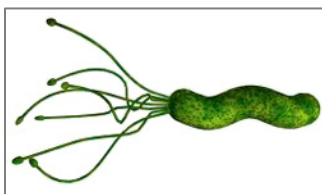


Cancer-Preventing Properties of Lemongrass Therapeutic Grade Essential Oil

World Life Expectancy Map positions Japan, Chile and Costa Rica in fifth place worldwide in death by Gastric Cancer.



Costa Rica, one of the countries with the highest age-adjusted incidence and mortality rates for **gastric cancer** (GC), has regions with contrasting gastric cancer incidence rate (GCIR). **Helicobacter pylori** (*H. pylori*) is a Gram-negative microaerobic bacterium that persistently colonizes the human gastric mucosa. There is an increased GC risk in subjects infected with *H. pylori* strains, especially those co-expressing the *cagA*, *vacA s1* and *babA2* genes. Cytokine gene polymorphisms of the host, IL-1beta, IL-1RN and IL-10, in response to *H. pylori* infection, have been also associated with an increased risk for developing gastric cancer.

A research team led by **Dr. Sergio A. Con from Costa Rica** evaluated the potential impact of *H. pylori* and/or host genetic factors on GCIR variability in Costa Rica. Their study will be published on January 14, 2009 in the "World Journal of Gastroenterology".

In their study, 191 *H. pylori*-positive patients were classified into groups A (high GCIR, n = 101) and B (low GCIR, n = 90). Human DNA obtained from biopsy specimens was used in the determination of polymorphisms of the genes coding for interleukin (IL)-1beta and IL-10 by PCR-RFLP, and IL-1RN by PCR. *H. pylori* DNA extractions obtained from clinical isolates of 83 patients were used for PCR-based genotyping of *H. pylori* *cagA*, *vacA* and *babA2*.

They found that cytokine polymorphisms showed no association with GCIR variability. However, gastric atrophy, intestinal metaplasia and strains with different *vacA* genotypes in the same stomach (mixed strain infection) were more frequently found in group A than in group B, and *cagA* and *vacA s1b* were significantly associated with high GCIR (P = 0.026 and 0.041, respectively).

Their result indicated that although a pro-inflammatory cytokine genetic profile showed an increased risk for developing GC, the characteristics of *H. pylori* infection, in particular the status of *cagA* and *vacA* genotype distribution seemed to play a major role in GCIR variability in Costa Rica. ~ Source: World Journal of Gastroenterology

Studies done by Ohno T, Kita M, Yamaoka Y, Imamura S, Yamamoto T, Mitsufuji S, Kodama T, Kashima K, Imanishi J, from the Third Department of Internal Medicine, Kyoto Prefectural University of Medicine, Kyoto, 602-8566, Japan, found that Thirteen(13) essential oils used in this study completely inhibited the growth of *H. pylori* in vitro at a concentration of 0.1% (v/v). *Cymbopogon citratus* (lemongrass) and *Lippia citriodora* (lemon verbena) were bactericidal against *H. pylori* at 0.01% at pH 4.0 and 5.0.

Resistance to lemongrass did not develop even after 10 sequential passages, whereas resistance to clarithromycin developed under the same conditions. In *in vivo* studies, the density of *H.*

pylori in the *stomach of mice* treated with lemongrass *was significantly reduced* compared with untreated mice.

Other studies show that *consuming very small amounts of essential oils can attack infection from Helicobacter Pylori (H. Pylori)*, a common cause of stomach ulcers and even heart disease and cancer. A concentration of just 0.002% Manuka or 0.004% Cinnamon Bark essential oils can wipe out several strains of Helicobacter pylori.

Lemongrass (*Cymbopogon flexuosus*) has a light, fresh, citrus aroma with earthy undertones. Refreshing, rejuvenating, stimulating, and balancing, it inspires and improves mental clarity. Lemongrass also supports the circulatory system and has a score of 17,765 on the antioxidant ORAC scale. Research was published in the Phytotherapy Research Journal regarding the powerful properties of topically applied lemongrass.

The Industrial Technology Development Institute of the Department of Science and Technology (ITDI-DOST), through its Chemicals & Minerals Division lists lemongrass oil as a potential anti-fungal topical eye medication.

