrus aurantifolia</i>) and roasted salt, filtered, precipitated, the water is taken, dropped on the eyes to cure conjunctivitis.
61	Kembang Kuning (unknown)	The leaves to roots are hot, lukewarmness barks and warm sap. Eleven shoots sre mixed with <i>arak</i> (traditional Balinese alcoholic drink), vinegar, honey and coriander (<i>Coriandrum sativum</i>), used as drops for asthma.
62	<i>Kenarak</i> (<i>Sapindus rarak</i> Dc)	The roots, leaves, bark are moderate, white sap, cool flesh are used to treat dyspepsia or nausea. The bark powder is used as <i>simbuh</i> added with candlenut (<i>Aleurites moluccanus</i>), 11 pieces of coriander (<i>Coriandrum sativum</i>), 9 pieces of yellow betel leaf (<i>Piper betle</i>) and 7 pieces of clove (<i>Syzygium aromaticum</i>).
63	Kenari (<i>Canarium ovatum</i>)	Hot flesh, leaves to roots are lukewarmness, hot sap, and moderate barks. The barks are mixed with vinegar, honey and lime juice (<i>Citrus aurantifolia</i>), used as a drink for headaches. The leaves, roots and stems are cool, lukewarmness white sap. The barks are added <i>musi</i> (<i>Marsilea crenata</i>), honey, <i>temu poh</i> (<i>Curcuma mangga</i>) and concentrated coconut milk, used as drops medicine, for treatment of <i>pemali Brahma</i> . <i>Pemali</i> is illnesses caused by violation of the rules regarding the agreement of space and time, <i>butha</i> and <i>kala</i> , space and existence of life.
64	Kepah (<i>Sterculia foetida</i>)	Hot leaves, fresh roots and warm barks are mixed with quicklime and lime juice (<i>Citrus aurantifolia</i>), used to cure paralysis or plegia.

65	Kepahi (<i>Stercukea foetida</i> L)	The leaves until roots are hot, the sap until barks are hot. The barks are mixed with <i>jangu</i> (<i>Acorus calamus</i>) and crushed until smooth to treat snake bites.
66	Kepasilan Juwuk (<i>Dendrophthoe glabrescens</i>)	Hot roots and flesh, lukewarmness leaves. The leaves are mixed with honey and galangal (<i>Alpinia galanga</i>), used as drops medicine to cure emesis.
67	Kepel (<i>Manglietia glauca</i>)	The flesh, leaves, and roots are cool. The barks are mixed with duck droppings, added sugar, roasted over coals, squeezed and filtered, then drunk and the rest is poured onto the feet for tocolytic among pregnancy.
68	Kepepe (<i>Sarcostemma esculentum</i>)	Hot flesh. The leaves are mixed with incense, lime (<i>Citrus aurantifolia</i>), and sandalwood (<i>Santalum album</i> L.) water to cure diarrhea. The barks are mixed with <i>sinrong wayah</i> and vinegar for scrubbing.
69	Kepuh (<i>Sterculia foetida</i>)	Cannot be used as a medicine.
70	Kepundung (<i>Baccaurea racemosa</i>)	The flesh, roots to leaves are lukewarmness, white sap is warm. They mixed with <i>massoi aromatica</i> (<i>Cryptocarya massoia</i>) and <i>sintok</i> (<i>Cinamomum sintoc</i> Bl.), used as a spray medicine for moon face.
71	Kerambit Naga (<i>unknown</i>)	The plant parts are mixed with 12 pieces of pepper (<i>Piper nigrum</i> L) and 12 old betel leaves (<i>Piper betle</i>), crushed until smooth, and used as an ointment.
72	Kerasi (<i>Lantana camara</i>)	The flesh, leaves and stems are cool, sap to roots are lukewarmness. They are mixed with water and eggs, used to cure alcohol intoxication. Warm leaves and fruit. The leaves are used for nausea and hangovers.
73	Kesahi (<i>unknown</i>)	The flesh, roots to leaves are cool, lukewarmness white sap, and warm bark. The shoots are mixed with watermelon (<i>Citrullus vulgaris</i>) flowers, honey and rock sugar, used as a drink for vertigo.
74	Kesawi Bang (<i>Nasturtium montanum</i> Wall)	The leaves to fresh roots, hot meat. The shoots of the tree are mixed with the bones of the wild fowl, vinegar, <i>brem</i> (Balinese traditional alcoholic drink fermented from red rice) black sticky rice (<i>Oryza sativa</i> var. <i>glutinosa</i>), and three white pepper (<i>Piper nigrum</i> L), used as a drink to treat respiratory ailments.
75	Kesegsegan (<i>Purtulaca oleracea</i> L)	The roots, leaves, and flesh are cold. As many as 60 shoots of the tree are mixed with <i>trigona</i> (stingless bees) honey (<i>Trigona</i> sp) and arak (traditional Balinese alcoholic drink), used as drops for stomach ache.
76	Kesimbukan (<i>Paederia foetida</i> L)	The flesh is cool, the medicine for infectious disease outbreak. Leaves are mixed with wasp nests made from soil in <i>Sanggah Kemulan</i> (mother temple), apply as paste medicine on the crown, and ask Ida Bhatara Brahma to clean it, taken three times, in front of the kitchen.
77	Ketimun Gantung (<i>Cucumis sativus</i> L)	Cool flesh. The fruit is mixed with rock sugar and ivory coconut (<i>Cocos nucifera</i> var. <i>eburnes</i>) water, used as a drink to cure after abortion.
78	Ketimun Uku (<i>Cucumis sativus</i>)	The roots to leaves are cool. The yellow leaves mixed with turmeric (<i>Curcuma longa</i> Linn. syn. <i>Curcuma domestica</i> Val.) rhizomes, <i>lempuyang</i> (<i>Zingiber zerumbet</i> L), and sandalwood (<i>Santalum album</i> L) powder, used as a spray medicine to treat stomach ache for three months pregnant women.

