



Local Herbs against COVID-19 Virus

Chitsanucha Chokwarakul

Punjadee School, Chaiyaphum, Thailand

*Corresponding author, E-mail: Wangiunkaix1999@gmail.com

Abstract

Herbs have been known to humans for ages. It is folk wisdom that has been passed on for several centuries. Some herbs have specific properties for treating symptoms, but some can treat many symptoms. Today, the world is facing a critical pandemic situation of Coronavirus disease or COVID-19. In this regard, herbs have become the disease treatment and prevention alternative in both drug form and nutritional products since it is a natural product, making it safe for use. As a result, there are many kinds of Thai herbs that have been used against the COVID-19 virus. As an educational guideline for those interested, this study presents popular Thai herbs such as Fatalaijon, Indian gooseberry, Kaempfer, and Garlic. However, to use these herbs safely, herbs and their application must be properly studied in detail.

Keywords: *herbs, inhibition, Coronavirus disease (COVID-19).*

1. Introduction

The policy of the Ministry of Public Health is ‘the introduction of Thai wisdom and Thai herbs into healthcare service system is the people’s choice. Open medical clinic and in major hospitals to achieve desirable Thai health system in the next 20 years and global health goals from Thai traditional and alternative medicine policies to the regions.’ At present, the global social trend is interested, restores, as well as uses traditional medicine to address health problems that modern medicine cannot meet all the goals such as Thai traditional medicine, which is holistic healthcare in line with the local community and culture. The Ministry of Public Health has set Thai traditional medicine as one of the 13 main branches that must be developed to be the choice of people as quickly as possible (Department of Thai Traditional and Alternative Medicine, 2017: 90-95) and to support Thailand in being the international health center in terms of health service, service for health promotion, medicines, and pharmaceutical products for health, academic service, and research work for building the national economic security. The Ministry of Public Health has coordinated with relevant agencies to further develop herbs regarding the treatment and products as follows: 1) encourage the establishment of a national master plan on the development of Thai herbs (2017–2021), 2) encourage the integration of Thai traditional medicine within the health service system and link with modern medicine, 3) promote research to create acceptance and confidence to the people, and 4) establish a workgroup of Thai traditional medicine in the Provincial Public Health Offices to achieve concrete operations (Department of Thai Traditional and Alternative Medicine. 2017: 1-10), thus causing both public and private sectors, as well as people, to become more interested in Thai herbs.

Due to the current pandemic situation of COVID-19, what people want most at the moment is “medicine to treat COVID-19,” but no modern medication to treat this disease has empirically been existed. Therefore, many people are seeking herbal medicine believed to be able to help prevent and treat the disease successfully until herbs such as Fatalaijon, Yaharak, and many others related to medical treatment, resulting in a market shortage. In the treatment of Thai traditional medicine, a method to treat influenza according to the guidelines indicated in Taksila scriptures has been used to treat fever for many hundreds of years. The treatment method was identified in the following three treatment steps. The first step is to perform a healing crisis formulation to release toxicity from the body using Yaharak, which consists of five herb roots, including



Chingchi, Tahiti arrowroot, Cluster fig, Kontha, and Yanang, already listed in the National List of Major Medicines. After that, the treatment is followed by treating an illness using Chantalila or Prasachandaeng that helps to reduce fever and internal body heat (Chotchoungchatchai et al., 2012). Lastly, the treatment is completed with fever covering medicine, that is, covering the fever in Taksila manner to help keep the body healthy and maintain internal organs to not be infected with COVID-19 virus. For the nature of the diseases that cause the body to create too much immunity, modern medicine can treat with immunosuppressants. Scientifically, there is still no direct medicine for this virus, so its symptoms must be treated first, which is different from Thai traditional medicine that initially treats by maintaining body balance and using primarily herbal medicines and food to adjust the balance such as eating food. “Food is medicine” is the correct principle to stimulate the immune system and increase circulation, for example, Kaengsom Dokhhae, Kaengliang, and Tom Yum. Eating fruits and vegetables according to the area so the fruits can be consumed continuously for a long time is a Triphala formulation to enhance immunity and provide humans with high in vitamin C, such as Indian gooseberry, lemon, tamarind leaves, and Sompoi leaves. People who concern about Coronavirus infection and want to take Fatalaijon can take it but have to reduce the amount of the drug down to 1 meal a day. If herbs are overconsumed, there will be problems and side effects on health in the long run.

