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Evaluation of anti-inflammatory action of Laurus nobilis-an in vitro study

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ABSTRACT

Bay leaf is also called as Laurus nobilis an aromatic evergreen tree or large shrub with green, glabrous leaves, in the flowering plant family Lauraceae. It is native to the Mediterranean region and is used as a bay leaf for seasoning in cooking. Its common names include bay laurel, sweet bay, bay (esp. United Kingdom) true laurel, Grecian laurel, laurel tree or simply laurel. Bay leaf refers to the aromatic leaves of several plants which are used in cooking for their distinctive flavour and fragrance. It has many medicinal properties which can also be used to treat cancer as well as gastric problems. Bay leaf is also commonly used to treat muscles and joint pain. Aqueous extracts of bay laurel can also be used as astringents and even as a reasonable salve for open wounds. The anti-inflammatory activity of bay leaf was determined but its ability to inhibit protein denaturation where denaturation of proteins is a well-documented cause of inflammation. The anti-inflammatory effect of the herb was comparable to reference analgesics and non-steroid anti-inflammatory drugs. The present study makes the herb worthy of further investigation

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INTRODUCTION

Laurus nobilis L. (Lauraceae), Laurel, an evergreen tree or shrub is cultivated in many temperate and warm parts of the world, particularly in the countries bordering on the Mediterranean basin (Olivera Politeo, Mila Juki, *et al.,*). Laurus nobilis Linn (Lauraceae) is a hardy evergreen tree that grows wild or cultivated. Laurus nobilis have been used for their astringent, carminative, diaphoretic, digestive, diuretic, emetic and stomachic properties. Bay oil or oil of bays (oleum Lauri)is used in liniments for bruising and sprains (Shivananda Nayak, Poorna Nalabothu *et al.,*). Laurus nobilis L. Is an aromatic plant frequently used as a spice in Mediterranean cookery and as a traditional medicine for the treatment of several infectious diseases (C. Ramos, B. Teixeira *et al.,*2012). The bark is smooth and reddish brown, and the leaf is lanceolate and leathery with shiny upper sides and matted undersides. They have a pleasant smell and a bitter taste.

Dried leaves, also called sweet bay are a highly esteemed flavouring material in culinary. Preparations (soups, fish, ragouts), especially in Dalmatian and French cuisines. Wilted and dried leaves indeed are strongly aromatic and can be stored for months. Its dried fruit (berries) can also be employed as a flavouring agent in the cuisine. Leaves and essential oil obtained from leaves increase gastric fluid secretion and act against digestive disorders such as flatulent colics (Hisashi Matsuda, Hiroshi Shimoda *et al.,* 2002). Laurus nobilis L. (laurel) leaves are frequently used as a spice for cooking purposes. Folk medicine in many

countries uses the infusion of the plant in stomachic and carminative remedies, as well as for the treatment of gastric diseases. (Stefano Dall'Acqua, Rinaldo Cervellati *et al.,*) Essential oil, distilled from leaves, has bactericidal and fungicidal properties (M. Tiziana Baratta, H. J. Damien Dorman *et al.,*). Bay leaf has been used as herbal medicine and has a pharmacological activity which includes anti-oxidant, anti-bacterial, anti-fungal, anti-diabetes and anti-inflammatory effects (FangFang, ShengminSang *et al.,* 2005). An antioxidant is a molecule that inhibits the oxidation, a chemical reaction that can produce free radicals. In turn, these radicals can start chain reactions causing damage or death to the cell. Free radicals can cause "oxidative stress," a process that can trigger cell damage (Saraswathy Meena). Oxidative stress is damage to cell structure and cell function by overly reactive oxygen-containing molecules and excessive chronic inflammation. Oxidative stress seems to play a significant role in many human diseases, including cancers (Sunanda Rao and Hafsa)Bay laurel was not only used in ceremonies and rituals in the past but also as herbal medicine. Hippocrates used all parts of the plant as a remedy for a variety of ailments, both internally and externally.

