

Antioxidant And Antimicrobial Properties Of Five Medicinal

The use of natural sources of food flavors, antioxidants, antimicrobial and preservatives is considered one of the most important modern trends. Therefore, this investigation was carried out to select and study the effect of some spices suitable for this target. The acceptability of pan bread flavored with coriander fruits powdered cumin fruits powdered, or turmeric powder at different concentrations. Antioxidant and antimicrobial activities assay was designed in order to recognize the antioxidant properties of either coriander or cumin essential oils with or without turmeric powder. The effect of feeding with diet supplemented with coriander and cumin in either powder or essential oil form with or without turmeric on hypercholesterolemic, liver function enzymes, kidney function and serum glucose rats for 45 days was studied. It could be concluded that, remarkable benefits could be obtained by using these spices in their powder or essential oil forms especially in hypercholesterolemic case.

Over the past decades, honeybees have been on the decline which is brought on by many causes such as pests, microorganisms, etc. A significant pest of the honeybees includes the Varroa mite. This worldwide pest can cause severe damage to honeybees or cause destruction of bee colonies by spreading pathogenic microorganisms and devouring their host's nutrients. Previous studies have shown that a way to control Varroa is through the use of plants that express bioactive properties. Such botanical species include the Vitex lucens, also is known as Puriri. Puriri is a tree that is an endemic and native species to New Zealand, which is listed in the Rongoa M?ori or the Medical Native Plants of New Zealand. It has historically been used to treat pain in different areas of the body, improve blood and nutritional flow throughout, as well as having an antibacterial characteristic. In this study, puriri leaves were extracted using several solvents (water, ethanol and cyclohexane). A novel technique of using ultrasound was also applied for improving the aqueous extraction yield. The extracts of puriri leaves were investigated for their bioactive properties which can be used for Varroa control. The antioxidant activity was determined by three assays including total phenolic contents (TPC) assay, DPPH assay and ABTS assay. All extracts (water extract with the process of maceration, ultrasound and reflux, water extract with maceration alone, ethanol extract and lipid extract) presented antioxidant properties and high TPC value. The antimicrobial activity test was performed using the disc diffusion method and modified dilution method against bacteria such as Pseudomonas fluorescens, Enterococcus faecalis, Bacillus subtilis, Bacillus cereus, Enterobacter aerogenes, S. epidermidis and Escherichia coli. All puriri leaves extracts had a variable degree of antimicrobial activity against bacteria related to honeybee or Varroa. B. cereus also known as a food-borne pathogen, was found to be the most susceptible to all of the puriri leaves extracts. The antioxidant and antimicrobial properties of the puriri leaves extracts determined in this study offer the direction of developing the anti-Varroa products for the honeybee industry in the future.

The present study aims to investigate the chemical composition, antimicrobial activity, and mechanism of antimicrobial activity, antioxidant properties of essential oils and extracts and the effects of them when applied to minced beef samples. For this

purposes; four essential oils (bay leaf, thyme, clove and cumin), two extracts (grape seed and olive leaf) and constituents of essential oils (eucalyptol, linalool, [alpha]-terpineol and [alpha]-pinene) were subjected to related tests. Chemical characterization was complemented for all essential oils and extracts. Antimicrobial activity was examined against *Staphylococcus aureus*, *Escherichia coli* O157:H7, *Salmonella Typhimurium*, *Listeria innocua*, *Shewanella putrefaciens*, *Carnobacterium divergens* and *Serratia liquefaciens*. All tested compounds were effective on the bacteria with different concentrations. Antioxidant activity was proved by FRAP and DPPH methods. Physical disturbance and changes in the structures of bacteria was demonstrated by various techniques. The activity of two most potent essential oils (thyme and clove) was investigated in the minced meat application study. The findings represented that clove essential oil restricted the growth of *S. Typhimurium* and coliform bacteria. They did not have a significant inhibition effect on the aerobic mesophilic bacteria, total yeasts and molds and also psychrotrophic organisms. The results indicated that L^* and a^* values were maintained during the storage period. The featured effect of essential oils was antioxidant characteristic in meat application study. All treatment showed significant reduction in oxidation comparing with control. The obtained results may suggest that tested essential oils possess compounds with antimicrobial characteristic as well as antioxidant activity and therefore they can be used as natural preservatives in food especially in meat products.