Herbs are, therefore, a disease treatment and prevention alternative in the forms of medicine and trendy dietary supplements. Referring to “herbs,” it may be thought that it is only a plant or a tree of natural origin until making it feel safe to use. This causes problems from the improper or incorrect use of herbs until causing harm to the users. A growing number of clinical reports of adverse reactions from herbal use have been found, especially in those who use it as a medicine for treatment. This article aims to present information about herbs and how to use herbs against COVID-19 as an educational guideline for those interested.

2. Principled Knowledge

2.1 Thai Herbs

According to the Herbal Products Act B.E. 2562 (2019), the definition of “herbs” means natural products obtained from plants, animals, microbes, or minerals used to mix, prepare, or transform into herbal products, and “herbal product” means (1) herbal medicine and shall include Thai traditional medicine, medicine developed from herbs, and traditional medicine used by humans according to the law of medicine or medicine based on alternative medicine knowledge as the Minister and the Committer suggested to prescribes the medicine for treatment and relief of human illness or disease prevention. (2) It means herbal products or products containing essential ingredients that are or transformed from herbs, ready to be used for human use to affect health or body function better, strengthen the structure or body function, or reduce risk factors of disease. Moreover, if aiming to use herbal medicine for therapeutic benefit, it requires the knowledge and expertise of specialists who can formulate the correct and appropriate drug formulation or drug administration method specific to the individual and the symptoms of the disease (Jearanai, 2014).

Receiving incomplete information or sharing word-of-mouth information may lead to safety neglect in choosing correct and appropriate doses and their application, as often seen in adverse reports or events. For instance, “*Vernonia amygdalina*” is used to treat diabetes or reduce blood sugar levels, but it was found that applying it wrongly results in increased liver and kidney function values until it can be lethal to the user. Recently, there has been a social news spread of COVID-19 prevention by eating Fatalaijon across the internet. Fatalaijon is a herb known for its effectiveness in the treatment of common cold, cough, and sore throat in acute respiratory infections, however, only its antiviral activity in the cold group, especially in the test tube and laboratory animals, has been studied. It is also not recommended to be eaten to strengthen the immune system or continuously consumed for more than 7 days. All harm caused by the use of the herbs, according to studies with strong evidence experimented or case studies, can be classified into 7 groups, in which one type of the herbs may cause more than one group of the harm as follows (Wongkrajang & Supharattanasitthi, 2015).

1. Allergic reactions



2. Toxic reactions such as herbs with hepatotoxicity. For instance, a study on the use of Siamese cassia leaf in tablet form (single dose) in 1999 reported acute hepatitis or herbs-cause nephrotoxicity. Therefore, people should carefully use it in patients with kidney disease. Herbs that cause this kind of harm are such as licorice, Indian senna, Indian mulberry, and carambola juice.

3. Adverse effects is that the use of certain herbs may cause related or unrelated side effects or adverse effects to the desired pharmacological activity, such as garlic and ginkgo, which cause adverse reactions such as bleeding easily.

4. Herb and drug reactions are two forms: (1) pharmacokinetic reactions with drugs or herbs altering the absorption, distribution, metabolism, and drug elimination from the body, which causes the amount of active drug or herb to be increased or decreased, and (2) the pharmacodynamic reactions with drugs or herbs altering the action of the drug on the target tissue or organ, which causes the drugs or herbs to show synergistic effects or antagonist effects such as easy bleeding or hemorrhage from eating herbs like ginkgo, goji, and garlic with antifibrinolytics or anticoagulant such as Aspirin Warfarin, or eating tea or green tea with Warfarin inhibiting the treatment efficacy of the drug.

5. Mistaken plants or mistaken preparation is caused by a misunderstanding about the types of herbs with similar properties and similar to some poisonous plants and by using the wrong herbs, including being used wrongly, such as misusing the wrong part of the herb or making potions in the wrong way.

6. Contamination includes heavy metal substances, insecticides, an excessive amount of microorganisms with herbal medicines products, which result in harm to the body acutely and chronically, and some substances are accumulated and lead to harm in the long run.

7. Adulterants are herbs or herbal products with exaggerating claims of their herbal properties. For example, it is claimed that it can treat many diseases or treat them quickly. From several sample investigations, it was found that adulterant substances with pharmacological activity and therapeutic effect will be found such as steroids causing harm to the body if used wrongly.

