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Review Article

Indonesian Saintific Jamu in the Treatment of Various Diseases: A Review

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Abstract

Jamu is the ancestral heritage of the Indonesian people which has been passed down from generation to generation, originating from cultural diversity, local wisdom and biological diversity. Empirical evidence shows that jamu can maintain and improve people's health. The government, through the Ministry of Health, issued regulations regarding the Saintification of Herbal Medicine to provide scientific evidence regarding the efficacy and safety of herbal medicine through health service-based research. Scientific herbs approved by the National Herbal Saintification Commission are sourced from research that has been conducted by the Center for Research and Development of Medicinal Plants and Traditional Medicines (B2P2TOOT). A literature review was carried out on 12 scientific herbal medicines using the narrative method by grouping the results of similar research according to established journal criteria. Based on the results of the literature review that has been carried out, it can be concluded that 12 scientific herbal medicines are safe and have health benefits.

Keywords: Djampi, Jamu, Oesodo, Scientific herbal concoctions, Traditional medicine

Kajian Literatur Jamu Saintifik Indonesia Dalam Pengobatan Berbagai Penyakit

Abstrak

Jamu merupakan warisan leluhur bangsa Indonesia yang diwariskan secara turun-temurun berasal dari keragaman budaya, kearifan lokal, dan keragaman hayati. Bukti empiris menunjukkan bahwa jamu dapat menjaga dan meningkatkan kesehatan masyarakat. Pemerintah melalui Kementerian Kesehatan, menerbitkan peraturan tentang Saintifikasi Jamu untuk menyediakan bukti ilmiah mengenai khasiat dan keamanan jamu melalui penelitian berbasis pelayanan kesehatan. Ramuan jamu saintifik disetujui oleh Komisi Saintifikasi Jamu Nasional bersumber dari penelitian yang telah dilaksanakan oleh Balai Besar Penelitian dan Pengembangan Tanaman Obat dan Obat Tradisional (B2P2TOOT). Kajian literatur dilakukan terhadap 12 ramuan jamu saintifik menggunakan metode naratif dengan mengelompokkan hasil penelitian sejenis sesuai dengan kriteria jurnal yang ditetapkan. Berdasarkan hasil kajian literatur yang telah dilakukan dapat disimpulkan 12 ramuan jamu saintifik aman dan memiliki khasiat bagi kesehatan.

Kata Kunci: Djampi, Obat tradisional, Oesodo, Jamu, Ramuan jamu saintifik

1. Introduction

The lifestyle of modern society, which tends to be unhealthy, increases the incidence of non-communicable diseases (NCDs) which are characterized by various complaints such as high cholesterol, high blood sugar levels, high uric acid levels and arthritis. In dealing with this problem, people's choice to return to nature by using medicinal plants is becoming increasingly widespread.[1] Indonesia has a wealth of medicinal plants from various tribes spread across various regions of Indonesia, from Sabang to Merauke. Jamu has been used much by Indonesian society as cultural heritage due to its efficacy and utilization for generations. Jamu formula often consist of medicinal plants processed in traditional way or consisted of several kinds of herbs or poly-herbs simultaneously processed to produce several types of active compounds.[2] Jamu comes from Sanskrit, namely from the word “djamoe” which stands for “djampi” and “oesodo”. Djampi means healing with medicinal herbs, while oesodo means health, so it is concluded that medicinal herbs are beneficial for health.[3]

Based on Minister of Health Decree No.003/MENKES/PER/I/2010 concerning Saintification of Jamu, it is stated that the scientification of jamu is scientific proof of the efficacy and safety of jamu. Jamu scientification is carried out through clinical observation, namely health service-based research. The scientification of herbal medicine itself is a breakthrough for the Ministry of Health in its efforts to provide scientific support (evidence based) for herbal medicine so that it can be used in formal health services. In the context of Saintification of Jamu or scientific proof of the efficacy and safety of Jamu, B2P2TOOT since 2010 has carried out a series of preclinical and clinical tests on various herbal medicines.[4] The use of jamu to maintain health by the community for preventive, promotive and curative purposes is expected to reduce health expenditures. By using these ingredients, it is hoped that initial complaints can be treated with herbal medicine, so that they do not become prolonged. People can also use the surrounding land to cultivate this medicinal plant.[1] There are currently 12 types of jamu formulas that have been scientifically proven. Therefore, this review article aims to collect research related to 12 scientific jamu formulas for health and the safety of their consumption.

2. Methods

The method used is a literature review article (LRA) with library sources obtained through the Google Scholar data base published from 2013 to 2023 on the topic of the benefits and safety of jamu for health. We use the keywords "12 scientific jamu concoction" to search for jamu that have been proven to cure various diseases. Relevant articles were collected and reviewed.

The number of journals from this search resulted in 43 journals. Inclusion criteria are articles published between 2013-2023, articles in English or Indonesian, articles that can be accessed in full text, and articles that contain information related to 12 scientific herbal concoctions in the treatment of various diseases. Exclusion criteria are articles published after 2023, articles other than English or Indonesian, paid articles that cannot be accessed, and articles that do not contain information related to 12 scientific herbal concoctions in the treatment of various diseases.

3. Result and Discussion

3.1. Jamu for Osteoarthritis

Osteoarthritis is one of the most common diseases in the world and affects more than 50% of the elderly population.[5] An imbalance between the deterioration and repair of the tissues in the synovial joint organ is the cause of osteoarthritis (OA), which can be brought on by a number of risk factors such as trauma, overuse, and hereditary susceptibility.[6] In Indonesia, the prevalence is 5% at ageslessthan 40 years, 30% at the age of 40-60 years, and 65% at the age of more than 60 years.[7] Indonesia has several herbs formulas which have been used traditionally to reduce pain of OA. According B2P2TOOT, scientific jamu for osteoarthritis consists of temulawak (*Curcuma xanthorrhiza*), Equisetum debile,

kumis kucing leaves (*Orthosiphon aristatus*), turmeric rhizome (*Curcuma longa*), fennel seed (*Foeniculum vulgare*), and meniran herb (*Phyllanthus niruri*).

