



## POTENTIATED PLU KOW: *Houttuynia cordata* Thunb



My first exposure to Plu Kow was in a Wat (temple) in the hills of Chiang Mai, Thailand just below Doi Suthep, one of the most holy sites in Northern Thailand. The monks were wild harvesting Plu Kow from the nearby mountain for medicinal use. The monk's genuine enthusiasm and practical knowledge of Plu Kow left a strong impression on me, but it was not until many years later that my involvement in processing Thai herbs brought me to the serious study of this traditional Thai herb.

Traditional medicinal uses of the Plu Kow leaf in China include relief of fever, detoxification, and anti-inflammation. In Korea, Plu Kow leaf is used to treat high blood pressure, arteriosclerosis and cancer. In Thailand, Plu Kow, is a traditional healing herb used in recipes for dysentery, dermatitis, respiratory infections, cancer, sexually transmitted diseases, measles, hemorrhoids, wounds and more.

Research on Plu Kow has been limited mostly to Asia with emphasis being in China, Thailand, Korea, Japan and India. This extensive body of research has had minimal exposure in the Western World. Plu Kow is among the least known Thai herbs with high feasibility for use in medicines, health supplements and functional foods. With so little written about Plu Kow in the English language, it is the hope of this author that the existing research on Plu Kow described herein shall stimulate interest for further research.

One hundred and twenty-six research reports from 1908 -2003 are listed in alphabetical order of the research topics and include the document names, published journals, and researcher's names in Appendix A. Ninety two of these were published between 1983 and 2003.

In addition by 2003, there were more than seventeen certifications and patents which include Plu Kow for the most part relating to antibodies and immune system support. These are related mostly to two categories:

- a. Curing allergic reactions such as asthma, rheumatoid arthritis, food allergies, atopic dermatitis etc.
- b. Treatment of immunodeficiency diseases

During the past ten years, interest in Plu Kow has blossomed and science is, once again, verifying the repeatedly verifiable profound results realized by traditional botanical medicine. It is the goal of science to reveal and explain what's happening to cause these results, not to deny the clear results because they cannot be fully explained within the limits of modern experimental scientific logic at this point in time.

The beneficial effects of Plu Kow can be divided into two distinct categories. First is the ability of this herb to help prevent cell replication by promoting DNA fragmentation (chain termination during

DNA replication). The second category relates to Plu Kow's contributions to boost our immune system's ability to kill infected viruses, bacteria and cancer cells.

## **DNA FRAGMENTATION:**

Viruses, cancer cells, and some bacteria have genes that suppress programmed cell death leading to unchecked replication. For example, Herpes Simplex Virus 1 contains genes with replication-incompetent virus mutations that block apoptosis (genetically pre-programmed cell death). Successful viral replication involves evasion of host defenses and circumvention of the mechanisms that limit replication by killing infected cells.

In an emergency response to viral infections our immune system will target replicatory viral DNA to induce early cell death which would severely limit virus proliferation. In response, viruses have adapted by evolving survival- promoting strategies to evade or delay early apoptosis by targeting strategic points in the apoptotic pathway. Some viruses intentionally induce apoptosis at late stages of infection as a strategy to spread the infection to nearby cells while evading the host's immune inflammatory responses and protecting the virus from host enzymes and antibodies. At this late stage in apoptosis, components of the cells become encased in membrane-bound apoptotic bodies which are neatly absorbed into nearby cells and the virus hitches a ride.

Virus, bacterial and cancer cell replication requires double stranded RNA production. RNA helicases function as alternative pattern recognition receptors that induce apoptosis via DNA fragmentation which prevents these cells from DNA replication. The introduction of genes that will not allow the process of DNA replication to proceed is a significant aspect of our immune system.

Healthy cells have an inherent DNA repair mechanism which removes deficient or damaged atoms from the nucleoside string and replaces them with a new segment of healthy atoms. However, all viruses (including HIV), many cancer cells and some bacteria have lost this DNA repair mechanism. So while the virus, tumor and bacteria cells experience DNA fragmentation halting DNA replication, Plu Kow does not interfere with healthy cell replication.

Studies published in the "American Journal of Chinese Medicine" reported that Plu Kow reduced viral RNA synthesis and virus induced caspase 3 activity. This study indicated that Plu Kow affected apoptotic processes in EV71 by inhibiting viral replication. (Vol 37, Issue 1, 2009 by Lin et.al.) Essential oils found in Plu Kow have been found to effectively terminate the DNA chain during DNA replication. The metabolic pathway or biological mechanism in this case does not aim at destroying the target pathogen, but rather inhibiting its replication process while not harming its host.