Mentha (also known as mint, from Greek *míntha* (Palaeolexicon) is a genus of plants in the family Lamiaceae (mint family) (Harley et al., 2004). The species are not clearly distinct and estimates of the number of species varies (Bunsawat et al., 2004).

Hybridization between some of the species occurs naturally. Many other hybrids, as well as numerous cultivars, are known in cultivation. The genus has a subcosmopolitan distribution across Europe, Africa, Asia, Australia, and North America (Brickell et al., 1997). Mints are aromatic, almost exclusively perennial, rarely annual, herbs. They have wide-spreading underground and overground stolons and erect, square (Rose, Francis, 1981) branched stems. The leaves are arranged in opposite pairs, from oblong to lanceolate, often downy, and with aserrated margin. Leaf colors range from dark green and gray - green to purple, blue, and sometimes pale yellow. The flowers are white to purple and produced in false whorls called verticillasters.

Etilingera punicae (tuhau), of the Zingiberaceae family is an indigenous plant in Sabah which has been used as food and condiment. Phenolic extracts from different parts of tuhau, including rhizome, stem, bud and leaf were screened for potential antioxidant properties. The results suggested that several different phytochemical compounds contribute to antioxidative activity of different parts of tuhau. Four parts of tuhau extracts were screened for their antimicrobial activities against *Bacillus cereus*, *Staphylococcus aureus*, *Salmonella typhimurium* and *Pseudomonas aeruginosa* by discs diffusion assay.

IN THIS BOOK, A RESEARCH WORK IS PUBLISHED, IN WHICH SOME MEDICINAL PLANTS WERE TAKEN AND TEST THEIR ANTIMICROBIAL ACTIVITY AGAINST SOME BACTERIA AND ANTIOXIDANT ACTIVITY.

Natural products, especially those produced by edible and medicinal plant species, are currently under special investigation as food additives due to their usefulness, accessibility and non-toxic nature. The present study was designed

to evaluate the antimicrobial and antioxidant properties of *Psidium guajava* L. leaves. *P. guajava* exhibited a broad-spectrum antimicrobial activity since it was active against all Gram positive bacteria, Gram negative bacteria and fungi thus supporting folkloric use in the treatment of some infectious diseases caused by pathogenic microorganisms. A strong correlation was observed between antioxidant activity and total phenol content. Among the different solvent extracts and fractions, the acetone extract was the most potent extract, even better than that of the standard. The results obtained indicate the strong antioxidant properties of the *Psidium guajava* which may be attributed to the presence of high phenolic content. Therefore, it is worthwhile to consider the utilization of this plant for the production of functional food ingredients or phytochemicals for medicinal exploration.

In the traditional system of medicine, the plant is being used as diuretic and anthelmintic, antidiabetic, expectorant and in the treatment of lithiasis. The plant is used for arresting haemorrhage during pregnancy, burn healing, as an anti-inflammatory, headache, skin diseases to dissolve kidney and gall bladder stones. Bacterial pathogens have evolved numerous defence mechanism against antimicrobial agents hence resistance to old and newly produced drugs is on the rise. The phenomenon of antibiotic resistance exhibited by the pathogenic minor has led to the need for screening of several medicinal plants for their potential antimicrobial activity. In the present study various extracts *Aerva lanata* were tested against pathogens of UTI & RTI (*Staphylococcus aureus*, *Pseudomonas* sp, *E. coli*, *Klebsiella* sp.) Among the organism tested *Staphylococcus aureus*, *E. coli* showed the maximum clear zone with Aqueous extract followed by the *Pseudomonas* sp, *Klebsiella* sp, phytochemical analysis revealed the presence of sterols, saponins, glycosides phenols and resins. The phytochemicals were separated by paper chromatography and identification based on R_f values. Antioxidant array was also carried out and found to possess antioxidant potential. This study will aim the clinician to prescribe adequate treatment for urinary tract and respiratory tract infections.