Previous clinical trials have shown an effective and safe alternative for pain relief of OA and clinically comparable efficacy and safety to piroxicam after 28 days intervention. This clinical study concluded that the treatment of OA herbal concoction for 28 days significantly decreased the pain in patients with osteoarthritis. The osteoarthritis jamu concoction consisted of 15g Curcuma xanthorrhiza dried rhizome, 3g Centella asiatica dried herbs, 15g Curcuma longa dried rhizome, 3g Foeniculum vulgare seeds, 5g Orthosiphon stamineus dried leaves, 7g Phyllanthus niruri dried herbs, and 5g Equisetum debile dried herbs.[6]

In addition, the previous in vivo study of sondhep herb also used for joint pain in osteoarthritis. It consists of red ginger (*Zingiber officinale* var. Rubrum) rhizomes, aromatic ginger (*Kaempferia galanga* Linn) rhizomes, garlic bulb (*Allium sativum*), and solo garlic (*Allium sativum*). Scientifically, each ingredient of the Sondhep herb can reduce IL-1β as a mediator of inflammation and pain. The Sondhep herb can reduce IL-1β levels because all components in this herb contain compounds that have an activity to reduce IL-1β levels. These compounds are six-gingerol in red ginger (*Zingiber officinale* var. Rubrum) rhizomes, ethyl-p-methoxycinnamate in aromatic ginger (*Kaempferia galanga* Linn) rhizomes, diallyl-disulfide (DADS) in garlic (*Allium sativum*) bulbs and solo garlic (*Allium sativum*).[8] However, there has been no clinical testing regarding the effect of sondhep herb on osteoarthritis and its safety.

3.2. Jamu for Hemorrhoids

Lifestyle changes cause various kinds of complaints, for example hemorrhoids. Occupational factors, food intake that does not contain enough fiber, obesity, pregnancy, can cause hemorrhoids. Hemorrhoids are characterized by pain when defecating, fresh blood in the feces, and itching around the anus. Bleeding can cause severe anemia requiring a transfusion.[9]

Medicinal plants are increasingly in demand as an alternative hemorrhoid therapy. According to B2P2TOOT, scientific jamu for hemorrhoids consists of turmeric rhizome (*Curcuma longa*), temulawak (*Curcuma xanthorrhiza*), daun ungu (*Graptophyllum pictum*), daun duduk (*Desmodium triquetrum*), daun iler (*Plectranthus scutellarioides*), and meniran herb (*Phyllanthus niruri*). People themselves have long used daun ungu (*Graptophyllum pictum*), daun duduk (*Desmodium triquetrum*), and daun iler (*Plectranthus scutellarioides*) for hemorrhoids. So efforts are needed so that people can use scientific jamu concoctions for hemorrhoids safely.[9]

The chemical compounds in daun ungu include flavonoids, anthocyanins, leukoantosinins and tannins. The flavonoids have the effect of reducing hyperpermeability and increasing the elasticity of blood vessels, so they can reduce bleeding.[10] Daun ungu also have a mild laxative effect, so they can help sufferers complain of difficulty defecating. Iler leaves phytochemically contain secondary metabolites of flavonoids, steroids and tannins. The high content of steroid compounds consists of a mixture of sterols with their main components, sitosterol and stigmasterol.[11] The steroid compounds of iler leaves can function as a substitute for corticosteroids, in reducing the irritation and itching of hemorrhoid sufferers. Phytochemical screening of duduk leaves showed flavonoids, steroids, tannins, alkaloids, trigoneline, and hypaphorin.[12] Duduk leaves showed good wound healing activity. This is useful in treating rectal injuries that cause bleeding. The use of turmeric, ginger and meniran aims to maintain the body's immune system.

The Zingiberaceae family is a plant commonly used in Indonesian herbal medicine (jamu).[12] Based on clinical trials, the simplicia used are 15 grams of daun ungu, 12 grams of daun duduk, 9 grams of daun iler, 3 grams of temulawak, 3 grams of turmeric, and 3 grams of meniran. The result showed liver function examination values (SGOT, SGPT) and kidney function (urea,

creatinine). The average SGOT value for the herb group on day 0 was 18.17 mg/dL. After intervention for 28 and 56 days, the mean SGOT values were 18.90 mg/dL and 18.96 mg/dL. Meanwhile, the average SGPT value for the herb group on day 0 was 19.22 mg/dL. On the 28th and 56th day of examination, the average SGPT values were 18.33 and 20.34 mg/dL. The herb group had an average urea value on day 0 of 22.36 mg/dL. After examination on days 28 and 56, the mean urea values were 22.65 mg/dL and 22.95 mg/dL. Meanwhile, the mean creatinine value of the herb group subjects on day 0 was 0.85 mg/dL. The next examination on days 28 and 56, the average creatinine value was 0.8 mg/dL and 0.85 mg/dL. The herb is relatively safe for the liver and kidneys. Herbal medicines are effective in treating hemorrhoids comparable to comparable drugs and are safe to use.[9]

3.3. Jamu for Liver Function Disorders

As the largest organ in the body, the liver has various important functions, including protein, glucose and fat metabolism, detoxification processes, formation and release of various enzymes and bilirubin. The high speed of blood flow through the liver is needed to balance the oxygen demand of liver cells because more than 50% of its blood supply is venous blood. Bacteria, viruses, drugs, toxins and other microorganisms that enter the portal vein will be detoxified in the liver. Because of its complex function, the liver is easily damaged.[13]

The liver is mainly composed of liver cells called hepatocytes. If a disorder occurs in the liver that causes damage to hepatocytes, there will be over-expression of the enzymes produced by hepatocytes.[14] An increase in these enzymes is a sign of a disorder in the liver. Liver dysfunction is still a major health problem in the world with a high incidence rate, especially in developing countries.[15]

Management of liver function disorders is aimed at treating the cause of the disorder and protecting and repairing liver cells that have the potential to be or have been damaged by the disorder (hepatoprotector). According to B2P2TOOT, scientific jamu for hepatoprotective consists of turmeric rhizome (*Curcuma longa*), temulawak (*Curcuma xanthorrhiza*), and jombang leaves (*Taraxacum officinale*).

Preclinical research found that scientific jamu concoction consisting of *Curcuma longa* rhizomes, *Curcuma xanthorrhiza* rhizomes, and *Taraxacum officinale* leaves given to mice along with paracetamol at a dose of 500 mg/kg body weight for 7 days has a hepatoprotective effect by inhibiting the increased levels of SGPT, SGOT, MDA and ALP, as well as showing better histopathological features of liver cells than control.[16]

A prior clinical study of the hepatoprotector formula consisting of 6 grams of *Curcuma longa* rhizomes, 28 grams of *Curcuma xanthorrhiza* rhizomes, and 12 grams of *Taraxacum officinale* leaves with a positive control of 2 x 140 mg silymarin was conducted at the traditional medicine clinics in 2015. The results showed that the mean SGPT of subjects taking the hepatoprotector formula decreased from 97.34 IU/L to 39.91 IU/L, which was not significantly different from the mean SGPT of subjects taking silymarin that decreased from 94.63 IU/L to 42.81 IU/L. The mean SGOT of the subjects taking the hepatoprotector formula also decreased from 79.35 IU/L to 36.14 IU/L, which was not significantly different from the mean SGOT of subjects taking silymarin that decreased from 74.55 IU/L to 20.74 IU/L14. In terms of safety, jamu is safe, proven by routine blood tests and kidney function which did not experience significant changes at the end of the test compared to the beginning.