Therefore, for those who want to use the herbs to understand and use them correctly and safely, the herbal details should be studied whether the herb is suitable for use and how to use it correctly, including be aware of a principle in choosing herbal medicine or herbal products (5 right principles) as follows. (Wongkrajang & Supharattanasitthi, 2014)

1. Right tree: Since most herbs have synonymous or duplicated names and local specific name may be called a different name despite the same plant, or sometimes its name is the same, but it is a different plant, thus if you want to use any herb, you must use the right one by using it based on the botanical names of each plant as names to avoid confusion and checking plant identity by comparing it with plant specimens in botanical gardens or reliable botanical books.

2. Right part: Part of each herb; root, flower, leaf, bark, or seed, or the majority of the herbs may have the same or different chemical elements or substances, or in some plants, each part of the plants may contain the same active ingredients but in different amounts; therefore, the strength or effectiveness of the treatment may be different, or in some plants, some are used as a medicine, and some are poisonous.

3. Right size: Although many herbal drugs are not dangerous, the excessive dosage may be harmful to the body or the treatment effect, especially in young children who are less tolerant than adults. Also, when using it discontinuously or longer than prescribed instructions, the drug should be stopped to allow the body to rest and eliminate the drug from the body. If necessary or there is a desire to use the herb for a long time, there should be a physical examination before, during, and after the use of the herbs periodically, including liver function tests such as liver enzymes (AST, ALT), kidney function (BUN, Cr), blood pressure, and blood sugar levels (Wongkrajang & Supharattanasitthi, 2014).

4. Right method is a method of using drugs or herbs to prepare drugs correctly according to the principles. For example, some must use fresh plants, must squeeze water, must boil and simmer, or boil with water or be fermented in liquor, and so on (Wongkrajang & Supharattanasitthi, 2014). In case of changing to another method different from ancient or traditional methods, it is necessary to study the efficacy and safety before using it since the chemicals in each plant are diverse, and changes in the drug preparation method may cause the extracted substances to differ, which can sometimes be harmful to the body.



5. Right disease: For example, if you want to relieve constipation, you have to use herbs with laxative effects. If you use astringent herbs, it will cause your stomach to be more pain, or if used in conjunction with medical treatment or aim for direct results for treatment, it is recommended to ask for experts such as applied Thai traditional medicine, Thai traditional medicine, or pharmacist. for safety and maximum benefits.

In addition to the aforementioned principles used for consideration, there are still principles for consideration and recommendations before considering the use or while using herbs or herbal products such as (Chunhawarakorn, 2019)

1. People should study whether the product consists of any type of herb or any herbal ingredient. If there is an adverse reaction, it will be known what kind of herb is caused and keep the information in careful use.

2. People should be usually aware of any abnormalities that may occur during herbal use. If any abnormal symptoms occur during herbal use, should stop using and consult a doctor or pharmacist.

3. Pregnant or breastfeeding women and children should not use herbs if not needed, especially herbs without safety information because certain substances in the herb can pass through the placenta, excrete through milk, or have an effect on growth.

2.2 Coronavirus Disease 2019 or (COVID-19)

2.2.1 Symptoms of COVID-19

The most common symptoms of COVID-19 are fever, cough, fatigue, muscle pain (for some patients), stuffiness, runny nose, sore throat, diarrhea, loss of taste and smell, skin rash, skin color changes of fingers and toes. The severity of these symptoms is usually mild and starts to be gradually severed. Some patients are infected but have mild symptoms. The vast majority of people (80 percent) can recover without hospitalization, and about 1 in 5 of those infected with the COVID-19 have severe symptoms and shortness of breath. Moreover, elderly people with underlying diseases, such as high blood pressure, heart disease, diabetes, or cancer, are more likely to have a more serious illness. However, everyone can be ill with COVID-19 and may be severely ill. People of all sexes and ages with fever and/or cough with shortness of breath, chest pain, loss of sound, or inability to move, should consult the doctor immediately, if possible, calling ahead for the hospital to give advice. If there are mild symptoms such as a little cough or low fever, there is normally no need to see a doctor but have to stay home quarantine, monitor symptoms, and follow the official advice to separate yourself from others (World Health Organization, 2020). However, if you are in the outbreak risk areas, you have to watch for fever and see a doctor. When going to a hospital, you have to wear a face mask and keep at least 1 meter apart, and do not touch on surfaces. If your child is sick, you should follow this advice as well. Also, you should see a doctor right away if you have shortness of breath and/or chest pain. If possible, you should call ahead so that it can give advice (Information and Communication Technology Center, Office of the Permanent Secretary, Ministry of Public Health, 2020).