## **AUTOLYSIS:**

Another critical metabolic pathway in apoptosis is autolysis which is the self-destruction (self-digestion) of cells via the digestive enzymes contained within them. Autolysis is aided by lysosomal, an enzyme that aids in the digestion of cells. Lysosomal synthesis is increased by essential oils found in Plu Kow.

## CYTOTOXICITY AGAINST TUMOR CELL LINES, VIRUSES AND BACTERIA:

If we are to win this battle against such adaptive opponents we must not only halt virus/tumor/bacterial replication but also strengthen our defenses by inducing synthesis of NK cells, T Cells, B Cells, CD8, CD 4 all of which boost our immune system's ability kill infected viruses, bacteria and cancer cells.

A research study indicates that a polymer of the essential oils in Plu Kow (houltuyinin) combines with sodium bisulfite to create the compound, Houltuyinin sodium bisulfite (HSB) which helps to induce antibody synthesis and also helps to enhance the functions of macrophage white blood cells, increasing their capacity to find and destroy impurities by increasing the synthesis of lysosomal. Lysosomal is an enzyme that digests engulfed viruses and bacteria. Plu Kow also increases the creation of IL-1B and IL-2 lymphocytes.

Alkaloids extracted from Plu Kow have been shown to destroy five kinds of human cancer cells: colon cancer, malignant melanoma, ovarian cancer and lung cancer. One of Plu Kow's alkaloids, spendidin, demonstrates the ability to destroy cancer cell lines ED50. Aristolactam B, another alkaloid extracted from Plu Kow demonstrates effects on XF-498 .

Compounds including Plu Kow leaf juice fed to five leukemic cell lines stopped the growth of all five.

In China, powdered compounds including Plu Kow leaves are used to treat cancers in the alimentary canal, respiratory canal, breast, womb, stomach, rectum and lungs. Plu Kow is also used for healing the side effects caused by radiation and chemical cancer therapies.

Plu Kow effectiveness extends to:

1. Anti-allergy and anti- asthma: Plu Kow blocks excessive histamine thereby inhibiting anaphylactic reactions that otherwise lead to allergic reactions and asthma.
2. Polyphenols provide strong antioxidant activity which plays a crucial role in immune system support. Antioxidants inhibit lipid peroxidation. Apoptotic genes experience oxidative damage by free radicals. Scavenging these free radicals protects apoptotic genes thereby promoting death of virus, cancer, and bacteria cells.
3. Plu Kow displays strong antibacterial properties which are especially effective for Propionibacterium acnes and Staphylococcus epidermidis, both of which are major causes of acne.
4. Plu Kow provides strong immune support by stimulating lymphocyte synthesis including:

- NK (Natural Killer) white blood cells which scan the body for abnormal cells, destroying them before they can develop. NK cells regulate the immune system through cytokine secretions that drive the antitumor cellular immune response.
- T Cells locate and identify antigen markers on invading cells and inject a poison to kill them.
- B-cells produce and secrete specific plasma cells that produce antibodies.
- CD8 is a trans-membrane glycol protein that forms a powerful branch of the adaptive immune system by eradicating intracellular infections and helps to control a wide spectrum of chronic infections as well as eradication of tumors. In the final stage of fighting infections, CD8 develops cellular memory. Memory CD8 cells provide protective immunity against both acute and chronic viral infections.
- CD4 is a glucoprotein found on the surface of immune cells that send signals to other immune cells (including CD8) to destroy the infection. If CD4 cells are depleted (such as in the case of untreated HIV) the body is left vulnerable to infections it would otherwise be able to fight.
- Ig G: Immunoglobulin G is the most abundant antibody isotope found in the blood and extracellular fluids controlling infection of body tissues by a variety of immune mechanisms that include:
  - Immobilization and binding together of pathogens
  - Recognition and ingestion by immune cells
  - Activation of immune protein production resulting in pathogen elimination
  - Binding and neutralizing toxins.
- IgM: Immunoglobulin M is a basic antibody produced by B Cells and found in the blood and lymphatic fluids. This is the largest antibody in the human circulatory system and appears
- arthritis, the number and activity of the white blood cells drop, while the red blood cells often increase in number. How can the same compound be both an immune stimulant in some patients and yet act in other patients as an immunosuppressant? The adaptogenic mechanism appears to be in the differentiation phase early in the course of infection thereby making it useful in early diagnosis of infectious diseases.
- IL B1: Interleukin B1 cells are lymphocytes essential to the development of autoimmunity. IL B1 mediates host resistance against multi-cellular, extracellular pathogens.
- IL 2: Interleukin 2 cytokine signaling molecules regulate the activity of white blood cells responsible for immunity against microbial infections.