79	Kroya (<i>Ficus infectoria</i>)	The flesh like running water. The leaves and roots are mixed with massoia aromatica (<i>Cryptocarya massoia</i>) which is painted with the image of Betara Kala, used as <i>babayon</i> , sprayed three times on the head, five times on the chest and three times on the forehead as a medicine for syncope or unconscious.
80	Kutuh (<i>Ceiba petandra</i>)	Leaves to roots are cool, barks and sap are lukewarmness. The water of <i>embung</i> (new shoots growing) is mixed with burnt borax (sodium tetraborate), used as a drink to cure aphthous stomatitis on baby tongue.
81	Kwanta (unknown)	Hot roots and barks, lukewarmness sap and leaves. The leaves are mixed with garlic (<i>Allium sativum</i>), jangu (<i>Acorus calamus</i>) and <i>temu tis</i> (<i>Curcuma purpurascens</i> Bl. syn. <i>C. soloensis</i> Val.) to be used as a spray medicine for people with asthma.
82	Lambon Kutuh (<i>Manihot utilissima</i>)	The roots to leaves are lukewarmness. The roots are mixed with massoia aromatica (<i>Cryptocarya massoia</i>), vinegar, shallots (<i>Eleutherine palmifolia</i>), and pepper (<i>Piper nigrum</i>) eleven seeds for myalgia.
83	Legundi (<i>Vitex trifolia</i> L)	Hot flesh. 16 leaves are mixed with garlic (<i>Allium sativum</i>), jangu (<i>Acorus calamus</i>) and vinegar to be used as a scrub for paralytic or plegia. Warm flesh, lukewarmness roots and leaves. The leaves are mixed with coconut oil and then heated in a fire to cure fever.
84	Limo (<i>Citrus amblycarpa</i>)	Hot flesh, hot roots, and cool sap. The barks are mixed with vinegar, eleven seeds of pepper (<i>Piper nigrum</i>), crushed until smooth and used as a drink for paresthesia.
85	Majagawu (<i>Dysoxylum densiflorum</i>)	Lukewarmness flesh, hot sap, and roots to leaves are cool. The sap, roots and leaves are mixed with vinegar and roasted salt, used to treat dyspepsia.
86	Manas (<i>Ananas comosus</i>)	Hot meat, leaves to cool roots. The fruit is grated, take the water used as a drink to cure loss of sense.
87	Manas Bang (<i>Ananas comosus</i>)	Lukewarmness flesh, cool leaves and roots. The fruit is mixed with moon coconut (<i>Cocos nucifera</i> var. <i>rubescens</i>) water, <i>mulung</i> coconut (<i>Cocos nucifera</i> var. <i>viridis</i> , coconut with pink or pink fiber) water, the essence of hibiscus (<i>Hibiscus rosa-sinensis</i> L) flower, squeezed, used as drops in the nose to treat osteoarthritis.
88	Manggi (<i>Marselia crenata</i>)	The tasteless flesh is roasted in hot ashes, used in warm condition to cure eczema.
89	Manggis (<i>Garcinia mangostana</i>)	The roots and leaves are warm, the bark is hot. The sap is mixed with pigeon droppings, eleven seeds of pepper (<i>Piper nigrum</i>), old turmeric (<i>Curcuma longa</i> Linn. syn. <i>Curcuma domestica</i> Val) and eleven old betel (<i>Piper betle</i>) leaves, crushed until smooth, rubbed on the lips to cure herpes.
90	Merica (<i>Piper nigrum</i>)	Hot meat, barks until sap are hot. The leaves are mixed with chili vines (<i>Piper retrofractum</i>) and massoia aromatica (<i>Cryptocarya massoia</i>), used as a spray for tension type headaches.
91	Miana Cemeng (<i>Coleus scutellarrioides</i>)	Cool flesh, root is also cold. Six leaves are mixed with virgin coconut oil (VCO), and used as a drink.

92	Munggi (unknown)	The flesh, roots to leaves are cold. Hot red sap. The three shoots are mixed with shallots (<i>Eleutherine palmifolia</i>), used as a scrub medicine for lost of vision or blind eyes.
93	Musi (<i>Marsilea crenata</i>)	Hot roots and leaves and lukewarmness bark are mixed with garlic (<i>Allium sativum</i>) and <i>jangu</i> (<i>Acorus calamus</i>), used as medicine for <i>ila Brahma</i> (red leprosy).
94	Nangka (<i>Artocarpus heterophyllus</i>)	The flesh and root are moderate, white sap. Three pieces of young leaves are mixed with eleven seeds of pepper (<i>Piper nigrum</i>), used as a scrub for dyspepsia.
95	Nyuh Gading (<i>Cocos nucifera</i> L)	Ivory coconut is an incarnation of Lord Brahma and is holy. Ivory coconut water is mixed with lotus flower (<i>Nymphaea alba</i>) and thistle flower (<i>Calotropis gigantea</i>), used as a means of purification (self-cleaning) from various types of impurities in a noetic way (<i>leteh</i>) and is blamed by the Gods (<i>kapongor Dewa</i>). Before being treated, you should not use any medicine.
96	Padi (<i>Oryza sativa</i>)	The roots to barks are lukewarmness, and leaves cool. The leaves are mixed with <i>temu tis</i> (<i>Curcuma purpurascens</i> Bl. syn. <i>C. soloensis</i> Val.) and <i>massoia aromatica</i> (<i>Cryptocarya massoia</i>), used as a spray for enema facial with red eyes.
97	Pahang (<i>Pongamia pinnata</i>)	Hot flesh, red sap. The roots and leaves are mixed with the oil from coconut and marine animals and vinegar, used as a drink to cure stiffness.
98	Pakel (<i>Mangifera foetida</i> L)	The flesh to barks are hot, red and hot sap, roots to leaves are cold. They are mixed with pepper (<i>Piper nigrum</i>) and quicklime or calcium oxide, used as drink for abortion.
99	Paku Jukut (<i>Diplazium esculentum</i>)	The leaves to the roots are cool, the tree is also cold. The young leaves are mixed with crab, coconut milk and onion (<i>Allium cepa</i> L), roasted in hot ashes, used as a drink for people who do not want to eat or appetite disturbance.
100	Paku Lelipi (<i>Crassula sp</i>)	The flesh, root to leaves are lukewarmness. The shoots are mixed with quicklime, salt and <i>massoia aromatica</i> (<i>Cryptocarya massoia</i>), crushed until smooth, used to cure scorpion bites.
101	Pala (<i>Myristica fragrans</i>)	Lukewarmness leaves and roots, cool sap and barks. The barks are mixed with brown rice (<i>Oryza nivara</i>), <i>massoia aromatica</i> (<i>Cryptocarya massoia</i>) and roasted coconut, used as a spray medicine for <i>pemalian</i> . <i>Pemalian</i> is illnesses caused by violation of the rules regarding the agreement of space and time, <i>butha</i> and <i>kala</i> , space and existence of life.
102	Palit Sedangan (<i>Thevea peruviana</i> K. Schum)	Warm meat, hot sap and roots, warm leaves, lukewarmness barks. The leaves are mixed with galangal oil (<i>Alpinia galanga</i>), crushed until smooth, then fired in hot ashes, squeezed and filtered, the water is used as eye drops to treat sore eyes.
103	Pancarsona (<i>Marremia mammosa</i>)	Warm flesh, lukewarmness leaves and roots. The yellow leaves are mixed with <i>sulasih</i> (<i>Ocimum basilicum</i>), tamarind (<i>Tamarindus indica</i>), three slices of galangal (<i>Alpinia galanga</i>) and toasted salt, crushed until smooth to cure dyspepsia. The plant is used as medicine to burn and overcome all illnesses caused by the magically influence of a <i>Pandita</i> or a Brahmin.