Microbial safety of fresh fruits and vegetables is an increasing concern with any possible recall or outbreaks negatively affecting the entire industry. The interest in the development of active packaging has recently been steadily increasing due to significant concerns about environmental pollution caused by non-biodegradable packaging materials and consumer demand for high quality food products. Newly developed packaging materials and methods often have additional functional properties, such as antioxidant and antimicrobial properties. In our study, the chitosan-gallic acid edible films and chitosan-essential oil coatings with antimicrobial activity, as well as active packaging with chlorine dioxide sachet were developed. The results show that the incorporation of gallic acid significantly increased the antimicrobial activities of the films against *Escherichia coli*, *Salmonella typhimurium*, *Listeria innocua* and *Bacillus subtilis*. Inclusion of 0.5 g/100 g gallic acid also significantly improved the mechanical and

physical properties of chitosan film. For the chitosan-essential oil coatings, a combination of & ge; 0.1% CAR or & ge; 0.2% ECIN with a chitosan coating effectively reduced softening of fresh berries and decay by inhibiting microbial growth. The effect of chlorine dioxide (ClO₂) gas on the safety and quality of blueberries was also studied and the results show that ClO₂ treatment in active packaging improved the microbial safety of blueberries and reduced decay during storage without impairing the firmness.

Fish processing byproducts account for a large percent of the weight of total catch. These byproducts can be used for a variety of purposes including gelatin extraction. Gelatin has numerous food and pharmaceutical applications. However, bovine gelatin has traditionally been used for most applications due to its superior properties. Fish gelatin is being reexamined as gelatin source for food applications due to concerns (prion contamination and cultural restrictions) associated with bovine gelatin. This research is focused on improving fish gelatin properties and demonstrating additional uses for fish gelatins by developing antioxidant and antimicrobial films. First objective involved the development of trout (*Oncorhynchus mykiss*) skin gelatin films with epigallocatechin gallate (EGCG) (50 and 250 ppm) and green tea powder (1% and 20% wt/wt of gelatin). Films were tested for physical properties, in vitro antioxidant activity and effect on stabilizing cod liver oil held at 40°C for 20 days. Antioxidant activity was retained in films containing green tea powder, but was reduced (P

Plant essential oils have been used for centuries in the preparation of cosmetic fragrances and food flavors, as well as in traditional medicines as therapeutic remedies. In recent years they have been attracting the renewed interest of both the scientific community and the general public. Their use in different aspects of human life is generally regarded as being part of a healthier, natural-oriented life style. On the other hand, a wealth of scientific studies has been documenting their biological properties, particularly associated with their antimicrobial and antioxidant activities, although additional medicinal properties have also been brought to light. This book offers an up-to-date examination of scientific literature on the antimicrobial and antioxidant activity of main dietary essential oils from all over the world, together with a general introduction to their chemistry, classification, bio-synthetic origin, preparation and analysis. (Imprint: Nova)

This book discusses the scope and limitations of the antimicrobial and antioxidant properties of foods as medicines or medicinal coadjuvants in traditional Indian herbal therapies. The first chapter introduces readers to the relevance of the Ayurveda system, its holistic classification approach, applications of selected herbs and the demonstrable efficacy of herbal extracts in terms of antimicrobial susceptibility. In turn, the second chapter discusses the antimicrobial properties and kinetic mechanisms of inhibition ascribed to selected vegetable extracts. The third chapter addresses the antioxidant power of phenolic compounds from vegetable products and herbal extracts. The book closes with a review of natural antioxidant agents' role in the treatment of metabolic disorders. Written from an Indian perspective, this book unravels the chemistry of the traditional Indian diet and its impact on health. Further, it can serve as a reference for other traditional products with similar health claims.

A guide to the use of essential oils in food, including information on their composition, extraction methods, and their antioxidant and antimicrobial applications Consumers' food preferences are moving away from synthetic additives and preservatives and there is an

increase demand for convenient packaged foods with long shelf lives. The use of essential oils fills the need for more natural preservatives to extend the shelf-life and maintaining the safety of foods. Essential Oils in Food Processing offers researchers in food science a guide to the chemistry, safety and applications of these easily accessible and eco-friendly substances. The text offers a review of essential oils components, history, source and their application in foods and explores common and new extraction methods of essential oils from herbs and spices. The authors show how to determine the chemical composition of essential oils as well as an explanation of the antimicrobial and antioxidant activity of these oils in foods. This resource also delves into the effect of essential oils on food flavor and explores the interaction of essential oils and food components. Essential Oils in Food Processing offers a: Handbook of the use of essential oils in food, including their composition, extraction methods and their antioxidant and antimicrobial applications Guide that shows how essential oils can be used to extend the shelf life of food products whilst meeting consumer demand for "natural" products Review of the use of essential oils as natural flavour ingredients Summary of relevant food regulations as pertaining to essential oils Academic researchers in food science, R&D scientists, and educators and advanced students in food science and nutrition can tap into the most recent findings and basic understanding of the chemistry, application, and safe use of essential oils in food processing.