Immunomodulation involves bi-directional regulation of immune functions, which can be either up-regulated or down-regulated, and, in either case, seems to come from the same mechanism in the body. When an immunomodulatory herb is given to a patient in an immune-deficient state, such as cancer, hepatitis or HIV infection, the number and activity of the white blood cells increase. Conversely, if the same herb is given to someone in a hyper-immune state such as is found in Lupus, Lymphoma or Rheumatoid arthritis the white blood cell count goes down and the red blood cell count increases. The blood cells are produced in the bone marrow, primarily in the

long bones of the legs. They leave the bone marrow as immature cells, and travel to other organs where they mature into specific types of blood cells such as red blood cells, T-cells, natural killer cells etc. It would appear that Plu Kow exerts some influence over the differentiation mechanism that signals the body where to direct these immature cells for maturation.

## **ANTI-VIRAL:**

Viruses are parasitic and live and grow inside host cells. They use the biological processes of the host cells to synthesize complete virus particles. Patients exhibiting sudden viral symptoms with healthy immune systems can normally recover by themselves. However, for people with chronic viral infections and irregular immune systems, viruses can cause severe symptoms and lead to other diseases. In these cases relief of symptoms is not adequate and treatment aims at reducing the viral infection and /or boosting the immune system. In allopathic medicine this is largely accomplished by vaccines which are effective for treatment of smallpox and measles but are ineffective in other cases such as the common cold and inflamed eyes. Chemical therapies stop viral infection by killing the host cells. This therapy is consistent with the punch-line, “The operation was successful, but the patient died.”

Antiviral substances can be derived from plants. Evaporated oil from Plu Kow leaves has been shown to resist influenza virus in nursing cells and has been shown to kill herpes simplex virus type 1 (HSV-1), influenza virus, and human immunodeficiency virus type 1 (HIV-1) without destroying the host cells.

The “American Journal of Chinese Medicine” refers to scientific studies indicating that out of 22 tested medicinal herbs, only Plu Kow neutralized EV 71(Enterovirus 71) activity and induced antiviral effects. Vol 37, Issue 1, 2000, by Lin et. al.)

Injections of Plu Kow have been found to exert a direct inhibitory activity against various forms of herpes and Plu Kow was one of the eight compounds selected to treat SARS in China.

Chinese doctors blend Plu Kow as a major ingredient in medications to cure viral diseases and many of these formulations are patented medicines

## **ANTI-BACTERIAL:**

Many diseases are caused by bacteria which have different symptoms depending on the infected areas. Common bacterial diseases include diarrhea and inflamed urinary canal. Bacterial infections target the respiratory canal, alimentary canal, abscesses, oral cavity and reproductive system.

Thai herbs that demonstrate anti-microbial properties include shallot, garlic, ginger guava leaf and most particularly, Plu Kow leaf.

Plu Kow leaves contain decanoyl acetaldehyde which is an effective antimicrobial in the case of Staphylococcus and Plu Kow inhibits the growth of molds which cause Haemophilus influenzae,

Pneumococcus, and Staphylococcus. There are numerous medicinal formulation patents in China that include the Plu Kow leaf for its antimicrobial effects.

## **ANTI-INFLAMMATORY:**

Inflammation is an important part of the body's defense system and our natural healing process. However when the body overreacts to ever-present insults such as pollution or infection, inflammation can become acute and chronic. In the case of chronic inflammation, decreasing the inflammatory process is a desirable therapeutic intervention. The long list of health problems that result from chronic inflammation are well known.

Research reports indicate that Plu Kow can interrupt the inflammation cycle. Cyclooxygenase is an enzyme that plays a critical role in the creation of prostaglandins that act as inflammatory mediators. If our cell walls (membranes) are injured, arachidonic acid (AA) is released which initiates a series of events designed to rescue the cell. The first step in this cascade of events requires an enzyme called cyclooxygenases (COX) to convert AA into prostaglandins which cause your blood vessels to release fluid into the injured tissues (which cause swelling) in an attempt to isolate the area of damage. Prostaglandins also stimulate nerve endings to produce pain which informs the brain regarding the extent and location where the damage has occurred. Finally the prostaglandins attract immune cells to the damaged area. Essential oils contained in the Plu Kow leaf directly inhibit the cyclooxygenase enzyme thus interrupting the chain of events that leads to inflammation.

## **IMMUNE SYSTEM MODULATION:**

The human body can read the "markers" that determine if a substance within the body is natural to the body or a foreign substance. When the body perceives foreign markers it interprets this as a threat and takes action to rid the body of this substance.

There are genetic non-specific immune reactions such as coughing, sneezing, sweating and a host of natural killer cells designed to attack and kill the invader. When there is an invader that results in infection or allergy the body has strategies that are more specific and more efficient. Specific immune responses can be a result of antibody creation or cellular reaction.