104	Pangi (<i>Pangium edule</i> R)	Hot flesh, lukewarmness roots and sap, and warm barks. The fruit is mixed with rock sugar, used as drops for epistaxis.
105	Panisih (<i>Phyllanthus buxifolius</i>)	Flesh is cold. The roots to the leaves are also cold. The sap is like hot fire. The sap is mixed with chili vines (<i>Piper retrofractum</i>) and lime (<i>Citrus aurantiifolia</i>) used as drops for treatment of illness caused by magical power.
106	Paspasan (<i>Coccinia cordifolia</i>)	The leaves and roots until the peel are cold. The leaves are mixed with galangal (<i>Alpinia galanga</i>), turmeric (<i>Curcuma longa</i> Linn. syn. <i>Curcuma domestica</i> Val) and <i>biu-batu</i> (<i>Musa acuminata</i>), used as an oral medicine for fever. Flesh, root to leaves are lukewarmness. The roots are mixed with honey, pomegranate juice (<i>Punica granatum</i>) and fresh chicken eggs, used as drops to treat vertigo. The leaves are mixed with fennel onions (<i>Eleutherine palmifolia</i>), used as a scrub.
107	Paya (<i>Momordica charantia</i>)	Lukewarmness flesh, warm leaves, cool roots. The 21 pieces leaves are mixed with honey, rock sugar, pepper (<i>Piper nigrum</i>) eleven seeds, to cure vertigo.
108	Pengeng-pengeng (<i>Pedilanthus tithymaloides</i>)	The roots and leaves are lukewarmness. The hot sap is used to cure migraine. The leaves are used as patches on the forehead, mixed with garlic (<i>Allium sativum</i>) and <i>jeringau</i> (<i>Acorus Calamus</i> L).
109	Piling (<i>Abrus precatoris</i> L)	The flash is warm, the leaves until barks are lukewarmness, the sap until roots are white roots. The roots are mixed with young coconut to cure polydipsia.
110	Poh Amplem (<i>Magifera sp</i>)	Lukewarmness roots and leaves, white sap, warm flesh, and moderate bark. The barks are mixed with <i>kencur</i> (<i>Kaempferia galanga</i>), <i>massoia aromatica</i> (<i>Cryptocarya massoia</i>) and <i>sinrong</i> (mixture of herbal medicines and spices including nutmeg, coriander, <i>massoai</i> , <i>jeringau</i> , and clove) used as a spray medicine for <i>pemali Brahma</i> or stabbing pain in the side of the stomach.
111	Poh Gedang (<i>Mangifera indica</i>)	Lukewarmness flesh, cool leaves, hot sap, cool roots. The barks are mixed with honey and water of sandalwood (<i>Santalum album</i> L.), used as a stomach scrub for abortion.
112	Poh Weni (<i>Mangifera odorata</i>)	Hot meat, red sap is also hot. The sap is mixed with <i>musi</i> (<i>Marsilea crenata</i>) and red-sulphur, which is used as a spray medicine in the midriff of the liver to cure palpitation. Red sap, roots to leaves are hot. The sap is mixed with <i>arak</i> (traditional Balinese alcoholic drink) and vinegar and is used as a medicine for obesity.
113	Pucuk (<i>Syzygium myrtifolium</i>)	The flesh to the leaves is cool, the skin to the roots is also cool. The leaves are mixed with new chicken eggs, taken as medicine for facilitating childbirth.
114	Pule (<i>Alstonia scholaris</i>)	Lukewarmness flesh, hot sap, cool roots. The shoots are mixed with sugar and roasted coconut, then used to cure fever.
115	Pulet (<i>Saccopetalum horsfieldie</i>)	Lukewarmness flesh, warm leaves, cool roots, hot sap. The root is used as scrub to cure dactylitis.
116	Puring (<i>Codiaeum variegatum</i>)	Hot flesh, roots to leaves are warm. Three of the shoots are mixed with a cigarette filled with incense, and they are blown into the ear to cure hearing lose or deafness.
117	Samblung (<i>Epipremnum pinatum</i>)	The leaves are lukewarmness, the sap and bark are cool, used as a medicine for epilepsy, the roots mixed with shallots (<i>Eleutherine palmifolia</i>) are used for scrubs.