2.2.2 Spread of the Disease

This disease can spread from person to person through the respiratory droplet. When a patient with COVID-19 coughs, sneezes, or speaks, these droplets are quite heavy, which cannot spread very far and quickly fall to the ground. We take COVID-19 from inhaling. Therefore, it is necessary to keep social distance at least 1 meter from others. These droplets also fall onto objects and surfaces such as tables, doorknobs, handrails and when people take their hands to grab those surfaces and catch their eyes, nose, or mouth, you will take this pathogen as well. It is, therefore, imperative to wash your hands frequently with soap and water and use hand sanitizer. Keeping your hands clean and maintaining cough/sneeze etiquette is important to do at all times, and it is the best way to protect yourself and your loved ones. If possible, you should keep at least 1 meter from others, especially when standing near someone who is coughing or sneezing because some infected people may not have symptoms, keeping your distance from everyone is also a good idea if you are in the outbreak region of COVID-19 (Department of Mental Health, 2020).

If we come into close contact with someone infected with COVID-19, we might be infected. Close contact means living together or being close to each other within 1 meter of the patient. If you are sick with mild symptoms, you should isolate yourself. Although you think that you are not in close contact with the



infection, but you have symptoms, you should isolate yourself and observe the symptoms which are more likely to infect others in the mild early stages. Consequently, self-quarantine is essential. If there is no symptom but had been in close contact with the patient, you have to quarantine for 14 days. In the case of the COVID-19 patients (confirmed by examination), they have to further quarantine for 14 days although the symptoms are gone to be careful. It is not yet certain how long people can continue to transmit the infection after recovery, so should follow the official instructions on quarantine strictly (Singweratham, 2020).

If someone has to quarantine because of illness but not under the supervision of a doctor, they should stay in a wide and well-ventilated area with hand sanitizer and a toilet. If possible, a bed should be separated at least 1 meter apart, and at least 1-meter distance should be kept from others including family members. Furthermore, daily symptoms have to be monitored, and should quarantine themselves for 14 days, even though they feel like staying healthy. If there is shortness of breath, a medical provider should be contacted by calling in advance, and if possible, stay positive and energized by connecting with loved ones by phone or through online channels and exercise at home.

2.2.3 Self-protection to Prevent Disease and the Spread of Disease

In the practice to reduce the risk of infection or transmission, the following precautions should be followed (World Health Organization, 2019).

1. Wash your hands frequently and thoroughly with hand sanitizer or with water and soap because cleaning hands with these two methods can kill pathogens on your hands.

2. Keep a distance of at least 1 meter from others because when people cough, sneeze, or speak, it will cause respiratory droplets that may contain pathogens, and if stay too close, those respiratory droplets will be into the body from breathing in case of the sick person.

3. Avoid going to crowded areas because when many people gather, we are at risk of approaching patients with COVID-19, and when people are crowded, it is difficult to keep a distance of 1 meter from others.

4. Avoid touching your eyes, nose, and mouth with your hands since your hands touch a lot of things and may come in contact with pathogens. When hands are contaminated, they transmit pathogens to the eyes, nose, and mouth, and it can enter our body and make us sick (Department of Mental Health, 2020).

5. We and neighboring people should have good respiratory hygiene, which means that you must cover your mouth every time you cough or sneeze with your elbow or with a tissue, then immediately throw away it, and wash your hands because these droplets can spread infection. If you have good cough/sneeze etiquette, you can protect other people from other pathogens, such as colds, flu, and COVID-19.

6. Stay home and quarantine yourself, with mild symptoms such as cough, headache, fever until recovery. Let someone deliver supplies and necessary items, but if you have to leave the house, you have to wear a mask to prevent infecting others because avoiding contact with others is to protect others from COVID-19 and other pathogens.

