# Mango (mangifera indica) leaves extract and coconut oil as an antibacterial ointm...

Business, Industries

Mango (Mangifera indica) leaves extract and Coconut Oil as an Antibacterial Ointment AScienceInvestigatory Projectof Kristifany C. Mamba Bansud National High School-Regional Science High School for Region IV – MIMAROPA Pag-asa, Bansud, Oriental Mindoro Abstract The purpose of this study is to produce an antibacterial ointment out of Mango leaves extract and coconut oil. Young mango leaves were gathered and was chopped into small pieces. 50 mL of coconut oil was put in a frying pan. Then, the chopped mango leaves was added to the coconut oil. It was mixed for 10 minutes.

Next, the small bits of mango leaves were removed from the coconut oil. Lastly, candle wax was added to the mixture. It was stirred again thoroughly. The solution was transferred into an empty container and left to cool down. The mango leaves extract with coconut oil was tested at the Bureau of Plant Industry. It was tested against the bacteria E. coli and S. aureus. The resulting Numerical value was 2. 5 for E. coli and 3. 0 for S. aureus. The bureau used the standard parameter 1-2- slightly inhibited and 3-5 as partially inhibited. Thus, the inhibition of the mango leaves extract and coconut oil in E. oli was slight and it is partial in S. aureus. The researcher concluded that mango leaves extract with coconut oil can kill bacteria like E. coli and S. aureus. It can also be concluded that it can help wounds heal faster because of its antibacterial property. Chapter I Introduction Background of the Study The Philippines have many different herbal plants that can cure different illness like body pain, toothache, arthritis, and other diseases. The herbal plants we have contain helpful constituents and properties that can cure different kinds of diseases.

We can make useful product made from these plant and other materials. Nowadays, many herbal plants are being discovered with more uses. Many companies used herbal plants to make ointments, tablets, coffee or teas. Ointments are very useful in treating different kind of wounds. The production of ointments from herbal plants found in our country can help us minimize our dependence on the use of high – cost ointments. The herbal plant must have anti-inflammatory, anti-allergenic and antibacterial properties to produce an effective ointment.

Most of the wounds are infected by the common bacteria like Escherichia coli. As the wounds go deeper and become more complex they can infect the underlying muscles and bone causing osteomyelitis. Coliforms and anaerobes are associated with osteomyelitis in those people who have infected wounds. You also see the bacteria Staphylococcus aureus in the infected wound. Local factors that increase chances of wound infection are having large wound area, increased wound depth, degree of chronicity, the body, necrotic tissue, and mechanism of injury (bites, perforated viscus). (Neal R. Chamberlain. n. . ) The mango leaves (Mangifera indica) and coconut oil possesses antibacterial activity against different bacteria. (Research Update of Mango and Mango Leaf Extract, n. d. ). Coconut and olive oils are traditionally used to moisturize and treat skin infections. Extensive research done by scientists such as Jon J Kabara, PhD, has shown that the Lauric acid found in Coconut Oil is a potent antimicrobial agent . Lauric acid is a major component (49%) of Coconut oil. It has also been found

to kill the H. Pylori bacteria in the stomach which are responsible for many stomach problems such as ulcers.

The good thing about Lauric acid is that it doesn't kill friendly bacteria in the stomach. Antibiotics kill both good and bad bacteria in the stomach and often need to be followed with probiotics such as acidophilus bacteria to replenish friendly bacteria in the gut. Objectives General Mangifera indica leaves and coconut oil have anti-bacterial contents which can help remove the infection on the wounds. This study aimed to produce an ointment which can kill the bacteria and cure different types of wounds out of Mangifera indica leaves and coconut oil. Specific

This research study was conducted to determine if mango leaves extract and coconut oil can be made into an ointment and if it can help wound heal faster. Statement of the Problem Specifically, this study ought to answer the following questions: 1. Can the ointment made from Mangifera indica leaves extracts and coconut oil kill the bacteria in the wounds? 2. Can the Mangifera indica leaves extract and coconut oil be made into an ointment? 3. Can the ointment made from Mangifera indica leaves and coconut oil extract help the wound to heal faster? Hypothesis 1.