118	Sambung Tulang (Euphorbia turivalling L)	Hot meat, roots to hot skin. The sap is taken with weeds (<i>Imperata cylindrica</i>), used as scrub to treat leprosy.
119	Sekapa (<i>Dioscorea hispida</i>)	Tasteless flesh, roots to sap are also tasteless, leaves to barks are lukewarmness. The flowers are mixed with shallots (<i>Eleutherine palmifolia</i>), used as scrubs for treating furuncles.
120	Sembung (<i>Blumea balsamifera</i>)	Warm flesh, leaves to roots are lukewarmness. The leaves are mixed with <i>biu-batu</i> (<i>Musa balbisiana</i> Colla), tamarin (<i>Tamarindus indica</i>) and galangal (<i>Alpinia galanga</i>), used as a drink for fever medicine. Lukewarmness tree and leaves. The root is mixed with fennel onion (<i>Eleutherine palmifolia</i>), used as a scrub for treating epilepsy.
121	Sempol (<i>Hedychium ceronarium</i>)	Cool flesh, lukewarmness leaves. The root is mixed with shallots (<i>Eleutherine palmifolia</i>), used as a scrub to treat fever. The flower water is used as drops.
122	Sentul (<i>Sandoricum koetjape</i>)	Hot meat. The roots and leaves are used as a drink, to cure vomiting. The barks are mixed with <i>temu tis</i> (<i>Curcuma purpurascens</i> Bl. syn. <i>C. soloensis</i> Val.) three slices and roasted salt, used as spray medicine for gastro enteritis.
123	Silikaya (<i>Annona squamosa</i>)	Hot meat, lukewarmness roots to sap, leaves to barks are hot. The barks are mixed with vinegar and <i>sinrong</i> (mixture of herbal medicines and spices including nutmeg, coriander, massoi, <i>jeringau</i> , and clove), used powder as a medicine for fatigue.
124	Sirsak (<i>Annona muricata</i>)	Roots until the leaves are lukewarmness. The young leaves are mixed with nutmeg (<i>Myristica fragrans</i>), <i>sepet-sepet</i> (astringent) and <i>temu tis</i> (<i>Curcuma purpurascens</i> Bl. syn. <i>C. soloensis</i> Val.), used as a spray for constipation.
125	Sotong (<i>Psidium guajava</i> L)	Warm flesh, astringent taste. The fruit is used as a medicine for gastro enteritis. The shoots are mixed with coriander (<i>Coriandrum sativum</i>) three seeds and finely ground, paste in the navel.
126	Sumaga (<i>Citrus nolibis</i>)	The flesh, leaves and roots are hot, sap is lukewarmness. The fruit is mixed with vinegar and three slices of <i>temu tis</i> (<i>Curcuma purpurascens</i> Bl. syn. <i>C. soloensis</i> Val.) used to treat arthralgia.
127	Suren (<i>Sandoricum koetjape</i>)	Lukewarmness flesh, hot roots. The shoots are mixed with 11 slices of <i>temu tis</i> (<i>Curcuma purpurascens</i> Bl. syn. <i>C. soloensis</i> Val.), used to treat hematoma.
128	Tabya Dakep (<i>Piper retrpfractum</i>)	Hot flesh, hot roots and barks. The leaves are mixed with old betel (Piper betle) leaves, pepper (<i>Piper nigrum</i>), tamarin (<i>Tamarindus indica</i>), <i>temu tis</i> (<i>Curcuma purpurascens</i> Bl. syn. <i>C. soloensis</i> Val.) two slices, used as a drink for epilepsy medication.
129	Tahep (<i>Artocarpus elasticus</i> Reinw ex Blume)	Warm flesh, hot roots to leaves, lukewarmness barks. The sap is mixed with honey, used as drops for stomatitis.
130	Tangi (<i>Lagerstro emiaspeciosa</i>)	Warm flesh, lukewarmness sap, cool leaves, hot roots. The barks are mixed with eleven pieces of old betel (<i>Piper betle</i>) leaf oil, used to cure anxiety or agitation.

131	Tanjung (<i>Lagerstroemia speciosa</i> L)	Lukewarmness leaves to root, warm sap, cool sap. The barks are mixed with 21 pieces of pepper (<i>Piper nigrum</i>), massoia aromatica (<i>Cryptocarya massoia</i>), nutmeg (<i>Myristica fragrans</i>) and coriander (<i>Coriandrum sativum</i>), used as a spray for ascites.
132	Tapis-tapis (unknown)	The leaves and roots are lukewarmness, bark is hot. The leaves are mixed with vinegar and <i>majegau</i> (<i>Dysoxylum densiflorum</i>) powder, galangal (<i>Alpinia galanga</i>), turmeric (<i>Curcuma longa</i>) and brown rice (<i>Oryza rufipogon</i>), crushed until smooth, used as an ointment, to treat swelling in the thighs.
133	Taru Amplas (<i>Ficus ampelas</i> Burm F)	White sap, hot meat, lukewarmness leaves and roots, cool stems. The sap is mixed with <i>pulasari</i> (<i>Alyxia stellata</i>) and red onion (<i>Allium cepa</i> L.), roasted in hot ashes, used as topical medicine for cheilitis actinic.
134	Taru Api (<i>Avicennia alba</i>)	The flesh is all hot, the sap is red. The sap is mixed with copper powder which is painted by Bhatari Durga's image, added with black goat hair, vinegar, red sulfur, old turmeric (<i>Curcuma longa</i> Linn. syn. <i>Curcuma domestica</i> Val), used as a medicine for leprosy.
135	Taru Bang (<i>Pterocarpus indicus</i> Willd.)	Hot flesh like fire, lukewarmness root, white sap. The leaves are mixed with cobwebs from the kitchen, lime (<i>Citrus aurantiifolia</i>) and quicklime (calcium oxide), used as a medicine for herpes zoster.
136	Taru Bowok (unknown)	The leaves to the roots are hot, the sap is pale and hot. The barks are mixed with <i>kayu santen</i> (<i>Kibatalia arborea</i>) and water, placed in a clay pot, asked for prayers and grace from Bhetara Brahma, used to treat mental illness.
137	Taru Buwu (unknown)	Lukewarmness meat. The 11 pieces or barks are mixed with thick coconut milk and lime (<i>Citrus aurantiifolia</i>), used as a drink to cure arthralgia.
138	Taru Gadgad (unknown)	Warm flesh, lukewarmness leaves and roots. The barks is mixed with vinegar, used as a scrub for paresthesia.
139	Taru Jaran (<i>Lansea coromandelica</i>)	Leaves and roots are hot, white sap, flesh is hot. The bark was added with <i>majegau</i> (<i>Dysoxylum densiflorum</i>) powder, pasted until soft, used as spry to treat hearing loss. Leaves and roots are mixed with vinegar, pepper (<i>Piper nigrum</i>), <i>temu tis</i> (<i>Curcuma purpurascens</i> Bl. syn. <i>C. soloensis</i> Val.) and used for drop ear.
140	Taru Manis (<i>Cinnamomum verum</i>)	The roots to leaves are cold. The leaves are mixed with onion (<i>Allium cepa</i> L.), used as a drink to cure dysphonia.
141	Taru Mas (unknown)	The flesh is all cold. The fruit juice is mixed with rock sugar, used as drops to cure dysentery.
142	Taru Merak (<i>Caesalpinia pulcherrina</i>)	Hot roots and leaves, lukewarmness barks, hot flowers. The flowers are mixed with spices and sweet basil (<i>Ocimum sanctum</i>), used as paste on the crown of a child who cries for irritable syndrome.
143	Taru Miling (unknown)	The leaves are lukewarmness, roots and sap are hot. The shoots are mixed with <i>temu tis</i> (<i>Curcuma purpurascens</i> Bl. syn. <i>C. soloensis</i> Val.) to treat palpitation. The roots are mixed with lawn marshpennywort (<i>Hydrocotyle sibthorpioides</i>), and used as drops.
144	Taru Pramana Kabeh (unknown)	Flowers are cool, leaves are warm, barks are hoot, shoots are medium, and roots are medium. Flowers and leaves are mixed with massoia aromatica (<i>Cryptocarya massoia</i>), spryed aroum body for <i>pemali</i> illness.