3.4. Jamu for Weight Loss

In this decade, being overweight (obesity) is a health problem. Even today, obesity is referred to as The New World Syndrome, where the incidence continues to increase throughout the world. Obesity is a risk factor for various diseases, especially degenerative and metabolic diseases. One of the causes of obesity is consumption of junk food. Junk foods are found to be associated with obesity due to their high energy content and the amount of fat present or free sugar,

chemical additives, and sodium with the presence of a low amount of micronutrients and fiber.[17] Obesity has a strong correlation with morbidity and mortality, so it needs serious attention regarding the causes, preventive measures and treatment efforts.[18] According to B2P2TOOT, scientific jamu for weight loss consists of tempuyung leaves (*Sonchus arvensis*), dutch teak leaves (*Guazuma ulmifolia*), kemuning leaves (*Murraya paniculata*), and rhubarb root (*Rheum officinale*).

Preclinical research on scientific jamu consisting of Dutch teak leaves (*Guazuma ulmifolia*), kemuning leaves (*Murraya paniculata*), rhubarb roots (*Rheum officinale*), and tempuyung leaves (*Sonchus arvensis*), showed that giving a single oral dose up to the largest dose of 5000 mg/Kgbb does not cause toxic effects. Observing the health of the test animals for 14 days throughout the group of test animals did not reveal any clinical symptoms of poisoning such as diarrhea, polyuria, vomiting, seizures, tremors and decreased consciousness. So it can be classified that the ingredient meets the Practical Non Toxic (PNT) criteria.[19]

The Jamu Saintification Clinic, Center for Research and Development of Medicinal Plants and Traditional Medicine, uses a concoction consisting of tempuyung leaves (*Sonchus arvensis*), dutch teak leaves (*Guazuma ulmifolia*), kemuning leaves (*Murraya paniculata*), and rhubarb root (*Rheum officinale*) for weight loss. The results of clinical observations in 2011 on 33 subjects for 2 months showed that the herb could reduce Body Mass Index (BMI) by 136 kg/m², and no symptoms and signs of toxicity were found. The boiled water of the concoction mentioned above has also been tested for acute and sub-chronic toxicity using experimental animals and did not show significant differences when compared to controls without treatment in terms of parameters of kidney function and liver function (not toxic).[20] The results of other clinical observations, the intervention of herbal medicine for obesity consisting of 4 types of simplicia, namely 10 g of dutch teak leaves (*Guazuma ulmifolia*), 10 g of kemuning leaves (*Murraya paniculata*), 4 g of rhubarb roots (*Rheum officinale*), and 10 g of tempuyung leaves (*Sonchus arvensis*) was able to reduce subjects' Body Mass Index (BMI), Abdominal Circumference, and Upper Arm Circumference which was equivalent to orlistat and was proven safe to use for 56 days.[21]

3.5. Jamu for Urinary Tract Stones

Urinary Tract Stones is a condition caused by stones along the urinary tract which can cause pain, bleeding and infection. Urinary Tract Stones is grouped based on the location of the stone, namely kidney stones, ureters, bladder and urethra. The choice of therapy is a challenge because Extracorporeal Shock Wave Lithotripsy (ESWL) and Ureteroscopic Lithotripsy (URSL), which are the best choices, still have a negative influence on quality of life. Urinary Tract Stones disease has a negative impact on quality of life (QoL) both in the short and long term, although it is rarely fatal.[22] The target of therapy is not only to pay attention to the status of the disappearance of stones in the urinary tract, but also to the patient's quality of life. According to B2P2TOOT, scientific jamu for urinary track stones consists of tempuyung (*Sonchus arvensis*), temulawak (*Curcuma xanthorrhiza*), kumis kucing leaves (*Orthosiphon stamineus*), kunyit (*Curcuma longa*), vile shard leaves (*Strobilanthes crispa*), meniran (*Phyllanthus niruri*), and alang alang rhizome (*Imperata cylindrica*).

Previous clinical research on scientific jamu for Urinary Tract Stones from B2P2TOOT is in the form of a simplicia consisting of 6 g of *Sonchus arvensis* leaves, 4 g of *Orthosiphon stamineus* leaves, 5 g of *Strobilanthus crispa* leaves, 5 g of *Imperata cylindrica* roots, 5 g of *Curcuma xanthorrhiza* rhizomes, 4 g of *Curcuma longa* rhizomes, and 3 g *Phyllanthus niruri* herb are able to relieve clinical symptoms that arise in this disease. This ability is equivalent to herbal extracts circulating in the community. The difference between herbal medicines and herbal extracts lies in the solvent and several additional components in Urinary Track

Stones jamu such as Imperata cylindrica, *Curcuma xanthorrhiza*, and *C. domestica*. Several studies state that water as a solvent is better than alcohol for plants that have the ability to dissolve Urinary Track Stones, for example in *Sonchus arvensis* L, the ability to dissolve kidney stones by water extract is better than alcohol extract.[22]

Orthosiphom stamineus Benth and *Sonchus arvensis* L are plants that have a diuretic effect. The analgesic and anti-inflammatory effects of turmeric and temulawak in herbal medicine formulas also play a role in reducing pain. Curcumin, which is the main ingredient in turmeric and temulawak, selectively inhibits lipoxygenase, phospholipase A2 and COX-2, but not COX-1, resulting in anti-inflammatory and analgesic benefits without the side effects associated with non-selective analgesics. Meanwhile, in the control group, *Orthosiphon stamineus* and *Phyllanthus niruri* also had the potential to have an analgesic effect.[22]

3.6. Jamu for Breast Milk Booster

As a country that produces medicinal plants, especially herbal plants, Indonesia plays a role in the breast milk use program. The Breast Milk Use Program is one part of the program to improve the people's diet. The aim is to play a role in preventing infant and child deaths, as well as improving the quality of the nation's future generations in the future through improving breast milk production. In an effort to obtain natural ingredients that might be used to overcome this problem, an alternative that can be used is the administration of traditional medicine (jamu), for example temulawak rhizome extract (*Curcuma xanthorrhiza*) and kencur (*Kaemferia galanga*).[23] Consumption of herbal medicine for nursing mothers to relieve interference during breastfeeding consisting of pain and swelling of the mother, reduced breast milk and not smooth23. According to B2P2TOOT, scientific jamu for breast milk booster consists of katuk leaves (*Sauropus androgynus*), papaya leaves (*Carica papaya*), and bangun-bangun leaves (*Coleus amboinicus*).