7. If you have a fever and/or cough with shortness of breath, you should consult your doctor immediately. If possible, you should call in advance so that a hospital can advise you because the state and local authorities have information about the latest situation in your area. Calling ahead of time will make healthcare workers refer you to the appropriate healthcare facility to protect yourself and prevent the spread of other viruses and pathogens (Department of Mental Health, 2020).

8. Follow the news and information from reliable sources such as World Health Organization and Public Health Authority because the authorities and the local community will provide the best information on what local people should do to protect themselves.

To protect yourself from the Covid-19 crisis, you should wear a face mask every time you leave home, wash your hands, and keep your distance from people (Singweratham, 2020). All of these methods are to adjust our lifestyle to reduce the risk of infection. Lifestyle adjustments can be applied to virtually any disease prevention, not just in the presence of the COVID-19 because whenever you continue to live a comfortable life, you will increase the risk of disease and the likelihood of approaching the disease more easily from the same repetitive cycle of life, for example, eating more harmful food than beneficial, not exercising, and so on. The deadly pathogens lurking in the body might take this opportunity to show



themselves up. In brief, the most effective way to protect you and others from COVID-19 is to wash your hands frequently, avoid touching your eyes, nose, and mouth, cover your mouth and nose with tissue or elbows when coughing or sneezing and immediately throw tissue paper away, wash your hands, and keep at least 1 meter from others.

2.3 Herbs Used for COVID-19 Prevention

Coronavirus disease 2019 (COVID-19) and its outbreak have been a daunting challenge to global health. The early clinical features and epidemiology of analyzed cases, along with their many complications, have been a stark reminder of a dire need for systematic and multipronged measures, in addition to antiviral treatments (Zhang. et.al, 2020).

Thai vegetables, fruits, and herbs that are effective in preventing the virus from entering the body and helping to reduce the chance of infection are fruits and vegetables high in quercetin, such as Plukaow, shallots, onion, moringa, mulberry, and apples. Furthermore, fruits and vegetables high in hesperidin and rutin are the skin and inner membranes of citrus fruits (such as oranges, lemons, bergamot, tangerines). Basil contains orientin, an effective active ingredient in preventing the virus from entering the body, and orange and mulberry peels, as two of the six herbs in Chinese medicine formulation used to drink instead of tea, can prevent pneumonia caused by the infection of the COVID-19 according to the guidelines of Hubei Province (Pawakang, 2020).

It can be divided into three main types as follows (Teerattaweechai et al., 2019).

1. Immune enhancement group includes Plukaow, various mushrooms, Triphala (Myrobalan Wood, Belleric Myrobalan, Indian gooseberry)
2. Group with high vitamin C and antioxidants are Siamese cassia flowers, star gooseberry, Liang leaves, neems, bitter cucumber, spring bitter cucumber, Chiangda vegetables, kale, moringa, Vietnamese coriander, Indian gooseberry, mulberry, and colorful vegetables and fruits.
3. Group containing active ingredients in the prevention of COVID-19 infection are Plukaow, basil, shallots, onions, moringa, mulberry, apple, peel of citrus fruits (orange, lemon, bergamot, tangerine).

Currently, there is no specific treatment for COVID-19. Furthermore, people in the community and researchers are trying to find the best way to cure or prevent the disease, including using herbal medicine. Since the immune status of patients plays an essential role in COVID-19 infection, an herbal medicine, which has an immunomodulatory effect, could have the potential as a preventive measure and even therapeutic agent for patients with the COVID-19 infection (Zhang & Liu, 2020). A recent trend in the community is the consumption of herbal medicines containing certain active compounds, which have antimicrobial or antiviral, anti-inflammatory, and immunostimulatory activities, such as echinacea, quinine, and curcumin. These herbal compounds are assumed to have the capacity to modulate the immune response and, therefore, they are believed to have beneficial effects on preventing or treating COVID-19 (Sharma, et.al, 2009; Kocaadam & Sanlier, 2017).