The ointment made from Mangifera indica leaves extracts and coconut oil can kill bacteria in the wounds. 2. The extract of Mangifera indica leaves and coconut oil can be made into an ointment for curing wounds. Significance of the Study This study greatly benefits the people in the community who cannot afford to buy expensive ointment for wounds. It can also benefit the

hospitals and in small clinics. The additional medication in curing wounds can help a lot to save a life. It has significance to those who were far from the store or drug store because they can cure our wounds without taking too long from buying ointments from far drugstores.

It can be also a source of income for the people in provinces. Scope and Limitation This study was limited only on the production of ointments from mango leaves extracts and coconut oil. The ointment produced from mango leaves extracts and coconut oil focuses on killing the bacteria in the wounds. It was limited to use if there is irritation on the skin after the application of the ointment. For the patients who have sensitive skin should ask permission from adoctorbefore using the ointment. Chapter II Review of Related Literature Review of Related Literature

Antibacterial Pertaining to a substance that kills bacteria or inhibits their growth or replication. Antibiotics synthesized chemically or derived from various microorganisms exert their bactericidal or bacteriostatic effect by interfering with the production of the bacterial plasma wall; by interfering with protein synthesis, nucleic acid synthesis, or plasma membrane integrity; or by inhibiting critical biosynthetic pathways in the bacteria. (2009, Elsevier. ) E. coli E. coli is a common type of bacteria that can get intofood, like beef and vegetables. E. oli is short for the medical termEscherichia coli. E. coli normally lives inside your intestines, where it helps your body break down and digest the food you eat. Unfortunately, certain types (called strains) ofE. coli can get from the intestines into the blood. This is a rare illness, but it can cause a very serious infection. (Steven Dowshen, MD,

August 2009) S. aureus Staphylococci (staph) are Gram-positive spherical bacteria that occur in microscopic clusters resembling grapes. Bacteriologicalcultureof the nose and skin of normal humans invariably yields staphylococci.

In 1884, Rosenbach described the two pigmented colony types of staphylococci and proposed the appropriate nomenclature: Staphylococcus aureus (yellow) and Staphylococcus albus (white). The latter species is now named Staphylococcus epidermidis. Although more than 20 species of Staphylococcus are described in Bergey's Manual (2001), only Staphylococcus aureus and Staphylococcus epidermidis are significant in their interactions with humans. S. aureus colonizes mainly the nasal passages, but it may be found regularly in most other anatomical locales, including the skin, oral cavity and gastrointestinal tract. S. ureus is often hemolytic on blood agar; S. epidermidis is non hemolytic. The bacteria are catalase-positive and oxidase-negative. S. aureus can grow at a temperature range of 15 to 45 degrees and at NaCl concentrations as high as 15 percent. Nearly all strains of S. aureus produce the enzyme coagulase: nearly all strains of S. epidermidis lack this enzyme. S. aureus should always be considered a potential pathogen; most strains of S. epidermidis are nonpathogenic and may even play a protective role in humans as normal flora. Staphylococcus epidermidis may be a pathogen in the hospitalenvironment. Pathogenesis of S. aureus infections

Staphylococcus aureus causes a variety of suppurative (pus-forming) infections and toxinoses in humans. It causes superficial skin lesions such