Papaya leaves and katuk leaves are plants that act as galactagogues. Polyphenyls and steroids found in katuk leaves contribute to the prolactin reflex, stimulate the alveoli to produce breast milk, and stimulate the release and flow of breast milk through stimulation of the hormone oxytocin. Meanwhile, according to the previous research that explains one galactogogue containing guaercetin which can activate the hormone prolactin. Many mineral elements found in papaya leaves can help produce breast milk. Through a mechanism involving the hormones prolactin and oxytocin, which are important for the production and release of breast milk in nursing mothers, the minerals manganese and potassium can help increase milk supply.[24]

From the results of clinical research on the Effectiveness of Local Plants Katuk Leaves and Papaya Leaves as Galactagogues in Increasing Breast Milk Production at TPMB Badriah Susilawatiin 2022, it was found that of the 10 respondents in the group before giving katuk leaves, the majority showed fairly smooth milk production, namely 8 people (80%), while after giving katuk leaves, it showed that all respondents had smooth milk production, totaling 8 people (80%) and milk production was quite smooth amounted to 2 people (20%). It was seen that of the 10 respondents in the group before giving papaya leaves, the majority showed substandard milk production, namely 6 people (60%), while after giving papaya leaves, all respondents showed smooth milk production, totaling 7 people (70%) and milk production was quite smooth amounted to 3 people (30%). Based on this study, it can be concluded that there is no difference between giving katuk leaves and papaya leaves to increase milk production so that there is a similarity in the effectiveness of loka katuk leaves and papaya leaves as a galattagogue for increasing milk production in TPMB Badriah Susilawati in 2022.[24]

From the results of clinical trials conducted by B2P2TOOT, it is known that the formula for breast milk-stimulating herbal medicine consisting of 25 grams of katuk leaves (*Sauropus androgynus*), 5 grams of papaya leaves (*Carica papaya*) and

10 grams of bangun-bangun leaves (*Coleus amboinicus*) can increase breast milk volume significantly compared to the single simplicia of katuk leaves ($p<0.05$) after administration of 28 days, namely 178.17 ± 40.37 for the formula for breast milk-stimulating herbal medicine, and 141.27 ± 27.88 for the single simplicia katuk leaf. Meanwhile, on the 14th day of administering the herbal medicine formula to facilitate breast milk, an increase of 134.77 ± 50.32 was obtained, while for katuk leaf simplicia it was 120.23 ± 38.00, statistically this increase was not significant ($p> 0.05$). From a safety perspective, this Jamu formula does not interfere with/alter liver function and kidney function.[25] In further research, consumption of breast milk-stimulating herbal concoctions consisting of katuk leaves, papaya leaves and bangun-bangun leaves had no effect on iron levels in breast milk. The average level of maternal nutritional consumption is still lower than the recommended RDA.[26]

In the other hand, kencur (*Kaemferia galanga* L.), its rhizome was used by 27.7% of respondents, used as a single ingredient or mixed with rice to make herbal medicine to facilitate breast milk production. The function of kencur in traditional Javanese herbal medicine is not only to facilitate the production of breast milk, but also as a body warmer and reduce pain. Ethyl Cinnamate compounds 65.98%, Ethyl pmethoxycinnamate 23.65%, (+)-3-Carene 3.42%, Beta-Pinene 2.09%, Camphene 1.67%, Hexadecane 1.61%, Alpha-Pinene 0.71%, Myrcene 0.50%, 1-Limonene 0.37% in kencur rhizomes have antifungal, anti-inflammatory, and antibacterial activity. Traditional herbal medicine beras kencur extract is effective in increasing breast milk production.[27]

Previous study researchers compared traditional herbal medicine "beras kencur" on the quantity of breast milk Production. Breast milk measurement is done by calculating the amount of milk (in ml or measuring cup) that the mother milks or the amount of milk volume that is perceived implicitly from the results of interviews about breastfeeding frequency and breast fullness. The provision of beras kencur is carried out with the provision of giving 150-250ml of a mixture of rice extract and also beras kencur (in collaboration with traditional herbal medicine sellers). Traditional herbal medicine beras kencur extract is effective in increasing breast milk production.[27]

Previous study showed that on the first, third and seventh days of postpartum mothers, it can be concluded that giving temulawak has an effect on the smooth production of breast milk in postpartum mothers (0-7 days) in Blora Regency, giving kencur rice has an effect on the smooth production of breast milk in postpartum mothers (0-7 days) in Blora Regency, giving temu lawak and kencur rice both influence the smoothness of breastfeeding in postpartum mothers (0-7 days) in Blora Regency, but seen from the mean value (average) which has the most dominant influence on smooth breast milk production by giving kencur rice.[28]

3.7. Jamu for Gout

The problem of high uric acid or hyperuricemia is often found in the community. Hyperuricemia is a metabolic disorder which is defined as an increase in uric acid levels of more than 7.0 mg/dL for men and 6.0 mg/dL for women. If non-pharmacological efforts such as diet and exercise to reduce high uric acid levels are less successful, then medicine is needed. Drugs for hyperuricemia have various side effects such as nausea, vomiting and diarrhea, liver toxicity, intestinal nephritis and cataracts have also been reported.[29]

Indonesian traditional medicine has great potential in the treatment of gout. According to B2P2TOOT, scientific jamu for gout consists of turmeric rhizome (*Curcuma longa*), kepel leaves (*Stelechocarpus burahol*), tempuyung herb (*Sonchus arvensis*), secang wood (*Caesalpinia sappan*), meniran herb (*Phyllanthus niruri*), and temulawak (*Curcuma xanthorrhiza*).

Previous study, treatment of hyperuricemia at RRJ Hortus Medicus uses 3 antihyperuricemia herbal formulas, namely 1st, 2nd, and 3rd herbal formula. The total sample was 120 medical records and prescriptions for hyperuricemia patients

at Hortus Medicus clinic for the period July-December 2020. Each formula has diferent ingredients. The 1st formula consist of kepel (*Stelechocarpus burahol*) leaf, secang (*Caesalpinia sappan*) bark, tempuyung (*Sonchus arvensis*) herb. The compositions of 2nd herbal formula are cabe jawa (*Piper retrofactum*), daun sendok (*Plantago mayor*) leaves, celery (*Apium graveolens*). Formula 3rd consists of rumput bolong (*Equisetum debille*) herb, temulawak (*Curcuma xanthorhizza*), turmeric (*Curcuma longa*). Among three hyperuricemia herbals formulas used in Hortus Medicus, the 1st formula consist of secang (*Caesalpinia sappan*) bark, tempuyung (*Sonchus arvensis*) herb, kepel (*Stelechocarpus burahol*) was mostly used. The percentage of therapeutic efficacy was also higher compared to the other two formulas.[30]