Non-steroidal anti-inflammatory drugs are drugs reduce inflammation and relieve fever and pain by blocking enzymes and proteins made by the body. NSAIDs such as ibuprofen and naproxen block a protein called prostaglandin. NSAIDs are strong medicines. The actions they take in the body to help one condition can cause problems in other ways. NSAIDs may increase the risk of heart attack, stroke, skin reactions and serious stomach and intestinal bleeding. These risks are greater if taken NSAIDs at higher doses or for longer periods than recommended. Some available anti-inflammatory drugs are aspirin, diclofenac, ibuprofen, oxaprozin etc. The side effects of commercially available drugs: nausea, vomiting, diarrhoea, constipation etc. Advances of using herbal anti-inflammatory are they have no side effects. The human body's natural response to injury results in inflammation-induced pain, swelling, and erythema. In order to reduce pain, anti-inflammatory agents such as NSAIDs act on the multiple inflammatory pathways, which, although often very effective, can have undesirable side effects such as gastric ulceration and, infrequently, myocardial infarction and stroke. For centuries, natural anti-inflammatory compounds have been used to mediate the inflammatory process and often with a fewer side effect. Ongoing experiments and clinical trials are being continued to guide and provide their scientifically based effectiveness to reduce inflammation and promote wellness.

Bay laurel is mostly used as a pain remedy for thematic conditions and against ailments related to the upper part of the digestive tract. The herb is also used for flu, bronchitis and to stimulate appetite by increasing the secretion of digestive fluids. Bay laurel contains substances known to relieve pain associated with a migraine. It has been used externally as a compress on bruises and sprains and as a remedy for dandruff. Bay laurel has insect repellent properties, and the dried leaves can be used in potpourris in order to keep insects at bay.

MATERIALS AND METHODS

The reaction mixture (0.5ml) consisted of 0.45ml bovine serum albumin (5% aqueous solution) and 0.05ml of the methanol extract of turmeric (100-500µg/ml). pH was adjusted to 6.3 using a small amount of 1N HCl. The samples were incubated at 37°C for 20min and then heated at 57°C for 3min. After cooling the samples, 2.5ml phosphate buffer saline (pH 6.3) was added to each tube. Turbidity was measured spectrophotometrically at 660nm. For control tests, 0.05ml of distilled water was used instead of extracts while product control tests lacked bovine serum albumin. The percentage inhibition of protein denaturation was calculated as follows.

Percentage inhibition = 100 – ((O.D of test – O.D of product control)/O.D of Control) x 100

The IC50 value was defined as the concentration of the sample extract to inhibit 50% of protein denaturation under the assay condition.

RESULTS

Denaturation of proteins is a well-documented cause of inflammation. The anti-inflammatory activity of the extract was studied by its ability to inhibit protein denaturation. It was effective in inhibiting heat induced albumin denaturation at a different concentration as shown in table 1. The maximum inhibition, 74.56±1.65 was observed at 500mg/ml. Ic50 value was found to be 350.0±1.00mg/ml. An aspirin a standard anti-inflammatory drug showed the maximum inhibition, 77.12±1.42% at the concentration of 200mg/ml.

DISCUSSION

Currently, a search of new plant compounds possessing anticancer and antioxidant activity is a vital area of research in plant medicine, as plant products are safe and relatively low of cost (Madhusudhanan N., Vidya Ignatius and Lakshmi T). A novel estimate suggests that, in many

Table 1: Evaluation anti inflammatory action

Sample concentration (µg)	Percentage activity %	Control (Aspirin) Concentration (µg)	Percentage activity %
100	10.35 ± 1.02	50	17.97±0.50
200	29.25 ± 2.15	100	32.68±0.57
300	41.25 ± 1.55	150	47.39±1.50
400	60.23 ± 1.35	200	63.07±1.49
500	74.56 ± 1.65	250	77.12±1.42
Ic_{50} (µg/ml)	350.0 ±1.00	Ic_{50} (µg/ml)	160.7±0.50

Values are means of three independent analyses of the sample ± standard deviation (n = 3).