## **IMMUNE SYSTEM ACTIVATION:**

Plu Kow's immune system support is one of its most well researched and most notable qualities. A research team from the Medical Science Department, Ministry of Health (Thailand) studied the effects of Plu Kow on the immune system and found that it sets up an alarm that alerts dividing white blood cells to the presence of a foreign body. This study also investigated the effects of Plu Kow leaf used as an ingredient in herbal remedies and concluded that it helps dividing white blood cells in normal healthy people as well.

Polysaccharides found in Plu Kow are recognized by our bodies as foreign molecules and this recognition process constitutes an immune activator. Polysaccharides stimulate and potentiate the immune system. In Asia the understanding of Plu Kow's efficacy has resulted in a very high

interest to treat patients with Plu Kow as an immune modulator while undergoing conventional treatments.

The Managing Director of Thai Freeze Dry Company has visited an AIDS clinic in Thailand and distributed (contributed) potentiated Plu Kow capsules to 80 AIDS patients in support of a clinical study to determine the level of immune system support provided to AIDS patients by liquid Dokudami as well as Potentiated Plu Kow powder capsules. Initial results are highly encouraging.

In Japan and Thailand, Plu Kow is commonly referred to as Dokudami. “Doku” means “poison” and Dami translates to mean that it “ blocks poison” and so Dokudami carries the meaning that it is the poison that blocks poison. The body recognizes polysaccharides in Dokudami as foreign substances and this recognition jerks your immune system to attention. The sense that this is the poison that blocks poison is along the same lines by which an inoculation introduces a small dose of a disease to allow your immune system to build up resistance to this disease.

In Japan, Dokudami (Fermented Plu Kow leaves) is in the top ten medicinal plants and is regarded as a “cure all”. The Japanese Medicines Codex approves Dokudami as a diuretic making it one of the very few medicinal plants that have earned a place in the Japanese Medicine Codex.


## DIABETES:

Recent independent research indicates that Plu Kow may boost the effectiveness of the world’s most frequently used medication for Type 2 diabetes - Metformin. This is an example of an herb used as an adjunctive therapy to increase the effectiveness of a drug or medicine. Researchers found that taking plu kow together with Metformin was highly efficacious. (see attached article).

## DIURETIC ACTIVITY:

Plu Kow juice expands the small blood vessels and consequently increases blood circulation and diuretic activity. The diuretic activity of Plu Kow is attributed to potassium and quercetin contained in Plu Kow.

## CELLULAR FRACTION-LINE TECHNOLOGY (CFL) TAKES POTENTIATED PLU KOW TO THE NEXT LEVEL:

Plu Kow can be provided in fermented liquid form. The fermentation process begins with starter cultures of lactic acid bacteria which add an important probiotic function. This is an excellent product but keep in mind that like most liquid herbal products it is over 95% water. Thai Freeze Dry Co. Ltd. (Chiang Mai, Thailand) has developed a proprietary processing sequence whereby fresh Plu Kow leaves combined with fermented liquid Plu Kow are freeze dried in two steps using our Cellular Fraction-Line Technology . 

The quality and efficacy of any herb or botanical can be dramatically affected by the processes used in its preparation and preservation. CFL is a key component in the creation of our functional foods and nutraceuticals. This process allows us to preserve herbs in their fresh form, maintaining all of the medicinal activity of a live plant while providing the safety of a stable (preserved)



commodity. The key to the effectiveness is not only the availability of the fresh Plu Kow in the nearby mountains of pristine Northern Thailand but also the process by which this amazing herb is preserved. CFL eliminates moisture with no exposure to heat (oxidation) and produces a dry powder with a particle structure that makes it highly bioavailable.

In a second step in our process we freeze dry probiotic fermented liquid Plu Kow mixed together with our dynamically freed dried whole fresh Plu Kow leaf powder. The fully dried fresh powder absorbs all the fermented probiotic liquid.

CFL effectively preserves this combination of fresh leaves and fermented liquid plu kow.. Conventional drying using heat (dehydration) will destroy lactic acid bacteria and its value as a probiotic, but in contrast CFL preserves the desirable microbes together with all other thermo-sensitive phyto-compounds. Water (over 95% of the total weight of the fermented liquid product) is eliminated. This multi-step process results in a highly concentrated and stable product – “Potentiated Plu Kow.” In the case of a product as complex as potentiated plu kow, CFL is especially important to sustain the complex intelligent structure to provide strong and noticeable results.

“Potentiated Plu Kow” delivers the health supporting qualities of freeze dried fresh Plu Kow leaves together with the highly concentrated qualities of liquid fermented Plu Kow.

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