In the in vivo toxicity test, scientific jamu for hyperuricemia consisted of: 2 g tempuyung leaves (*Sonchus arvensis*), 5 g secang wood (*Caesalpinia sappan*), 3 g kepel leaves (*Stelechocarpus burahol*), 3 g temulawak rhizome (*Curcuma xanthorrhiza*), 3 g turmeric rhizome (*Curcuma longa*), and 3 g meniran herb (*Phyllanthus niruri*) (total weight of the herb 19 g) with a dose of 10944 mg/200 g BW, it does not cause death and the LD50 value is > 54720 mg/kg bw. This concoction is classified as Practically Non Toxic (PNT)31. Apart from that, in clinical trials, administration of hyperuricemia herbal concoctions resulted in the average blood urea and creatinine levels of research subjects before treatment, after treatment on day 28 and after treatment on day 56 which were still within normal limits, so it did not reduce glomerular filtration and no glomerular damage occurred. kidneys and does not interfere with kidney function.[32]

In the other study, one herbal product that has been marketed and is believed to be efficacious in lowering blood uric acid levels is Jamu X oral solution (BPOM registration number TR 163694371). Every 100 mL Jamu X contained 70 mL oxygen water, 20 mL honey nectar, 10 g palm sugar, 600 mg *Phaleria macrocarpa* extract (Mahkotadewa), 600 mg *Elephantopus scaber* extract (Tapak Liman), 600 mg *Sida rhombifolia* extract (Sidaguri), and 200 mg *Sonchus arvensis* extract (Tempuyung Leaves).[29]

Various components of Jamu X have long been used by the public, and has been scientifically researched to have the effect of improving and lowering blood uric acid levels. Previous clinical study has shown that Jamu X has the potential to reduce blood uric acid levels at any time with significant results ($p<0.05$) within one hour, especially in subjects with blood uric acid levels >6 mg/dL.

No side effects were found in the study Harmanto et al. (2019). These results are supported by clinical trials conducted by Triyono & Novianto (2019) which stated that herbal medicine for hyperuricemia can reduce blood uric acid levels, improve clinical symptoms, and increase the quality of life (SF-36 questionnaire) in subjects. Besides, Jamu for hyperuricemia is proven to have no severe side effects and does not interfere with kidney, liver, and blood function.[33]

3.8. Jamu for High Blood Pressure

Hypertension is characterized by changes in blood pressure with systolic pressure of more than 140 mmHg and/or diastolic pressure of more than 90 mmHg. The blood pressure value referred to is the average value of two or more examinations and is carried out in a sitting position. 1 Most cases of hypertension are discovered during examination due to other diseases, so it is often said to be a silent killer. Complications that accompany hypertension occur in the heart, brain and kidneys, causing high medical costs due to long hospital stays or continuous use of antihypertensive drugs.[34]

As one of the efforts to overcome abovementioned constraints, a preliminary study was conducted to develop the formula jamu antihipertensi (FJA) [antihypertension herbal formulation] consisting of 6 medicinal plant extracts. The FJA comprises three blood pressure reducing components, i.e. the leaves of *Apium graveolens* L (celery), *Orthosiphon aristatus* (Java tea, cat's

whiskers, kumis kucing) and *Centella asiatica* (Asiatic pennywort), and three components for improving physical fitness, i.e. the leaves of *Phyllanthus niruri* L. (meniran) and the rhizomes of temulawak (*Curcuma xanthorrhiza* Roxb.) and turmeric (*Curcuma longa*). These six herbal components have been recommended by the National Commission for Scientification of Jamu (Komisi Nasional Saintifikasi Jamu). The herbal formulation using these six simplicia have been scientifically tested as to their clinical antihypertensive benefits. In the in vivo toxicity test, scientific jamu for hypertension with the composition: 5 g celery herb (*Apium graveolens*), 3 g asiatic pennywort (*Centella asiatica*), 5 g cat's whiskers (*Orthosiphon aristatus*), 3 g temulawak rhizome (*Curcuma xanthorrhiza*), 3 g turmeric rhizome (*Curcuma longa*), and 3 g meniran herb (*Phyllanthus niruri*) (total weight of the herb 22 g) with administering a dose of 3078 mg/200 g bw given continuously for 90 days, did not cause abnormalities in blood, liver and kidney function. Meanwhile, the hypertension jamu concoction dose is 3564 mg/200 g bw. given continuously for 90 days did not show abnormalities in blood, liver and kidney function. This concoction is classified as Practically Non Toxic (PNT).[31]

One study on hypertensive patients receiving antihypertension jamu, was capable of reducing systolic and diastolic blood pressure by 12.67% and 2.33%, respectively, after 7 days of use. The results of this study constitute evidence that FJA has an antihypertensive effect comparable with that of captopril. FJA could reduce the systolic blood pressure to an equal extent as did captopril and could even more effectively reduce the diastolic blood pressure than captopril. These results are in accord with those of the Saintifikasi Jamu Antihipertensi (SJA) study using the same 6 plant simplicia as FJA. These "scientification" results also proved that SJA can more effectively reduce the blood pressure as compared with captopril, although the difference is not significant. The combination used in FJA comprises herbal extracts acting on the target organs and herbals capable of improving fitness. The herbals affecting the cardiovascular system in this formulation are *Apium graveolens* L, *Orthosiphon aristatus,* and *Centella asiatica*. Other herbals in the formulation are *Phyllanthus niruri* L, *Curcuma xanthorrhiza* Roxb, and *Curcuma longa*, which are expected to improve fitness, thus indirectly affecting the blood pressure. From this study it may be concluded that administration of FJA for 4 weeks is equally effective as captopril in reducing systolic and diastolic blood pressure in patients with mild and moderate hypertension. Thus, natural plants and herbs can be our source of drugs, with fewer side effects and better bioavailability for treatment of hypertension in the future.[35]

In the other clinical study of anti-hypertension jamu consisted of 5 g of *Apium graveolens*, 3 g of *Centella asiatica*, 3 g of *Orthosiphon stamineus*, 3 g of *Curcuma xanthorrhiza*, 3 g of *Curcuma longa*, and 3 g of *Phyllanthus niruri*. The comparison drug used was HCT 25 mg from PT Kimia Farma. This jamu is efficacious in lowering blood pressure in subjects classified as grade I hypertension and is comparable to the efficacy of HCT. This jamu is safe because it does not affect the subject's liver and kidney function until the end of the intervention. The ability of the jamu to reduce the subject's systolic and diastolic blood pressure is influenced by each component of the jamu.[35]