Developing countries people depend on traditional practitioners and medicinal plants to meet primary health care needs (Sriram S. and Lakshmi T. 2011). Laurus nobilis L. belongs to the family Lauraceae, which comprises numerous aromatic and medicinal plants (Ould Yerou Karima1 *et al.,* 2016). Laurus nobilis L. native to Mediterranean regions is also known as sweet bay, bay laurel, Grecian laurel, true bay, and bay. The dried leaves are used extensively in cooking, and the essential oil is generally used in the flavourings industry (Ferreira A, Proença C, *et al.,* 2006). The use of herbs and spices in food is steadily increasing (Sloan, 2005), especially since consumers have questioned the use of the synthetic antioxidants butylated hydroxytoluene (BHT) and butylated hydroxyanisole (BHA) in food products (Madsen & Bertelsen, 1995) (Konczak, I., Zabaras, D).Inflammation is the body's first response to infection or injury and is critical for both innate and adaptive immunity. It can be considered as part of the complex biological response of vascular tissues to harmful stimuli such as pathogens, damaged cells, or irritants.

The plant Laurus nobilis did contain anti-inflammatory action. According to table 1, the maximum inhibition was found to be around 74.56±1.65 for 500 µg/ml. It showed an IC50 value of about 350.0±1.00. Aspirin is also known as acetylsalicylic acid, which is a common medication used to treat pain, fever or inflammation. Aspirin is also used as a long term drug to help prevent heart attacks, ischaemic strokes, and blood clots in people at high risk. It may also decrease the risk of certain type of cancers, particularly collateral cancer (Patrignani, P; Patrono 2016). Aspirin showed maximum inhibition of about 77.12±1.42 in 250 µg/ml. It had an IC50 160.7±0.50. Aspirin is used as an anti-inflammatory agent both acute and long-term inflammations as well as for treatment of inflammatory diseases, such as rheumatoid arthritis (Thea Morris, Melanie Stables *et al.,* 2009). Aspirin is a non-steroidal anti-inflammatory drug (NSAID) and works similar to other NSAIDs but also suppresses the normal functioning of platelets.

Though aspirin is a drug which is used most commonly to treat various inflammatory diseases, it is also known to cause various problems and many side effects to the human body. One common adverse effect is an upset stomach. More significant side effects include stomach ulcers, stomach bleeding, and worsening asthma. Many guidelines recommend long term use of aspirin for prevention of cardiovascular events among patients with prior cardiovascular diseases or multiple risk factor (Edward S. Huang *et al.,*). However, aspirin is associated with an increased risk of major gastric intestinal bleeding (N Engl J). Prolonged use of this could lead to various other problems and diseases, whereas bay leaf is a commonly available herb and is often used for cooking purposes. Bay leaves (Laurus nobilis L., Family: Lauraceae) are traditionally used orally to treat the symptoms of gastrointestinal problems, such as epigastric bloating, impaired digestion, eructation, and flatulence (M. Elmastas İ. GülçinÖ *et al.,* 2006). Bay leaf has a lot of chemical properties that are useful in medical and basic materials in dentistry. It can be used to treat hypertension, diabetic mellitus, diarrhoea, gastritis, drunks and skin diseases (Agus Sumono and Agustin Wulan Sd 2008). The plant has other effects such as diuretic and analgesic effect (Itami p, Tim Lentera. 2005). The bay leaf plant contains a lot of chemical properties. The chemical properties include Tanine, flavonoid and essential oil, including citric acid and Eugenol (Dalimartha s. Salam 2005). Bay leaf extract is usually used to stop diarrhoea, gastritis, diabetes mellitus, itch, astringent, and scabies (wijayakusum H. 2005). Bay leaf can also be used to treat patients with high acid. New research describes that infuse of bay leaf in 0.5 mg dose can increase the excretion of Uric acid in urine of Wistar male rat (Apriono DK, Devi WAF, Agustin WSD. 2008). Therefore compared to other synthetic drugs, bay leaf has very less side effects and can be used in the treatment of various diseases. Due to its easy availability and it is cost efficient, it is easily available and can be used by people of all ages.

CONCLUSION

Recently, a lot of exploitation on natural sources is used as an alternative therapy. Because the side

effects are less than synthetic drugs, one of the natural sources used is a bay leaf or Laurus nobilis. The laurus Nobilis does contain anti-inflammatory properties. It contains very less side effects when compared to other synthetic drugs, which over prolonged use can cause damage to the human body and lead to several other diseases. This research can help us in devolving a drug which is less harmful to the humankind and can be used in the treatment of various diseases and prevention.

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