as boils, styesand furuncules; more serious infections such as pneumonia, mastitis, phlebitis, meningitis, and urinary tract infections; and deep-seated infections, such as osteomyelitis and endocarditis. S. aureus is a major cause of hospital acquired (nosocomial) infection of surgical wounds and infections associated with indwelling medical devices. S. aureus causes food poisoning by releasing enterotoxins into food, and toxic shock syndrome by release of superantigens into the blood stream. S. ureus expresses many potential virulence factors: (1) surface proteins that promote colonization of host tissues; (2) invasins that promote bacterial spread in tissues (leukocidin, kinases, hyaluronidase); (3) surface factors that inhibit phagocytic engulfment (capsule, Protein A); (4) biochemical properties that enhance their survival in phagocytes (carotenoids, catalase production); (5) immunological disguises (Protein A, coagulase); (6) membrane-damaging toxins that lyse eucaryotic cell membranes (hemolysins, leukotoxin, leukocidin; (7) exotoxins that damage host tissues or otherwise provoke symptoms of disease (SEA-G, TSST, ET); and (8) inherent and acquired resistance to antimicrobial agents. Membrane-damaging toxins alpha toxin (alpha-hemolysin) The best characterized and most potent membrane-damaging toxin of S. aureus is alpha toxin. It is expressed as a monomer that binds to the membrane of susceptible cells. Subunits then oligomerize to form heptameric rings with a central pore through which cellular contents leak.

In humans, platelets and monocytes are particularly sensitive to alpha toxin. Susceptible cells have a specific receptor for alpha toxin which allows the

toxin to bind causing small pores through which monovalent cations can pass. The mode of action of alpha hemolysin is likely by osmotic lysis. ?-toxin is a sphingomyelinase which damages membranes rich in this lipid. The classical test for ? -toxin is lysis of sheep erythrocytes. The majority of human isolates of S. aureus do not express ? -toxin. A lysogenic bacteriophage is known to encode the toxin. (2008 Kenneth Todar, PhD ) delta toxin is a very small peptide toxin produced by most strains of S. aureus. It is also produced by S. epidermidis.

The role of delta toxin in disease is unknown. Leukocidin is a multicomponent protein toxin produced as separate components which act together to damage membranes. Leukocidin forms a hetero-oligomeric transmembrane pore composed of four LukF and four LukS subunits, thereby forming an octameric pore in the affected membrane. Leukocidin is hemolytic, but less so than alpha hemolysin. Only 2% of all of S. aureus isolates express leukocidin, but nearly 90% of the strains isolated from severe dermonecrotic lesions express this toxin, which suggests that it is an important factor in necrotizing skin infections. (2008 Kenneth Todar, PhD ) Wound Healing

Wound healing is a complex process with many potential factors that can delay healing. There is increasing interest in the effects of bacteria on the processes of wound healing. All chronic wounds are colonized by bacteria, with low levels of bacteria being beneficial to the wound healing process. Wound infection is detrimental to wound healing, but the diagnosis and management of wound infection is controversial, and varies between clinicians. There is increasing recognition of the concept of critical

colonization or local infection, when wound healing may be delayed in the absence of the typical clinical features of infection. The progression from ound colonization to infection depends not only on the bacterial count or the species present, but also on the host immune response, the number of different species present, the virulence of the organisms and synergistic interactions between the different species. There is increasing evidence that bacteria within chronic wounds live within biofilm communities, in which the bacteria are protected from host defences and develop resistance to antibiotic treatment. (Edwards R, Harding KG Apr. 17, 2004) Bacteria and Wounds Bacteria are ubiquitous in the geography of the human body. In the skin, the averagehuman beingharbors at least 200 species of bacteria, totaling more than 1012 organisms. Therefore, when the skin is broken by trauma or disease, bacteria are also ubiquitous in wounds. When discussing the presence of bacteria in an open wound of a human host, three conditions are noted withrespectto their presence on or in the tissue, their impact on the healing of the wound, and the associated immune response from the host. The first condition is bacterial contamination or the simple existence of bacteria on the surface of the wound. Contamination is specifically defined as the presence of non-proliferating organisms on the superficial tissues. Contaminating bacteria do not elicit an immune response from the host and do not impact the healing process.