145	Taru (<i>Euplexaura sp.</i>)	Pulir	The flesh and leaves are lukewarmness, the barks until the roots are hot. The roots are mixed with borax (sodium tetraborate) and <i>semanggi gunung</i> (<i>Hydrocoytle sibthorpioides</i>), used as drops for chest palpitations.
146	Taru (<i>Altingia excelsa</i>)	Raso	The roots to leaves are lukewarmness. Three shoots are used to beat three times the child who was continuously crying, the tree had a magical power to fight the illnesses.
147	Taru (unknown)	Rumawa	The roots to leaves are warm. The flowers are mixed with incense, honey, water of moon coconut (<i>Cocos nucifera</i>) and water of ivory coconut (<i>Cocos nucifera</i>), used as drops for people who sob because they are blamed by <i>Bhetara Guru</i> (ancestor) for something lacking.
148	Taru (unknown)	Sikep	From the roots to the leaves are hot, the bark is cold. As many as 21 shoots are mixed with the bark of <i>pulasari</i> (<i>Alyxia stellata</i>), and <i>sintok</i> (<i>Cinamomum sintoc</i> Bl.), used as a spray for treating nervous disorders.
149	Taru Suri (<i>Toona sureni</i>)		Cool flesh. The leaves are used for drinks. The lukewarmness sap and barks are mixed with brown rice (<i>Oryza nivara</i>), used for dyspepsia
150	Taru (<i>Solanum verbascifolium</i>)	Teter	Hot flesh, lukewarmness leaves and roots, warm sap and barks. The 11 pieces of barks are mixed with marsilea (<i>Marsilea crenata</i>), clove (<i>Syzygium aromaticum</i>) flower stalks and the essence of hibiscus (<i>Hibiscus rosa-sinensis</i> L) flower which are used as spray for <i>pemali</i> illness. The sap to root are lukewarmness. The roots are mixed with copper sulphate (CuSO_4), paste on the teeth to cure toothache.
151	Taru (unknown)	Tilap	Hot flesh, hot roots to leaves, hot barks and sap, red sap. The leaves are mixed with <i>arak</i> (traditional Balinese alcoholic drink), vinegar, <i>sinrong wayah</i> and pepper (<i>Piper nigrum</i>), used as a drink to cure ascites.
152	Taru (unknown)	Udak	Hot flesh, sap and root are lukewarmness. The barks and leaves are mixed with honey, 7 seeds of pepper (<i>Piper nigrum</i>), roasted salt, roasted tamarind (<i>Tamarindus indica</i>), used as a drink to cure syncope.
153	Taru (<i>Pinanga coronata</i>)	Uduh	The flesh is hot, the root until sap are also hot. The barks with leaves are mixed with black peper (<i>Piper nigrum</i>), used as nasal drops to treat people with respiratory ailments.
154	Taruju (<i>Acanthus ilicifolius</i>)		The flesh and root are cool, mixed with shallots (<i>Eleutherine palmifolia</i>) can be used as a scrub, to cure fever.
155	Tebu (<i>Saccharum officinarum</i>)	Malem	The roots to leaves are cool, the water is lukewarmness. Grated sugarcane, take the water is mixed with black chicken eggs, rock sugar, palm sugar and galangal (<i>Alpinia galanga</i>), use nose drops to cure ascites.
156	Teleng (<i>Clitoria ternatea</i>)		Lukewarmness roots and leaves, hot sap and sap. Leaves mixed with massoia aromatica (<i>Cryptocarya massoia</i>) decorated with an image of <i>Bhatari Durga</i> , say <i>urip Saptawara</i> i.e. Sunday (5), Monday (4), Tuesday (3), Wednesday (7), Thursday (8), Friday (6), and Saturday (9) used as a spray for suddenly syncope.
157	Terong (<i>Solanum melongena</i>)		Warm flesh, roots to sap are hot. The leaves are mixed with <i>pulasari</i> (<i>Alyxia stellata</i>), <i>kencur</i> (<i>Kaempferia galanga</i>) and clove (<i>Syzygium aromaticum</i>) flower stalks, used as a medicine for smallpox in infants.
158	Tigaron (<i>Crataeva</i>)		The roots to leaves are hot, lukewarmness sap and hot barkts. The leaves are mixed with vinegar, frankincense (<i>Styrax benzoin</i>) and amethyst flowers (<i>Datura metel</i>), used as eye drops to cure metal health disorder.