Expert studies found lemongrass oil to have strong anti-fungal properties when tested to cure keratomycosis in rabbits. Keratomycosis is the inflammation of cornea often characterized by burning or blurring of vision.

Only *organically grown sources of lemongrass* fresh dried leaves and the essential oil derived from them should be used when treat nail fungus, toenail fungus, athlete's foot, candida or other yeast infections, free from pesticides and herbicides. Pure *organic Lemongrass is considered by herbalists to have several useful properties, including antibacterial, anti-fungal, and fever-reducing effects.*



In a test-tube investigation, published in the medical journal *Microbios* in 1996, researchers demonstrated that lemongrass was effective against 22 strains of bacteria and 12 types of fungi. A study in *Phytotherapy Research* showed that lemongrass had strong anti-fungal properties when applied topically. Research suggests that it is the chemical (citral) that is responsible for the anti-fungal properties of this herb.

Lemongrass is commonly used in cooking, candy and baked goods as well as a topical treatment for *athlete's foot, nail fungus, toenail fungus, ringworm, candida, back pain and muscle soreness*. It is believed to be a central nervous system depressant and has also been used to treat *internal parasites, stomach disorders, hypertension, high cholesterol and fever*.

It is important to note that the large volume of research performed on specific anti-fungal herbs seems to correlate that more than one herb mixed together in a preparation is more synergistically effective than a single herb. The *properties of lemongrass* are *cumulative* in the body extending its protection throughout the years.

Lemongrass has many uses in folk or traditional medicine in many different cultures, and is a common home remedy for many ailments. In Nepal and India, it is used as a *sedative*, in addition to a treatment for *fever*, and an *indigenous* cure for *infectious diseases*.

The herb has been used as an external treatment for *skin complaints* like ringworm, athlete's foot and scabies. Because lemongrass has been known to control overactive oil glands, it can also be used as a toning astringent to cleanse oily skin and tighten pores. In some countries, it is used to reduce *acne, pimples and blackheads*. Lemongrass is also used as a treatment for *lice and dandruff*.

People who suffer from *nervousness, restlessness, dizziness, or stress* may find relief in a cup of lemongrass tea. You can make your own lemongrass tea by steeping two leaves in a pot of boiling water. It is also a home remedy for *fevers and colds*. Mixed with pepper, lemongrass also brings relief to menstrual problems.

Lemongrass has been known to have a *detoxifying effect* on the body's digestive system, specifically the *pancreas, liver, kidney, and bladder*. The herb *helps lower levels of uric acid, cholesterol, and other toxins* in the body and *stimulates digestion*. As a result, lemongrass can help prevent gastroenteritis and indigestion. The herb *promotes blood circulation*. People who suffer from high blood pressure may find that drinking lemongrass tea can *reduce blood pressure*.

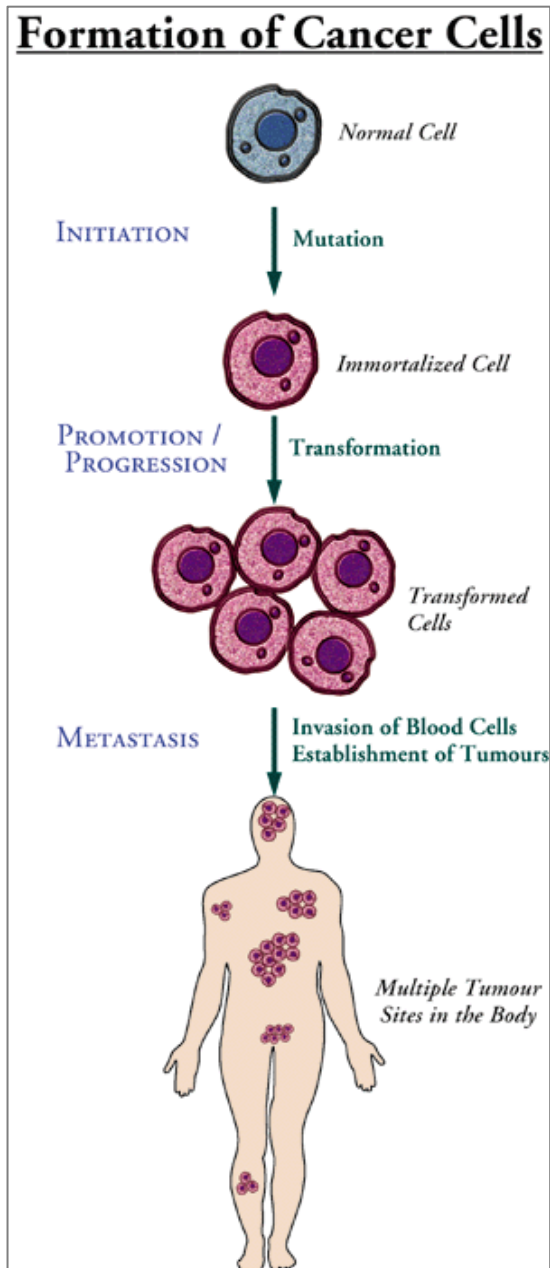
One of the most important applications of lemongrass is in the field of cancer research. Scientists are currently exploring the anti-carcinogenic properties of lemongrass.