The second condition, bacterial colonization, is differentiated from contamination in that it refers to proliferating organisms on the wound surface - bacteria that have adhered to the superficial tissues and have

begun to form colonies. Colonization is also characterized by a lack of immune response from the host and generally is not believed to impact or interfere with the healing process. 2 Wounds that contain nonviable tissue (ie, slough and/or eschar) offer a particularly hospitable environment for colonization because the dead tissues provide a ready source of nutrients for the growing bacterial colonies. In the third condition, bacterial infection, proliferating bacteria are not only present on the surface of the wound or in nonviable tissue, but have also invaded healthy, viable tissue to such a depth and extent that they elicit an immune response from the host.

Local clinical signs of tissue redness, pain, heat, and swelling generally characterize this immune response, along with an increase in exudate production or purulence. Bacterial infection delays and may even halt the healing process. The mechanism of this healing delay involves competition between host cells and bacterial cells for oxygen and nutrients and increased host cell production of inflammatory cytokines and proteases in response to the bacteria and their associated toxins. (Liza Ovington, PhD, CWS, n. d) Related studies In the research update of mango and mango leaf extract, effects of a natural extract from Mangifera indica L, and its active compound, mangiferin, on energy state and lipid peroxidation of red blood cells.

Following oxidativestress, modifications of several biologically important macromolecules have been demonstrated. In this study they investigated the effect of a natural extract from Mangifera indica L (Vimang), its main ingredient mangiferin and epigallocatechin gallate (EGCG) on energy metabolism, energy state and malondialdehyde (MDA) production in a red

blood cell system. Analysis of MDA, high energy phosphates and ascorbate was carried out by high performance liquid chromatography (HPLC). Under the experimental conditions, concentrations of MDA and ATP catabolites were affected in a dose-dependent way by H(2)O(2). Incubation with Vimang (0. , 1, 10, 50 and 100 mug/mL), mangiferin (1, 10, 100 mug/mL) and EGCG (0. 01, 0. 1, 1, 10 muM) significantly enhances erythrocyte resistance to H(2)O(2)-induced reactive oxygen species production. In particular, they demonstrate the protective activity of these compounds on ATP, GTP and total nucleotides (NT) depletion after H(2)O(2)-induced damage and a reduction of NAD and ADP, which both increase because of the energy consumption following H(2)O(2) addition. Energy charge potential, decreased in H(2)O(2)-treated erythrocytes, was also restored in a dose-dependent way by these substances. Their protective effects might be related to the strong free radical scavenging ability described for polyphenols. Mango and Mango Leaf Extract, n. d. ) Mangifera indica L. extract consists of a defined mixture of components (polyphenols, terpenoids, steroids, fatty acids and microelements). It contains a variety of polyphenols, phenolic esters, flavan-3-ols and a xanthone (mangiferin), as main component. This extract has antioxidant action, antitumor and immunemodulatory effects proved in experimental models in both in vitro and in vivo assays. The present study was performed to investigate the genotoxicity potential activity of Vimang assessed through different tests: Ames, Comet and micronucleus assays. Positive and negative controls were included in each experimental series.

Histidine requiring mutants of Salmonella typhimurium TA1535, TA1537, TA1538, TA98, TA100 and TA102 strains for point-mutation tests and in vitro micronucleus assay in primary human lymphocytes with and without metabolic activation were performed. Results of Comet assay show that the extract did not induce single strand breaks or alkali-labile sites on blood peripheral lymphocytes of treated animals compared with controls. On the other hand, the results of the micronucleus studies (in vitro and in vivo) show Vimang induces cytotoxic activity, determined as cell viability or PCE/NCE ratio, but neither increased the frequency of micronucleated binucleate cells in culture of human lymphocytes nor in mice bone marrow cells under their experimental conditions.

The positive control chemicals included in each experiment induced the expected changes. The present results indicate that M. indica L. extract show evidences of light cytotoxic activity but did not induce a mutagenic or genotoxic effects in the battery of assays used. (Mango and Mango Leaf Extract, n. d. ) Anti-allergic properties of Mangifera indica L. extract (Vimang) and contribution of its glucosylxanthone mangiferin. : Vimang is the brand name of formulations containing an extract of Mangifera indica L. , ethnopharmacologically used in Cuba for the treatment of some immunopathological disorders, including bronchial asthma, atopic dermatitis and other allergic diseases.