	<i>nurvala</i> Ham)	Buch.	
159	Tinga-tinga (<i>Sonneratia acida</i> L)		Lukewarmness leaves and roots, warm tree. The roots are mixed with thick coconut milk, galangal (<i>Alpinia galanga</i>), and turmeric (<i>Curcuma longa</i> Linn. syn. <i>Curcuma domestica</i> Val), used as drops medicine, to cure people who are polydipsia.
160	Tingkih atau Kemiri (<i>Aleurites moluccana</i> L)		Lukewarmness flesh, leaves to barks are lukewarmness, roots and sap are hot. Take the flesh of the seeds, mixed with salt and coconut oil, use the scrub on the navel to cure the umbilical cord.
161	Tingulun (<i>Protium javanicum</i>)		Flesh, roots and leaves are lukewarmness. Mixed with coriander (<i>Coriandrum sativum</i>) and temu tis (<i>Curcuma purpurascens</i> Bl. syn. <i>C. soloensis</i> Val.), it is used as a drink to cure diarrhea.
162	Tiyih (<i>Amorphopalus sp</i>)		The roots and leaves are lukewarmness, the sap is white, the flesh is cool, and the barks are also cool. The tubers are mixed with garlic (<i>Allium sativum</i>) and jangu (<i>Acorus calamus</i>), crushed, burned in hot ashes to cure festering bruises on the soles of the feet.
163	Tuwung (<i>Solanum surattense</i>)		Warm flesh, lukewarmness leaves, cool roots and warm bark. The roots are mixed with sintok (<i>Cinamomum sintoc</i> Bl.) and quicklime, to cure tiredness and thirsty.
164	Undik Kebo (unknown)		Flesh is hot. The sixteen pieces of leaves are mixed with garlic (<i>Allium sativum</i>), jangu (<i>Acorus calamus</i>), vinegar to treat paralysis or plegia.
165	Uring (unknown)		The flesh is cold the sap and bark are lukewarmness. The leaves mixed with brown rice (<i>Oryza rufipogon</i>) are used as herbal medicine, taken to treat dyspepsia.
166	Uwut-uwut (unknown)		The flesh is cold, the roots to the bark are also cold. The leaves are mixed with shallots (<i>Eleutherine palmifolia</i>) and water from a clay jug, crushed until smooth, used as a scrub on the fracture.
167	Uyah-uyah (<i>Ficus quercifolia</i>)		Hot flesh, cool roots and warm skin. The leaves are mixed with warangan and quicklime, crushed until smooth, used for pyoderma.
168	Wanggi (unknown)		The flesh, leaves and roots are cold. The shoots are mixed with shallots (<i>Eleutherine palmifolia</i>), used as rub for blind person or loss of vision.
169	Wani atau Kemang (<i>Mangifera Caesia</i> Jack)		Hot roots and leaves. The sap mixed with incense (<i>Styrax benzoin</i>) is used to treat otitis media.

The parts of plant used as medicines in *Lontar* UTP are roots (9.9%), rhizomes (5.6%), stem (4.7%), barks (15.0%), sap (6.0%), leaves (24.8%), shoots (7.7%), flowers (3.4%), fruits or seeds (12.4%), and all parts of plant (10.7%), Figure 2.a.

In the *Lontar Usada Taru Premana*, the characteristics of the plant parts are simply classified into three, namely hot, cold, and lukewarm. This is related to Hindu views or philosophy about the constituents of the human body.^{3,5} According to Ayurveda, the universe as well as the human body is made up of five primordial elements, called the *Panca Maha Bhuta* - the five basic elements forming nature, namely *akasa* (ether or empty space), *bayu* (air), *teja* (fire), *apah* (water), and *pertiwi* (earth).^{3,10,11} In combination, these elements give rise to three main biological substances or forces or principles in the human body, which are called *tri*

doshas, namely *vayu*, *pitta*, and *kapha*.^{12,13} These three *doshas* must be in a balanced state so that the body remains healthy. When the balance of the three *doshas* is disturbed, the body will get sick. If the amount of *pitta* element increases, then the body will become hot (*panas*), because the *pitta* element is hot. On the other hand, if the *kapha* element increases, then the body will become cold (*dingin*), because the *kapha* element is cold. If the *vayu* element increases, the body will become between hot and cold or lukewarm (*dumelada*). Based on this philosophy, in Balinese view illnesses or diseases can be simply classified based on their symptoms, hot (*panes*), cold (*dingin*), and lukewarm (*dumelada*). Based on *Lontar Usada Taru Premana*, plants can be used to treat illnesses and diseases. The three qualities of plants which result from this classification are hot, cold and lukewarm without further explanations. These qualities can be found in the different parts of the plant, the flesh, sap, roots, trunk, bark, wood, leaves, flowers, and fruit. Moreover, the Balinese terms for hot, cold, and lukewarm in reference to plants are different than those in reference to diseases. Heat in relation to the disease is *panas* or *kebus* while in relation to plants is *hanget*, which actually means warming. Coldness of the body is *nyem* or *enyem* which means cold or fresh. Coldness in plants is called *tis* or *etis* meaning moist cold, cooling. Lukewarm of the body is *sebaha*, actually the body's natural temperature, lukewarm in a plant is *dumalada*. In order to judge the character of the medicinal plant, one must pay attention to the flowers, or in their absence to the fruits, furthermore to the odour and flavour of the wood or flesh. If the flowers of the plant are white, yellow or green it is hot; if they are red or blue it is cold, and if they are multicoloured it is lukewarm. Sweet or sour tasting wood or flesh identifies the plant as hot, whereas bitter or pungent flavour as cold.