2.4 Examples of Herbs Used to Inhibit Virus

2.4.1 *Fatataijon*

Many research studies had been conducted on many types of herbs to study the results of the herbs in protecting or resisting or inhibiting the COVID-19. The research carried out by Mahidol University with Chao Phraya Abhaibhubejhr Hospital found that andrographolide substances in Fatalaijon are likely to develop into a single drug or be used in combination with standard drug formulations in treating the people infected with the COVID-19 conducted in the preliminary test tube research with human lung cells. The findings found outstanding benefits: creating inhibition of the COVID-19 in several processes, including inhibiting viral cell entry, inhibiting the division of virus resulting in a decrease in the number of infected cells. Therefore, with the properties above, the Department of Thai Traditional and Alternative Medicine under the Ministry of Public Health recommends taking Fatalaijon containing 180 mg andrographolide per day for 5 days in the COVID-19 patients with mild symptoms. However, there are prohibitions to use for the following people (Pawakang, 2020).



1. People who are allergic to Fatalaijon
2. Pregnant and breastfeeding women
3. Have liver and kidney abnormalities
4. People who have rheumatic heart disease

In agriculture, the cultivation of Fatalaijon does not require much maintenance because it is a single-season annual plant. Suttinee Yuvejwattana (2020) said that “Fahtalaijon in Thai, can curb virus and reduce the severity of inflammation.” Only the leaves of Fatalaijon are harvested. It is recommended that this plant should be kept during the flowering period, but the flowers are not yet blooming. It should not be harvested beyond this period because the active ingredients of the drug will be reduced (Suksawet, 2020). Today, the market value of the Fatalaijon is many times higher than before due to the pandemic situation that causes product shortage because all the raw materials used to make medicine are out of stock. From the original purchase-sale price, normally 30-40 baht per kilogram, the current price has risen to 120 - 150 baht per kilogram (Phaophanat, 2020).

2.4.2 Indian Gooseberry

Indian gooseberry has properties as an expectorant to soothe the throat, treat fever and diarrhea, excrete diuretics, treat scurvy, and has an antioxidant effect. Indian gooseberry researched from the 3D image simulation in the computer was found that the active ingredients in Indian gooseberry can bind to the protein limb of the COVID-19 and ACE2 receptor, playing a role in permeating through the lung cells and binding to the infection in many sites that can affect the inhibition of the generation and division of the virus (Kanjanasirirat et al., 2020).

2.4.3 Krachai

Krachai is a plant listed in the Herbal List in Primary Health Database and has spicy, bitter tastes recommended for all people to take care of the primary ailments with properties to cure stomach stiffness, flatulence, and heartburn. People can use it by boiling about half a handful of dried rhizomes with clean water and pouring only drinking water as Thailand Center of Excellence for Life Sciences (Public Organization) (TCELS) with the Faculty of Science, Mahidol University, and Faculty of Medicine, Ramathibodi Hospital, Mahidol University, revealed the effectiveness of Krachai Khao in inhibiting the COVID-19 virus. From the screening of more than 120 warehouse extracts, six extracts were found to have the potential to inhibit the proliferation of SARS-CoV-2 with a viral inhibitory effect of 100% at a low level of drug concentration and without cytotoxic. These results were tested against the inhibitory effects of the FDA approved drugs including Niclosamide and Hydroxychloroquine, which the research team has selected 2 extracts out of 6 such extracts, ginger and Krachai Khao, to perform an in-depth analysis of the cellular mechanisms, and when analyzed, it was found that Krachai Khao gave a concentration of 30 times more concentrated than the Fatalaijon extract and 10 times better than ginger extract; thus, the best substance was found among them (Pawakang, 2020). Then, the researchers investigated which active ingredient is contained in the Krachai Khao as the main inhibitory components and found that Panduratin A and Pinostrobin were the main viral inhibitors. At the same time, an in-depth analysis examination plan of the cellular mechanism was prepared.

2.4.4 Garlic

Garlic has a pungent smell but edible. Garlic is another great antiviral herb, and there are research studies that indicate garlic may help prevent infection with influenza type A and B, HIV, rhinovirus, and viral pneumonia. It was also found that garlic stimulates the immune system by helping increase the body's immune cells, making the body better able to cope with the virus (Weeraya Dumrongsakunchai & Wongwiwat Tassaneeyakul, 2008).

2.4.5 Basil and Sweet Basil

Basil and sweet basil, such as sweet basil, basil, and hairy basil, are classified as an antiviral herb that can be commonly available for consuming and cooking such as Basil Stir Fry, Kaeng Liang, or eat it as a side dish with chili paste, rice noodles, or Namtok noodles. There are many antiviral properties of this plant family. For example, one laboratory study found that basil extract contains compounds such as Apigenin and Ursolic acid that have properties against the herpes virus, hepatitis B, and enterovirus. Besides, another study



found that the basil stimulates the immune system; therefore, it may help against viral infections. When the researchers gave 24 healthy adult samples to take a basil extract supplement for 4 weeks, it was found that the number of T helper cells and Natural Killer Cells, which are white blood cells killing the virus better than normal white blood cells, significantly increases (Temsirireukkul et al., 2012).