Apium graveolens has hypotensive and diuretic activity in reducing blood pressure. The hypotensive activity of celery water extract is by stimulating muscarinic receptors. *Centella asiatica* is able to reduce systolic and diastolic blood pressure in hypertensive rats, without affecting heart rate. The quercetin content of Orthosiphon stamineus is able to reduce blood pressure by preventing platelet aggregation and thrombus. Apart from quercetin, another bioactive that can function as an antihypertensive is sinensetin. Other components of the herb are *Curcuma xanthorrhiza* and *Curcuma longa*. Both plants belong to the Zingiberaceae family. The secondary metabolite that is often found is curcumin. Curcumin can inhibit

platelet aggregation, which is triggered by the presence of collagen, adrenaline and arachidonic acid. The final constituent of the herb is *Phyllanthus niruri*. The phylantin content of *Phyllanthus niruri* is able to reduce the entry of Ca^{2+} into vascular smooth muscle cells thereby inhibiting phenylephrine released from the sarcoplasmic reticulum. Phenylephrine itself has a role in blood vessel contraction.[35]

3.9. Jamu for Dyspepsia

Dyspepsia is often encountered in daily clinical practice. Dyspepsia is ranked 10th with a proportion of 15% in the category of disease in outpatients and ranks 15th with a proportion of 19% in the category of inpatient disease in all hospitals in Indonesia in 2005. In 2011 dyspepsia was ranked 10th. 6th for outpatient and inpatient visits, while in 2012 it was ranked 5th for all outpatient and inpatient visits in all hospitals in Indonesia.[36]

Dyspepsia is not a life-threatening disease, but the pain that can come at any time is very disturbing for the sufferer. This disease is also not a disease that can heal itself (self-limited disease), so treatment efforts to reduce the frequency and intensity of acute dyspepsia attacks are very necessary. Pharmacological treatment for functional dyspepsia patients is not very satisfactory. According to B2P2TOOT, scientific jamu for dyspepsia consists of turmeric rhizome (*Curcuma longa*), sembung (*Blumea balsamifera*), black cumin (*Nigella sativa*), and ginger (*Zingiber officinale*).[36]

The clinical trial conducted at the Tawangmangu Jamu Research House involved 69 research subjects who met the inclusion and exclusion criteria. The results of the study showed that the use of dyspepsia jamu consist of 15 g turmeric rhizome (*Curcuma longa*), 15 g sembung (*Blumea balsamifera*), 2 g black cumin (*Nigella sativa*), and 15 g ginger (*Zingiber officinale*) for 56 days clinically found no significant side effects and did not interfere with liver function. The average SGOT and SGPT examination results before treatment and after treatment on day 28 and day 56 were still within normal limits (normal value of SGOT 3 –45 u/L, SGPT 2 –35 u/L). The results of the analysis above showed that the SGOT and SGPT values before and after drinking the herbal concoction were not significantly different, meaning that using the dyspepsia herbal concoction for 56 days did not interfere with liver function.[36]

3.10. Jamu for High Cholesterol

Cholesterol has a soft structure, such as a candle, consisting of fat that can be produced by the body or derived from food. Cholesterol is produced in the liver, and has a function to build cell walls as well as a precursor of steroid hormones. Normally cholesterol plasma level is below 200 mg/dL, while the cholesterol level more than or equal to 200 mg/dL indicates hiperkolesterolemia. Hypercholesterolemia is a medical condition characterized by increased of cholesterol level in the blood exceeds the normal limit. This condition often make patients leave conventional treatment and chose herbal treatment. Based on data from the Rumah Riset Jamu 'Hortus Medicus' there are about 500 new cases of hypercholesterolemia during 2013. Indonesia has some Jamu formulas that have empirically been used to lower blood cholesterol level.[37] According to B2P2TOOT, scientific jamu for hypercholesterolemia consists of dutch teak leaves (*Guazuma ulmifolia*), temulawak (*Curcuma xanthorrhiza*), green tea (*Camellia sinensis*), meniran (*Phyllanthus niruri*), tempuyung leaves (*Sonchus arvensis*), turmeric rhizome (*Curcuma longa*), and chinese teak leaves (*Cassia sennae*).

The potential of Jamu anticholesterol formula consists of *Guazuma ulmifolia, Cassia senna, Sonchus arvensis, Camellia sinensis, Curcuma xanthorrhiza, Curcuma longa,* and *Phyllanthus niruri* as alternative medicine that should be investigated. Preclinical study regarding this formula had been conducted by Saryanto et al in 2014 with the result administration of jamu anticholesterol formula infusion at dose 270 mg / 200 gram body weight, 540 mg / 200 gram body weight and 1080 mg / 200 gram body weight in rats, previously given high-

fat feed for 30 days causing a decrease in cholesterol respectively of 57 mg / dl , 120 mg / dl and 121 mg / dl were lower than positive controls with the administration of simvastatin which decreased by 99 mg / dl and higher than negative control. The oral single dose of jamu formula used in this study does not cause toxic effects, with an LD50 value greater than 5000 mg / Kgbb, cathegorized as Practical Non-Toxic (PNT) or including non-toxic materials. Sub-chronic toxicity test showed that administration of jamu formula for 3 months did not resulting toxic effect or death in the rats. Neither of damage was found on the organ examination, so the jamu formula in the safe category were used.[37]

The other previous study showed administration of anti-cholesterol Jamu formula contained of 6 g *Guazuma ulmifolia* dried leaves, 1 g *Cassia sennae* dried leaves, 6 g *Sonchus arvensis* dried leaves, 5 g *Camellia sinensis* dried leaves, 5 g C. *xanthorrhiza* dried rhizomes, 4 g C. *longa* dried rhizomes and 3 g *Philanthus niruri* dried herbs for 28 days significantly lowered plasma cholesterol levels in study subjects with mild hypercholesterolemia. Administration of anti-cholesterol jamu formula for 28 consecutive days was relatively safe for the liver and kidneys of the subjects, indicated by the absence of significant changes in the levels of Serum Glutamic Piruvic Transaminase (SGPT), Serum Glutamic Oxaloacetic Transaminase (SGOT), Ureum and Creatinine.[38] The study conducted by Harmanto et al. (2015), in 100 mL of herbal medicine J (BPOM registration number TR 133672511) containing 70 mL oxygen water, 20 mL honey nectar, 10 g palm sugar, 120 mg *Phaleria macrocarpa* extract, 120 mg *Centella asiatica* extract, 64 mg *Morindae citrifoliae* extract, 40 mg *Curcuma xanthorrhizae* extract has a significant effect on reducing blood cholesterol levels immediately ($P<0.01$) within one hour, especially in subjects with cholesterol levels of 200 mg/dL or more. Changes in total blood cholesterol levels after administration of herbal medicine J were not significant ($P>0.05$) in subjects with normal total blood cholesterol levels (<200 mg/dL).