Antioxidant and Antimicrobial Properties of Hibiscus Rosa-Sinensis
Antioxidant and Antimicrobial Properties of Alkylresorcinols
Indian Herbal Medicines
Antioxidant and Antimicrobial Properties
Springer Nature

Essential oils can be used as antibacterial additives and are generally recognized as safe. *Coleus zeylanicus* is one of the medicinal aromatic plant serves as a source of essential oils. Antimicrobial and antioxidant activities of essential oils obtained from the control and salinity stressed *Coleus zeylanicus* plant was investigated in the present study. Essential oils from the control and salinity stressed *Coleus zeylanicus* plant was extracted using Clevenger apparatus. The composition of essential oils was identified using gas chromatography mass spectrometry, which showed a few compounds expressed differentially. The antibacterial activity of the isolated essential oils was studied by using the agar well diffusion method, showing potent inhibitory activity against *Staphylococcus aureus*, *Escherichia coli* and *Pseudomonas aeruginosa*. The antioxidant and antimicrobial constituents of the essential oils were spotted using the bioautography method, revealing that the antioxidant and antimicrobial properties in the essential oils of *Coleus zeylanicus* were increased upon exposure to salinity stress.

Antimicrobial and antioxidant activities of nine species of microalgae have been determined to study its potential as healthy ingredients for functional foods. In order to determine the antioxidant capacity, two different techniques have been used. Firstly, a colorimetric test was carried out in order to detect the presence of lipophilic and hydrophilic antioxidant compounds, this method is based on the detection of the radical ABTS⁺, which is produced by the oxidation of ABTS in the presence of potassium persulfate, detection of the radical ABTS⁺ decreases in the presence of antioxidant compounds. Also the ORAC test was also applied for this purpose. Results with both methods showed very promising results for *Rhodomonas lens*. Thus this species was chosen to develop a functional cheese and study the healthy properties that the microalgae confer on it. To determine the antimicrobial activity five food-borne pathogenic strains were used: *Escherichia coli* CECT 516, *Enterococcus faecalis* CECT 481, *Listeria monocytogenes* CECT 935, *Salmonella enterica* CECT 4594 and *S. aureus* CECT 435. First, extracts of different polarity were obtained from microalgae. From each species, 4 extracts were obtained using different solvents of higher to less

polarity (MilliQ Water, ethanol, ethyl acetate and hexane). The use of these solvents is common in the preparation of plant extracts, since they ensure the solubility of most of the compounds of interest and do not show toxicity after evaporation to determine the antimicrobial activity. The agar diffusion technique was used and the plates were kept refrigerated at 4 °C for 1 h to allow the extracts to diffuse through the agar and subsequently incubated at 37 °C for 24 h to allow microbial growth. After that time the presence of inhibition halos was observed around the perforations of the plates. Results showed that the ethanolic extract presented more antimicrobial activity than the extracts using MilliQ Water, ethyl acetate or hexane. Salmonella was not inhibited by any of the extracts studied.