2.4.6 Licorice

Licorice has been used as a medicine since the past because many compounds have antiviral properties such as Glycyrrhizin, Liquiritigenin, Glabridin, and one laboratory study also found that licorice root extract can be against HIV, RSV virus, herpes virus, and coronavirus, which can also cause severe acute respiratory disease (SARS-CoV) (Panyoda et al., 2020).

2.4.7 Ginger

Ginger is another famous plant as an antiviral herb because it contains compounds such as Gingerol, Zingerone, which inhibits the proliferation of the virus and helps prevent the virus from entering the cells (Department of Thai Traditional and Alternative Medicine, 2017). One study found that the ginger extract helps against avian influenza, RSV virus, and feline calicivirus (FCV) similar to human norovirus (Temsirireukkul et al., 2012).

2.4.8 Peppermint

Peppermint is a plant in the marsh mint family that contains compounds with antiviral activity, antibacterial activity, and anti-inflammatory activity, such as menthol, Rosmarinic Acid, and a great substance for perspiration. It is popular to be consumed for perspiration when you have a fever. You can find peppermint in a variety of forms such as fresh leaves, dried leaves, tea, essential oils, and many others (Diane & Jeffrey, 2006).

3. Conclusions

Herbs are one of the key factors as the strength of Thailand and have been used for a long time as wisdom from generation to generation. Currently, there have been widely accepted extensive research studies. Especially during the COVID-19 situation, Thailand has been recognized globally as being able to control the epidemic quickly, and it is discussed about the strengths that can be further developed in healthcare security that can attract health-loving tourists from many countries to Thailand. According to the studies, Thai herbs such as Fatalaijon, Indian gooseberry, Krachai, and garlic are shown to prevent many types of viruses. However, the details of these herbs need to be studied whether it is suitable for use and people should know how to use it correctly. Also, there is a principle in the selection of herbal medicine or herbal products as follows: 1) Right tree: what herb will be used and it must be used correctly, 2) Right part: since each part of the herb has the same chemical components or active ingredients, 3) Right size: use the right and appropriate amount of the herbs, 4) Right method according to the principles, and 5) Right disease: herbs are used with the right disease. In addition to the aforementioned principles, kinds of herbs should be studied and any abnormalities that may occur during the use of herbs should be usually observed. If any unusual symptoms occur during herbal use, discontinue and consult a doctor or pharmacist. Pregnant or breastfeeding women and children are advised not to use herbs if not necessary, especially those with no safety information available.

4. References

- Chotchoungchatchai, S., Saralamp, P., Jenjittikul, T., Pornsiripongse, S. & Prathanturarug, S. (2012). Medicinal plants used with Thai Traditional Medicine in modern healthcare services: a case study in Kabchoeng Hospital, Surin Province, Thailand. *Journal of Ethnopharmacology*, 141(1), 193-205.
- Chunhawarakorn, R. (2019). *World of herb*. Retrieved January 10, 2021, From https://www.angelfire.com/ri2/rangsan/know_gen.html.
- Department of Mental Health. (2020). *Addressing Mental Health and Psychosocial Aspects of COVID-19 Outbreak*. IASC Reference Group on Mental Health and Psychosocial Support in Emergency Settings. Nonthaburi: Department of Mental Health.