3.11. Jamu for Lowering Blood Sugar Levels

Diabetes mellitus (DM) is a chronic disease characterized by an increase in blood sugar levels or what is commonly known as hyperglycemia. This increase in blood sugar levels can be caused by one or a combination of two factors, namely impaired insulin secretion by pancreatic beta cells and insulin resistance. The increase in the prevalence of this disease continues to occur in various countries in the world, except in Indonesia. In fact, predictions from the International Diabetes Federation (IDF) for the largest number of DM patients in 2045 are that Indonesia will rank 8th in the world with the number of DM patients reaching 16.6 million.[31] The wider community now sees phytotherapy as an alternative treatment for diabetes mellitus. Phytotherapy is considered relatively safe and without significant side effects. In general, the choice of phytotherapeutic drugs as an alternative therapy is based on several reasons: (1) Safer (less toxicity and side effects) especially for the long term, (2) Higher efficacy, (3) Better therapeutic success because it does not only includes causal therapy but also complications, symptomatic and rehabilitation therapy, (4) The costs are more affordable with the same efficacy, (5) More economic value if viewed from the utilization and development of national resources of native Indonesian medicinal plants.[39]

The use of medicinal plants that are effective in lowering blood glucose levels, are safe and are expected to be relatively cheaper, is an alternative treatment for DM. According to B2P2TOOT, scientific jamu for anti-hyperglycemic consists of bay leaves (*Syzygium polianthum*), cinnamon (*Cinnamomum burmani*), bitter herb (*Andrographis paniculata*), and temulawak (*Curcuma xanthorrhiza*). Giving antihyperglycemic herbal medicine consisting of 5 g of bitter herb (*Andrographis paniculata*), 5 g of bay leaves (*Syzygium polianthum*), 7 g of cinnamon (*Cinnamomum burmani*), 10 g of temulawak (*Curcuma xanthorrhiza*) for 15 consecutive days does not cause dangerous side effects and does not cause liver toxicity.[39]

The results of observations during the research proved that there were no side effects of jamu that the research subjects complained about, either through anamnesis or from physical and laboratory examinations. However, all research subjects (100%) complained of the bitter taste of the antihyperglycemia jamu concoction. Even though it tasted bitter, giving jamu for hyperglycemia did not cause nausea or vomiting in the research subjects so that all research subjects finished drinking the herbal medicine until the end of the study. The bitter taste arises because the anti-hyperglycemia herbal medicine contains bitter-tasting bitter herbs. Even though it is bitter, bitter can be useful for protecting the liver against toxic substances.[39]

The results of other research show that scientific herbal medicine for diabetes mellitus consists of bitter herb (*Andrographis paniculata*), cinnamon bark (*Cinnamomum zeylanicum*), bay leaves (*Syzygium polianthum*), temulawak (*Curcuma xanthorrhiza* Roxb), turmeric rhizome (*Curcuma longa*), and meniran (*Phyllanthus niruri* L) can reduce GDS and HbA1c levels in type 2 DM patients at the WKJ Tegal Herbal Medicine Clinic. The dosage form of this scientific herbal medicine is a mixture of simplicia which is prepared by boiling with water so that the active compounds extracted are polar compounds. Literature studies show that most of the active compounds in plants/ simplicia which are responsible for reducing blood glucose levels are semipolar.[40]

Bay leaves, bitter herb, and cinnamon are herbal ingredients that have been used for generations to treat hyperglycemia sufferers. Bay leaves (*Syzygium polyanthum*) contain around 0.17% essential oil, with important components eugenol and methyl kavikol. This content can reduce blood sugar levels. Sambiloto (*Andrographis paniculata*) can empirically reduce blood glucose levels. Sambiloto is a plant that has the effect of lowering blood sugar levels and can also act as an antioxidant. Cinnamon (*Cinnamomum burmani*) has been identified as having an impact on triglyceride levels. Cinnamon contains Methyl Hydroxyl Chalcone Polymer (MHCP), an active compound that can function as an insulin mimetic. Mechanisms influenced by MHCP include insulin receptor phosphorylation, glucose uptake, glycogen synthesis. The ginger plant (*Curcuma xanthorriza*) has active compounds consisting of curcumin and xanthorrhizol. The results of research conducted by Arun and Nalini prove that curcumin can reduce blood sugar levels in mice induced by alloxan. Curcumin can also reduce the occurrence of oxidative stress in diabetic mice because it causes a decrease in the entry of glucose into the polyol pathway.[39]

3.12. Jamu for Physical Fitness

Physical fitness is one of the factors that support athletes' achievement. Therefore every athlete must have a fit physique; an athlete is said to have a healthy physique if his body can adjust or adapt to physical activity without producing excessive fatigue. Palopo city swimming athletes sometimes experience extreme physical fatigue after swimming exercises. With physical fitness, athletes have a role in improving the training process.[41]

Traditional herbal medicine is the heritage of the Indonesian nation which has been used for treatment and health maintenance. As announced by the Minister of Health and the Coordinating Minister for Human Development and Culture (PMK) in January 2015, herbal medicine can be used to improve a person's fitness. This goal is implemented through the “Bugar dengan Jamu” (Bude Jamu) movement. The herbal medicine used must be safe, efficacious and of good quality. The “Bude Jamu” movement is very reasonable because the majority of Indonesian people have consumed herbal medicine. According to B2P2TOOT, scientific jamu for physical fitness consists of temulawak (*Curcuma xanthorrhiza*), meniran (*Phyllanthus niruri*), and turmeric rhizome (*Curcuma longa*).

Consuming a jamu formula consisting of 5 grams of temulawak (*Curcuma xanthorrhiza*), 4 grams of turmeric rhizome (*Curcuma longa*), and 3 grams of meniran herb

(*Phyllanthus niruri*) for 42 days is proven to be safe because liver function, kidney function, and blood profile are within the range of normal. This herbal formula can help improve cardiovascular fitness components but is not significant for other fitness components (body composition, muscle flexibility, and muscle strength). Temulawak rhizomes are useful for refreshing the body, speeding up metabolism, healthy liver function, increasing appetite, as an immunomodulator and hepatoprotector. Turmeric rhizomes are efficacious in improving digestion, antibacterial, hepatoprotective and anti-inflammatory. Meniran herb has been researched and proven to increase endurance, contains carbohydrates, protein, alkaloids and flavonoids. The main components of meniran that are responsible for immunostimulatory activity include phylantin, hypophyllanthin, and triacontanal.[42]

In the other hand, previous study showed that traditional herbal medicine made from ginger, free-range chicken eggs, honey, and palm sugar can improve the physical fitness of swimming athletes. Ginger rhizome could affect health, one of which is to relieve muscle pain. Palm sugar is useful for increasing endurance. Meanwhile, honey and free-range chicken eggs have benefits for improving physical fitness. For athletes who want to increase endurance and physical fitness for maximum results, herbal drinks can be a solution to improve fitness.[41]