The pioneering guide on the design, processing, and testing of antimicrobial plastic materials and coatings. The manifestation of harmful microbes in plastic materials used in medical devices and drugs, water purification systems, hospital equipment, textiles, and food packaging pose alarming health threats to consumers by exposing them to many serious infectious diseases. As a result, high demand for intensifying efforts in the R&D of antimicrobial polymers has placed heavy reliance on both academia and industry to find viable solutions for producing safer plastic materials. To assist researchers and students in this endeavor, *Antimicrobial Polymers* explores coupling contaminant-detering biocides and plastics—focusing particular attention on natural biocides and the nanofabrication of biocides. Each chapter is devoted to addressing a key technology employed to impart antimicrobial behavior to polymers, including chemical modification of the polymers themselves. A host of relevant topics, such as regulatory matters, human safety, and environmental risks are covered to help lend depth to the book's vital subject matter. In addition, *Antimicrobial Polymers*:
Discusses the design, processing, and testing of antimicrobial plastic materials
Covers interdisciplinary areas of chemistry and microbiology
Includes applications in food packaging, medical devices, nanotechnology, and coatings
Details regulations from the U.S. (FDA and EPA) and EU as well as human safety and environmental concerns
Achieving cleaner and more effective methods for improving the infection-fighting properties of versatile and necessary plastic materials is a goal that stretches across many scientific fields. *Antimicrobial Polymers* combines all of this information into one volume, exposing readers to preventive strategies that harbor vast potential for making exposure to polymeric products and surfaces a far less risky undertaking in the future. Extracts of plants are more safe and their toxicity is not a big problem, hence they could be exploited as nutritional supplements and antioxidant additives. The present study revealed that the consumption of the extracts of *Atropa Belladonna* and *Matricaria Chamomilla* medicinal plants could exert a number of valuable effects by virtue of their effective antioxidant and antimicrobial potential. Both the plants tested during the present work showed good antioxidant as well as antimicrobial activity, so these medicinal plants can be potential new sources of natural antioxidants.

The present work describes the investigation of extracts of the leaves and stem bark of *F. exasperata* for anti-inflammatory, anti-oxidant and antimicrobial activities as suggested by folklore medicine. It also describes the isolation and characterisation of the bioactive principles from *F. exasperata*. Anti-inflammatory activities of the extracts and isolates were investigated using the carrageenan-induced foot pad oedema model in the seven-day old chicks. Antioxidant protocols used included the DPPH scavenging,

linoleic acid lipid peroxidation and ferric reducing power assays. The agar well diffusion and micro-dilution assays were used in the antimicrobial studies. The active principles were isolated by using column and thin layer chromatographic techniques and characterised by their NMR spectra data. The stem bark extract showed considerable anti-inflammatory, antioxidant and antimicrobial activities. Bergapten and oxypeucedanin hydrate, isolated from the stem bark, sitosterol and sitosterol-3-O-beta-D-glucopyranoside, isolated from the leaves contributed to the bioactivities of *F. exasperata*. The compounds were being isolated for the first time in the plant *Withania somnifera* is an important medicinal plant traditionally used in the treatment of many diseases. *W. somnifera* leaves, fruits and roots have strong DPPH radical scavenging activities and antioxidant properties as well as antibacterial activity. *W. somnifera* is a plant with strong therapeutic properties thus further supporting its traditional claims. All major parts of *W. somnifera* such as the roots, fruits and leaves provide potential benefits for human health because of its high content of secondary metabolites especially phenolic compounds, flavonoids, ascorbic acids and anthocyanin as well as antioxidant and antimicrobial activity. *W. somnifera* leaves contain the highest amounts of polyphenols specially catechin which has promising medicinal and pharmacological value.

Meager data are available on the biological activity of *Leea philippinensis*, an endemic tree in the Philippines. Hence, this study was done to investigate the in vitro antioxidant and antimicrobial activities of polyphenolic constituents of *L. philippinensis*. An ethnomedicinal survey revealed that this plant has been used occasionally for treatment of inflammation, rheumatism and flatulence. Soxhlet extraction with increasing order of polarity of solvents (hexane, chloroform, ethyl acetate, acetone, and methanol) yielded acetone and methanol extracts with the highest total phenolic content (83.48 mg and 41.71 mg of Gallic Acid Equivalent (GAE)/g of dry weight, respectively) and total flavonoid content (87.13 mg and 83.03 mg of Quercetin Equivalent/g of dry weight). These crude extracts showed strong DPPH (1-1' diphenyl 2-picrylhydrazyl) scavenging activity but nephrotoxic at a dose of 2000 mg/kg. Acetone and methanol extracts were further separated using silica gel column chromatography with eluents hexane, hexane: acetone (1:1), acetone, acetone: methanol (1:1) and methanol. Corollarily, acetone fractions no. 9, and no. 10 and methanol fractions no. 7 and no. 8 gave the highest polyphenolic content. They exhibited dose-dependent response with IC ...

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