- Department of Thai Traditional and Alternative Medicine. (2017). *National Master Plan on Thai Herbs Development*. 2nd edition. Nonthaburi: TS Inter Print Co., Ltd.
- Department of Thai Traditional and Alternative Medicine. (2020). *Ginger ale*. Retrieved January 10, 2021, from: <https://www.dtam.moph.go.th/index.php/th/trust-news/6187-trust0004>.
- Diane, L. M. and Jeffrey, B. B. (2006). A review of the bioactivity and potential health benefits of peppermint tea. *Phytotherapy Research*, 20(8), 619-33.
- Dumrongsakunchai, W., & Tassaneeyakul, W. (2008). Herb and drug interaction. *Srinagarind Med Journal*, 23(2), 223-228.
- Information and Communication Technology Center, Office of the Permanent Secretary, Ministry of Public Health. (2020). *Coronavirus Disease 2019*. Nonthaburi: Ministry of Public Health.
- Jearanai, J. (2014). A Collective Study of Herbs and the Utilization of Ancient Drug Recipes of Traditional Thai Healers who live in NumPung Dam and Surrounding Areas, Sakon Nakhon Province: A Study under Her Royal Highness Princess Maha Chakri Sirindhorn's Plant Genetic Conservation Project, Suranaree University of Technology. Nakhon Ratchasima: Suranaree University of Technology.
- Kanjanasirirat, P. et.al. (2020). High-content screening of thai medicinal plants reveals boesenbergia reveals boesenbergia rotunda extract and its component panduratin a as anti-sars-cov-2 agents. *Scientific Reports*, 10, 19963
- Kocaadam, B. & Sanlier, N. (2017). Curcumin, an active component of turmeric (*Curcuma longa*), and its effects on health. *Critical Reviews in Food Science and Nutrition*. 57(13), 2889–2895.
- Panyoda, S., Hob, C. T., & Sheena, L.Y. (2020). Dietary therapy and herbal medicine for COVID-19 prevention: A review and perspective. *Journal of Traditional and Complementary Medicine*, 10(4):420-427
- Pawakang, N. (2020). Thai herbs against virus: taking it regularly reduces the risk of COVID-19. Retrieved January 10, 2021, from: <https://www.sanook.com/health/23117/>.
- Phaophanat, W. (2020). *Thai Herbs Against COVID-19*. Chiang Mai: Agricultural Technology Services Center, Faculty of Agriculture: Chiang Mai University.
- Sharma, M., Anderson, S. A., Schoop, R., & Hudson, J. B. (2009). Induction of multiple pro-inflammatory cytokines by respiratory viruses and reversal by standardized Echinacea, a potent antiviral herbal extract. *Antiviral Research*, 83(2), 165–170.
- Singweratham, N. (2020). Perception and preventive behaviors on the coronavirus disease-2019 (COVID-19) among dental nurses under the Ministry of Public Health. *Journal of Bamrasnaradura Infectious Diseases Institute*, 14(2), 104-115.
- Suksawet, T. (2020). Andrographolide from *Andrographis paniculata*". *Journal of Thai Traditional & Alternative Medicine*, 18(1), 222-227
- Teerattaweechai, C., Nakcharoen, P., & Intamas, W. (2019). *Herbal Anti Covid19 Welcome Drink*. Bangkok: Siam University.
- Temsirireukkul, R., Prathanthurarak, S., Chuakul, W. & Khiewwongjan, J. (2012). *Herbs and Thai Drug Formulation: Selection Based On Academic Principles*. (1st ed). Bangkok: Samlada Ltd.
- Wongkrajang, Y., & Supharattanasitthi, W. (2014). *Articles for sharing knowledge to the public: herbs and modern medicine to eat together, right?* Retrieved January 10, 2021, from <https://www.pharmacy.mahidol.ac.th/th/knowledge/article/209/>.
- Wongkrajang, Y., & Supharattanasitthi, W. (2015). *Articles for sharing knowledge to the public: precautions for using herbs*. Retrieved January 10, 2021, From, <https://www.pharmacy.mahidol.ac.th/th/knowledge/article/270/>.
- World Health Organization. (2020). *WHO Director-General's opening remarks at the media briefing on COVID-19 - 11 March 2020*. Geneva: World Health Organization.
- Yuwejattana, S. (2020). *Thailand Clears Use of Herbal Medicine for Covid-19 Treatment*. Retrieved January 10, 2021, From, <https://www.bloomberg.com/news/articles/2020-12-30/thailand-clears-use-of-herbal-medicine-for-covid-19-treatment>.



- Zhang, L. & Liu, Y. (2020). Potential interventions for novel coronavirus in China: a systematic review. *Journal of Medical Virology*, 92(5), 479–490
- Zhang, Y. et.al. (2020). *Herbal plants coordinate COVID-19 in multiple dimensions - An insight analysis for clinically applied remedies*. Beijing: BeijingBeijing University of Chinese Medicine Affiliated Dongzhimen Hospital.