Studies conducted on animals show that *lemongrass oil may prevent colon cancer, as well as other types of cancer*. While researchers have yet to find out what elements in lemongrass oil inhibit the growth of cancer cells, some scientists suggest that it could be because it contains citral. Citral, which is also found in lemon peels, is the substance that gives lemongrass its distinctive aroma and flavor. Citral has been found to "*relieve cramps, spasms, headaches and rheumatism*." Compared to all other plants, lemongrass contains the highest amount of citral.

Scientists at Ben Gurion University in Negev, Israel, may have found an answer. A research team led by Dr. Rivka Ofir and Prof. Yakov Weinstein, experts on Cell-Differentiation and Malignant Disease, from the Department of Microbiology and Immunology at Ben Gurion University found that citral causes cancer cells to "commit suicide" (Apoptosis) using a mechanism built in every cell called "programmed cell death".brudn53b

Mark A. Brudnak, Ph.D., ND explains how normal, non-cancer cells live a limited and constrained life. Once normal cells are formed, they have a finite number of cell divisions they undergo during their life-span and, with few exceptions; they remain relatively localized to the same point in the body during this entire process. As a cell lives and ages, it maintains an "awareness" of its surroundings via cell-cell communication molecules both on the cell surface and secreted. This allows the cells to determine if all around them is well and good and instructs them to maintain their relative positions in the body. Towards the end of a cell's designated life-span, certain cellular events occur which instruct the cell to terminate. This is called apoptosis or programmed cell death and is a very normal and useful event for clearing away the old and

making room for the new. While it may not sound like the most compassionate thing to do to old cells, the evolutionarily derived utility of such action affords the body a mechanism to remove cells which might be on their way to becoming cancer cells via mutations.



During cancer initiation stage, some mutation has to occur that results in either a loss of function or a gain of function. The key is, a mutation needs to occur and not be corrected by the usual cellular mechanism. At this point, cells will typically become described as 'immortalized'. When this occurs, the cells no longer have finite life-spans, but can live indefinitely. This allows the cancer cells to escape the process of apoptosis.

Apoptosis is the process of programmed cell death (PCD) that occurs in multi-cellular organisms. Apoptosis differs from necrosis, in which the cellular debris can damage the organism. In contrast to necrosis, which is a form of traumatic cell death that results from acute cellular injury, apoptosis confers advantages during an organism's life cycle.

Research in and around apoptosis has increased substantially since the early 1990s. In addition to its importance as a biological phenomenon, defective apoptotic processes have been implicated in an extensive variety of diseases. Excessive apoptosis causes atrophy, such as in ischemic damage, whereas an insufficient amount results in uncontrolled cell proliferation, such as cancer.

Ofir and Weinstein's team found that as little as **one gram of lemongrass** has enough citral to **cause cancer cells to "commit suicide"**. In their experiment, they grew cancerous and non-cancerous cells in a petri dish, and then treated the cells with one gram of lemongrass. The results were promising. The citral in the lemongrass killed the

cancerous cells, but did not harm the normal cells.

Even though all cancer is a multi-factorial disease, reducing any of the factors benefits cancer recovery and **lemongrass has proven to reduce some of the major cancer factors**. Therefore, lemongrass becomes **an important player for the gastric cancer population**, because it has proven to **reestablish apoptosis in cancer cells and kills *Helicobacter pylori***.