However, the effects of Vimang on allergic response have not been reported until now. In this study, the effects of Vimang and mangiferin, a C-glucosylxanthone isolated from the extract, on different parameters of

allergic response are reported. Vimang and mangiferin show a significant dose-dependent inhibition of IgE production in mice and anaphylaxis reaction in rats, histamine-induced vascular permeability and the histamine release induced by compound 48/80 from rat mast cells, and of lymphocyte proliferative response as evidence of the reduction of the amount of B and T lymphocytes able to contribute to allergic response. In these experiments, ketotifen, promethazine and isodium cromoglicate were used as reference drugs. Furthermore, they demonstrated that Vimang had an effect on an in-vivo model of inflammatory allergy mediated by mast cells. These results constitute the first report of the anti-allergic properties of Vimang on allergic models, as well as suggesting that this natural extract could be successfully used in the treatment of allergic disorders. Mangiferin, the major compound of Vimang, contributes to the anti-allergic effects of the extract. (Mango and Mango Leaf Extract, n. d. ) Anti-inflammatory, analgesic and hypoglycemic effects of Mangifera indica Linn. (Anacardiaceae) stem-bark aqueous extract. Previous studies in their laboratories and elsewhere have shown that some members of Anacardiaceaefamilypossess antiinflammatory, analgesic and hypoglycemic effects in man and mammalian experimental animals. The present study was, therefore, undertaken to examine the antiinflammatory, analgesic and antidiabetic properties of the stem-bark aqueous extract of Mangifera indica Linn. , M. indica a member of the Anacardiaceae family, in rats and mice. The stem-bark powder of M. indica was Soxhlet extracted with distilled water and used. M. indica stem-bark aqueous extract (MIE, 50-800 mg/kg i. p. ) produced dose-dependent and significant (p <0. 05-0. 01) analgesic effects against thermally and chemically induced nociceptive pain

stimuli in mice. MIE (50-800 mg/kg i. p. ) also significantly (p <0. 05-0. 001) inhibited fresh egg albumin-induced paw edema, and caused significant (p <0. 05-0. 001) hypoglycemic effects in rats. It is suggested that the analgesic effects of MIE (50-800 mg/kg i. p. ) may be peripherally and centrally mediated. The different chemical constituents of the plant, especially the polyphenolics, flavonoids, triterpenoids, mangiferin, and other chemical compounds present in the plant may be involved in the observed antiinflammatory, analgesic, and hypoglycemic effects of the plant's extract.

However, the results of this experimental animal study lend pharmacological credence to the suggested folkloric uses of the plant in the management and control of painful, arthritic and other inflammatory conditions, as well as in the management of adult-onset type 2diabetesmellitus in some rural African communities. (Mango and Mango Leaf Extract, n. d. ) Anthelminthic and antiallergic activities of Mangifera indica L. stem bark components Vimang and mangiferin. :  This study investigated the antiallergic and anthelmintic properties of Vimang (an aqueous extract of Mangifera indica family stem bark) and mangiferin (the major polyphenol present in Vimang) administered orally to mice experimentally infected with the nematode, Trichinella spiralis.

Treatment with Vimang or mangiferin (500 or 50 mg per kg body theyight per day, respectively) throughout the parasite life cycle led to a significant decline in the number of parasite larvae encysted in the musculature; however, neither treatment was effective against adults in the gut. Treatment with Vimang or mangiferin likewise led to a significant decline in serum levels of specific anti-Trichinella IgE, throughout the parasite life

cycle. Finally, oral treatment of rats with Vimang or mangiferin, daily for 50 days, inhibited mast cell degranulation as evaluated by the passive cutaneous anaphylaxis test (sensitization with infected mouse serum with a high IgE titre, then stimulation with the cytosolic fraction of T. spiralis muscle larvae).