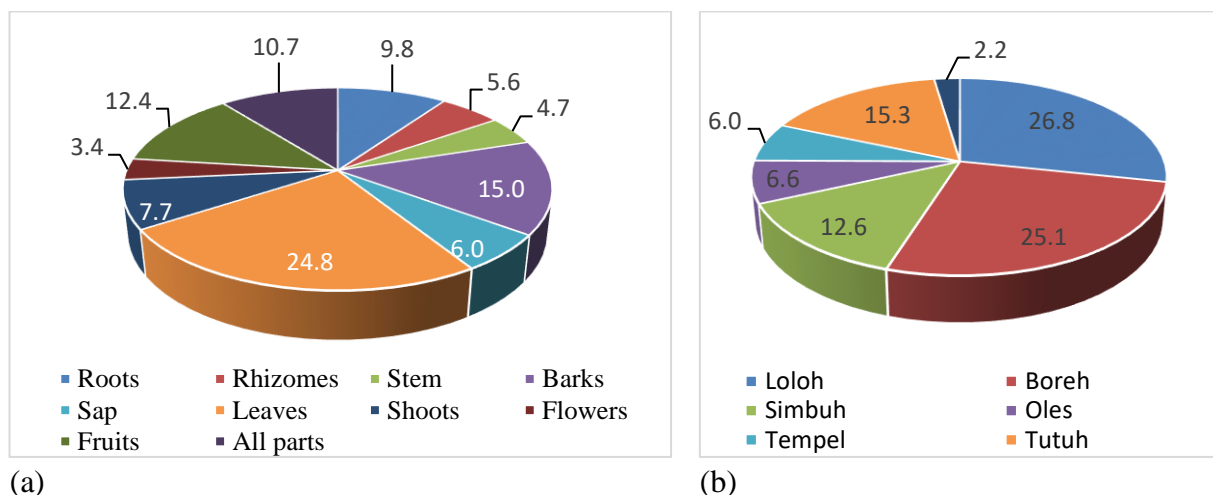


Figure 2. (a) The part of plant used and (b) the methods of using of medicines

Apart from plant properties, *Lontar Usada Taru Premana* also explains how to concoct or formulate plant parts and mix them with additional plants and other additives, such as coconut water, honey, chicken eggs, rock sugar, *arak* or *berem* (traditional Balinese alcoholic drinks), vegetable oils, vinegar and inorganic materials such as sulfur, quicklime, and borax. The additional plants most often used are *massoia aromatica* (*Cryptocarya massoia* syn. *Cinnamomum massoy*), pepper (*Piper nigrum*), *temu tis* (*Curcuma purpurascens* Bl. syn. *Curcuma soloensis* Val.), shallot (*Eleutherine palmifolia*) and red onion (*Allium cepa* L.), galangal (*Alpinia galanga*), coriander (*Coriandrum sativum*), turmeric (*Curcuma longa* Linn. syn. *Curcuma domestica* Val), *jangu* (*Acorus calamus*), garlic (*Allium sativum*), and lime (*Citrus aurantifolia*). There are 180 formulas used to treat around 84 types of illnesses and diseases caused by *kuasa skala* (natural causes) including common illnesses such as wounds, diseases caused by weather or climate changes, infectious diseases caused by microbes (fungi, bacteria and viruses), degenerative diseases (heart disease, hypertension, osteoporosis,

diabetes, nerves, and vertigo) and *kuasa niskala* (supernatural causes) such as *kesisipan* or *kepongor*, *pemali*, and black magic. *Kesisipan* is a state of illnesses in a person as a result of punishment, warning, scolding or blame by ancestors (*leluhur*), holy teachers (*Guru Suci*), and Lord (*Dewa*) due to ignorance or mistakes made either intentionally or unintentionally by that person.¹⁴ Whereas, *pemalinan* is illnesses caused by violation of the rules regarding the agreement of space (*butha*) and time (*kala*), or space and existence of life made by ancestors (*lelulur*).¹⁵

Moreover, according to *Usada Taru Premana*, there are eight methods in using the traditional medicines which are (1) *loloh*, a traditional herbal drink from Bali which is similar with *Jamu* from Java (26.8%), (2) *boreh*, a traditional cream or scrub which is spread overall around the wound or on the body (25.1%), (3) *simbuh*, spit a medicine is traditional medicine that is chewed up and then spat upon a sick person (12.6%), (4) *oles* or smear, a traditional oil, liquid or paste which is applied to certain parts of the body (6.6%), (5) *tempel*, the easiest treatment among all where the medicine is just affixed or pasted on the wound (6.0%), (6) *tutuh*, drop medicines which is immediately dropped on the wound or sucked through the nostril (15.3%), (7) *tigtig*, treating a disease by hitting the body, hands or feet with a wooden branch (1,1%), and (8) *melukat*, spiritually purification oneself spiritually (*sekala*) and physically (*niskala*) by using offerings and sprinkling holy water (1,1%), Figure 2(b).

Lontar Usada Taru Premana is one of the main sources for *balian* or traditional healers in Bali in studying and concocting medicines whose main ingredients come from plants to treat various illnesses and diseases. On the other hand, some substances are commonly taken regularly as medicine, even where there are no symptoms of disease. They are considered to be strengthening and prophylactic. For the same reason, some *boreh* and *loloh* or *jamu* are also used daily.

A number of plants listed in the UTP are now rare and even extinct, therefore it is difficult to find scientific names for these plants, such as *armawa*, *kapopoh*, *kwanta*, *tapis-tapis*, *taru bowok*, *taru buwu*, *taru gadgad*, *taru miling*, *kemarak*, *taru tilap*, *taru mas*, *taru raso*, *taru rumawa*, *taru sikep*, *taru suri*, *taru udak*, *undik kebo*, and *uring*. That plants are not common in daily live right now.