The other study also showed that administration of Jamu Kunyit Asam after strenuous physical activity can reduce creatine kinase levels in trained male athletes. Supplementation of Jamu Kunyit Asam acutely in this study can help reduce muscle damage due to strenuous physical exercise through nutritional intervention. The decrease in CK levels in this study was due to the curcumin compound contained in the Jamu Kunyit Asam. Curcumin is known to have a pharmacological effect that functions as a strong anti-inflammatory and antioxidant. Curcumin works as an anti-inflammatory in various ways including by scavenging free radicals and suppressing the activity of COX, LOX, iNOS and other inflammatory mediators. Research shows curcumin is a highly pleiotropic compound, where curcumin can interact with various target molecules involved in inflammation. Curcumin modulates the inflammatory response by decreasing the activity of cyclooxygenation-2 (COX-2), lipoxygenase, and nitric oxide synthase (iNOS) enzymes, inhibiting the production of inflammatory cytokines tumor necrosis factor alpha (TNF-a), interleukine-1, interleukine-2, interleukine-6 and interleukine-12, migration inhibitory proteins, decreased mitogen-activated protein, and monocyte chemoattractant protein (MCP)43.

Curcumin inhibits nuclear factor-kappa B, which is thought to be the mechanism by which it inhibits COX-2 and iNOS (NF-kB). Inflammation, cell proliferation, transformation, and tumor formation are all regulated by NF-kB. Curcumin is hypothesized to limit the phosphorylation of inhibitory factor I-kappa B kinase, which inhibits NF-B activation and proinflammatory gene expression (IkB). COX-2 and iNOS expression are reduced when NF-kB activation is inhibited, which inhibits inflammation and tumor processes. Curcumin is also thought to be able to reduce oxidative stress, inflammation through the NRF2-keap1 pathway. Curcumin can suppress proinflammatory pathways and inhibit TNF production and TNF-mediated cell signaling in various cell types. Curcumin can also be a TNF inhibitor by binding to TNF directly43.

Among the 12 scientific jamu concoctions, *Curcuma longa* and *Curcuma xanthorrhiza* are the herbs found in all herbs and play the biggest role in treating various diseases. Traditionally, *Curcuma xanthorrhiza* has been widely used throughout the local distribution area as an ingredient in herbal medicine (supplements and Indonesian herbal medicine) or for the treatment and control of various diseases and disorders since ancient times. Scientific studies show that the most abundant essential phytochemicals obtained from *Curcuma xanthorrhiza* rhizomes are terpenoids and curcuminoids. The main medicinal part of *Curcuma xanthorrhiza* which contains many sesquiterpenoids and

Table 1. Indonesian Scientific Jamu for Various Disease (1)

	Osteoarthritis	Hemorrhoids	Liver Function Disorder	Weight Loss	Urinary Tract Stones	Breast Milk Booster
Allium sativum	√					
Andrographis paniculata						
Apium graveolens						
Blumea balsamifera						
Caesalpinia sappan						
Camellia sinensis						
Carica papaya						√
Cassia sennae						
Centella asiatica						
Cinnamomum burmani						
Cinnamomum zeylanicum						
Coleus amboinicus						√
Curcuma longa	√	√	√		√	
Curcuma xanthorrhiza	√	√	√		√	√
Desmodium triquetrum		√				
Elephantopus scaber						
Equisetum debile						
Foeniculum vulgare	√					
Graptophyllum pictum		√				
Guazuma ulmifolia				√		
Imperata cylindrica					√	
Kaempferia galanga Linn	√					√
Morindae citrifoliae						
Murraya paniculata				√		
Nigella sativa						
Orthosiphon aristatus	√				√	
Phaleria macrocarpa						
Phyllanthus niruri	√	√			√	
Plantago mayor						
Piper retrofactum						
Plectranthus scutellarioides		√				
Rheum officinale				√		
Sauropus androgynus						√
Sida rhombifolia						
Sonchus arvensis				√	√	
Stelechocarpus burahol						
Strobilanthes crispa					√	
Syzygium polianthum						
Taraxacum officinale			√			
Zingiber officinale var. Rubrum	√					

Table 1. Indonesian Scientific Jamu for Various Disease (2)

	Gout	High Blood Pressure	Dyspepsia	High Cholesterol	Lowering Blood Sugar Level	Physical Fitness
Allium sativum						
Andrographis paniculata					√	
Apium graveolens	√	√				
Blumea balsamifera			√			
Caesalpinia sappan	√					
Camellia sinensis				√		
Carica papaya						
Cassia sennae				√		
Centella asiatica		√		√		
Cinnamomum burmani					√	
Cinnamomum zeylanicum					√	
Coleus amboinicus						
Curcuma longa	√	√	√	√	√	√
Curcuma xanthorrhiza	√	√		√	√	√
Desmodium triquetrum						
Elephantopus scaber	√					
Equisetum debile	√					
Foeniculum vulgare						
Graptophyllum pictum						
Guazuma ulmifolia				√		
Imperata cylindrica						
Kaempferia galanga Linn						
Morindae citrifoliae				√		
Murraya paniculata						
Nigella sativa			√			
Orthosiphon aristatus		√				
Phaleria macrocarpa	√			√		
Phyllanthus niruri	√	√		√	√	√
Plantago mayor	√					
Piper retrofactum	√					
Plectranthus scutellarioides						
Rheum officinale						
Sauropus androgynus						
Sida rhombifolia	√					
Sonchus arvensis	√			√		
Stelechocarpus burahol	√					
Strobilanthes crispa						
Syzygium polianthum					√	
Taraxacum officinale						
Zingiber officinale var. Rubrum			√			

curcuminoids is the rhizome. Therefore, market demand for *Curcuma xanthorrhiza* rhizomes is increasing from time to time.[44] Meanwhile, curcumin derived from *Curcuma longa* is the main curcuminoid in turmeric rhizomes and functions as a nutraceutical and pharmaceutical agent. Curcumin has a long history of use and unquestioned effectiveness through clinical trials.[45]

4. Conclusion

Jamu, as a traditional medicine native to Indonesia, has been used for generations by the ancestors of the Indonesian people from generation to generation and its benefits are felt both for maintaining health and treating disease. The scientification of jamu is scientific proof of the efficacy and safety of jamu. Currently, according to B2P2TOOT, there are 12 types of scientific jamu concoctions that have been scientifically proven and safe for consumption: Scientific jamu for high blood pressure, gout, gastric disorders (ulcers), arthritis, hemorrhoids, high cholesterol, hepatoprotector, urinary tract stones, diabetes mellitus, fitness, obesity, and breast milk booster. *Curcuma longa* and *Curcuma xanthorrhiza* are herbal plants that can treat various diseases and are distributed in 12 types of scientific jamu concoctions. From the review of this article, in the future we hope that there will be more research about scientific jamu concoction from Indonesia for treat the other diseases.

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