Since IgE plays a key role in the pathogenesis of allergic diseases, these results suggest that Vimang and mangiferin may be useful in the treatment of diseases of this type. (Mango and Mango Leaf Extract, n. d. ) Even your skin can benefit from Coconut Oil. Use it like you would any lotion. This healthy oil prevents destructive free-radical damage, and aids in the repair of the skin. Coconut oil helps remove the outer layer of dead skin cells, making the skin smoother. It keeps connective tissues strong and supple, limiting the damage caused by the sun. You can use it to protect your skin from drying, chapping, and the prevention of wrinkles.

It's one the healthiest things you can put on your skin. It is rich in lauric acid, a proven antibacterial, antiviral and anti-fungal agent. This beneficial oil builds the body's immune system, while attacking bacteria, viruses, and pathogens. It contains no trans fats (unlike vegetable oils, margarines and other shortenings). (Darlene Tabler, n. d. ) Chapter III Methodology Materials and equipments Mango leaves and coconut oil were used. Candle wax was utilized in the making of the product. The equipments used were frying pan, 2 beaker (150 ml), stirring rod and empty container. General Procedure Young mango leaves were gathered and chopped. 0 mL of coconut oil was put in a frying pan. Then, the chopped mango leaves were added to the

coconut oil. It was mixed for 10 minutes. Next, the mango leaves were removed. Lastly, the candle wax was added. It was mixed again thoroughly. It was transferred in an empty container. Testing Antibacterial property The mango leaves extract in coconut oil was brought to Bureau of Plant Industry to test its antibacterial property. Chapter IV Results and Discussion Table 1 Acc. No. | Sample| Test Organism| Inhibition| Inference| Numerical Value| SMI-10-037| Mango Leaves Extract in Coconut Oil| Echerichia coli| Resistant| Organism Resistant| 2. 5| | | S. ureus| Resistant| Organism Resistant| 3. 0| Table 1 shows that Mango Leaves Extract in Coconut Oil that has been tested on Echerichia coli gives the numerical value of 2. 5 and the sample that has been tested on S. aureus gives the numerical Value 3. 0. Using the scale 1-2 – slightly inhibited and 3-5 as partially inhibited. Chapter V Conclusion ; Recommendations Based on the result given by the Bureau of Plant Industry, the researcher can conclude: 1. The extract of Mangifera indica leaves and coconut oil can be made into an ointment for curing wounds. 2. The extract from Mangifera indica and coconut oil can be made into an ointment. 3.

The ointment made from Mangifera indica leaves extracts and coconut oil can kill bacteria in the wounds. The researcher recommends to have actual testing on open wounds and other skin diseases. Additional bacteria should have tested on the product. More laboratory test and the use of more accurate laboratory equipments were also recommended. Bibliography Bbosa, G. S. (March 2007). Antibacterial activity of Mangifera indica (L. ). Retrieved October 10, 2010 from http://api. ingentaconnect. com/ content/bsc/afje/2007/00000045/A00101s1/art00004; ssessionid=

615m49pbeqios Dow, G. , Browne, A. , and Sibbald, R. G. Infection in Chronic Wounds: Controversies in Diagnosis and Treatment. Ostomy/Wound Management. 999; 45(8): 23-40. Dowshen S. (August 2009). What Is. Retrieved December 4, 2010 from http://kidshealth. org/kid/stay_healthy/food/ecoli. html# Grolier Encyclopedia of Knowledge (1999). United States of America, Grolier Incorporated. Research Update of Mango and Mango Leaf Extract. (n. d). Retrieved August 11, 2010, from http://www. mdidea. com/products/herbextract/mangiferin/ research. html. Todar K. (2008). Staphylococcus. Retrieved December 4, 2010 from www. textbookofbacteriology. net  Williams, Y. (n. d. ). How to Make Herbal Ointment Remedies. Retrieved October 9, 2010, from http://www. unexplainable. net/artman/publish/article_ 7674. shtml