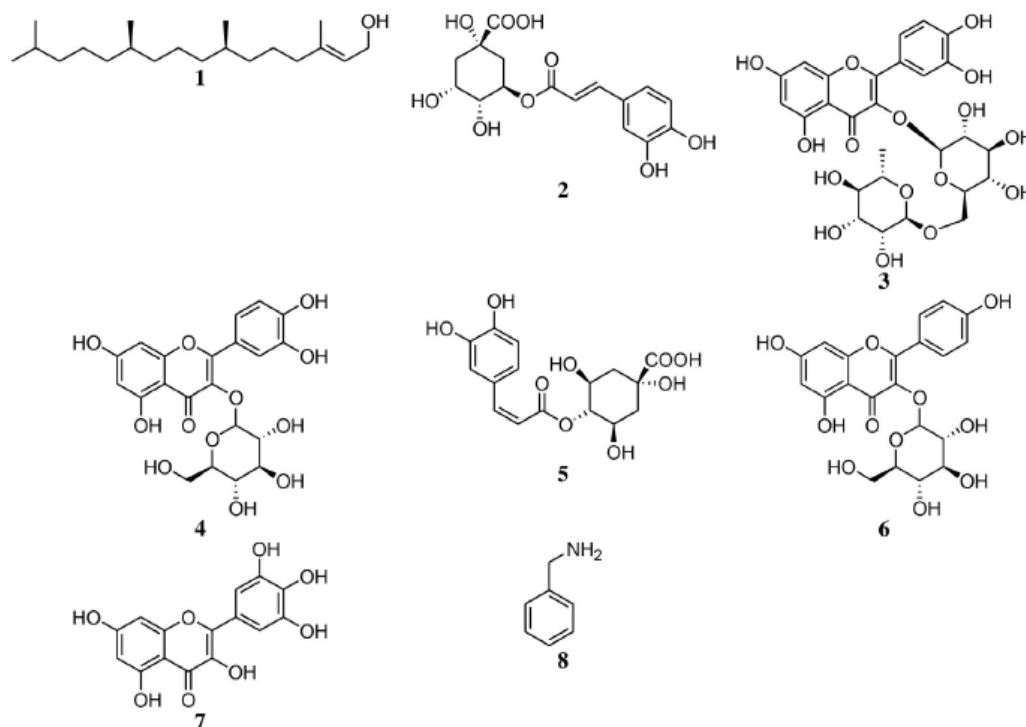


Figure 3. Chemical structures of selected compounds from *M. oleifera*: phytol (1), chlorogenic acid (2), rutin (3), isoquercetin (4), crypto-chlorogenic acid (5), astragalin (6), myricetin (7), and moringinine (8).

Until now there has been no scientific evidence for the truth of the contents of UTP, but it is based on empirical evidence. In order for UTP to be declared scientific, it must be constructed with philosophical thoughts of science, both scientific ontology, epistemology and axiology.¹⁶ It is our responsibility, especially the researchers, to prove the truth of the claims made by UTP. Research on traditional medicinal plants has already begun, for example, such as a study on the moringa plant (*Moringa oleifera*). According to UTP, moringa can be used for eye drops to treat conjunctivitis. As it is known that conjunctivitis can be caused by a virus and is an infectious disease. The research results showed that moringa tree has biological activity because it contains natural compounds such as carotenoids, tocopherols (α , γ , δ), phenolic acids, flavonoids, alkaloids, phytosterols, folate, polyunsaturated fatty acids, natural sugars, vitamins, minerals, and organic acids.^{17,18} Faizi *et.al.* reported that moringa contained alkaloid (moringine and moringinine), 4-hydroxymellein, octacosanoic acid, and β -sitosterol.¹⁹ Figure 3 gives chemical structures of selected compounds obtained from *M. oleifera*.

Many pharmacological studies have shown the ability of this plant to exhibit analgesic, anti-inflammatory, antipyretic, anticancer, antioxidant, nootropic, hepatoprotective, gastroprotective, anti-ulcer, cardiovascular, anti-obesity, antiepileptic, antiasthmatic, antidiabetic, anti-urolithiatic, diuretic, local anesthetic, anti-allergic, anthelmintic, wound healing, antimicrobial, immunomodulatory, and antidiarrheal properties.¹⁸ Extract of the seeds showed anti-inflammatory and antimicrobial actions²⁰ and inhibition of immediate hypersensitive reaction.²¹ *M. oleifera* showed significant activities against viruses like HIV, HSV, HBV, EBV and FMDV.²² It was reported to possess antiviral activity against foot and mouth disease virus at concentration ranges of 12-100 μ g/ml and 50-300 μ g/ml.²³ Aqueous extract, methanolic extract, and petroleum ether extract of *M. oleifera* leaf shown active against HIV lentiviral vector and inhibited early events of viral replication with EC₅₀ values of 7.17, 7.72 and 7.59 μ g/ml, respectively.²⁴ Crude ethanolic extract of *M. oleifera* leaves attenuated the activity of HSV-1, specifically with EC₅₀ value of 100 ± 5.3 μ g/ml.²⁵ The water leaves extract of the plant showed antiviral activity against hepatitis-B virus (HBV) with EC₅₀ values of 60 μ g/ml.²⁶ The ethanolic and methanolic leaves extracts of the plant showed antiviral activity against Epstein-Barr virus (EBV) with EC₅₀ values of 32.5 and 35.3 μ g/ml, respectively.²⁷ These are probably reason or scientific evidence that moringa tree can be used as a remedy for conjunctivitis.

CONCLUSION

There is a lontar text in Bali, known as *Lontar Usada Taru Premana*, which well deserves the label of Balinese pharmacopoeia since it lists traditional medicinal plants together with a description of their characteristics, properties, formulation, prescriptions and applications for long time ago. The *Lontar Usada Taru Premana* describes 214 plant species including 169 types of main plants and 45 additional plants that are commonly used for making traditional medicines with around 180 formulas. Moreover, there are 128 (75.7%) same types of plants found in all *lontar* versions. The same types of plants in version 1 and 2, version 2 and 3, and version 1 and 3 are 18 (10.7%), 8 (4.7%), and 0 (0%), respectively. While, the number of plants found only in version 1, 2, and 3 are 4 (2.4%), 7 (4.1%) and 4 (2.4%), respectively. The parts of plant used as medicines are roots (9.9%), rhizomes (5.6%), stem (4.7%), barks (15.0%), sap (6.0%), leaves (24.8%), shoots (7.7%), flowers (3.4%), fruits or seeds (12.4%), and all parts of plant (10.7%). The qualities or properties of plants were classified into three main group, namely: hot or warm (*panes* or *anget*), cold (*dingin* or *etis*) and lukewarm (*dumelada*). The methods to use the medicines are (1) *loloh* or *jamu* (26.8%), (2) *boreh* or scrub (25.1%), (3) *simbuh* or sprayed (12.6%), (4) *oles* or smeared (6.6%), (5) *tempel* or pasted (6.0.7%), (6) *tutuh* or drop (15.3%), (7) other methods (2.2%). The TBM are used to treat around 84 types of illnesses and diseases caused by *kuasa sekala* or natural powers including physical disorders, mental illness, common diseases due to weather condition, communicable diseases, and degenerative diseases, and *kuasa niskala* or supranatural

powers such as black magic, *kesisipan*, and *pemalihan*. The TBM are used by *balian* or traditional healer to treat various illnesses and diseases based on empirical evidence. The effectivities of the medicines should be scientifically proved by preclinical and clinical data. This is both a challenge and an opportunity for researchers in the pharmaceutical and medical fields.

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