



## REVIEW : PHYTOTHERAPY ALTERNATIVES IN VETERINARY MEDICINE

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### ABSTRACT:

Background: Ailments caused by bacteria, virus, fungus and parasite in small-scale and industrial livestock are becoming serious global health concern in Veterinary science. This ailments in animal can be cured with various classes of antibiotics, including beta-lactams, sulphonamide, aminoglycosides and macrolides. But overexpose to allopathic antibiotic led to antimicrobial resistance in infectious agent.

Purpose: This review will provide invaluable information regarding the different types of metabolic diseases, microbial infection in animal and their alternative treatment with phytotherapeutic agents classified by their mode of action.

Method: We reviewed antibacterial, antiviral, antiprotozoal, antioxidant & antineoplastic property of different plant & plant containing substances.

Result: Recent studies have revealed dietary herbal medicine containing phytochemical compound are effective and viable alternatives to pharmaceuticals because they are low-cost, effective, non-resistance-forming, inexhaustable, and economically friendly.

Conclusion: This review summarizes the available reports and evidence which support the use of plant and plant containing compounds for treatment of ailments.

**Keywords:-** Phytomedicine, mode of action, therapeutic effects.

### INTRODUCTION :

Phytotherapy (from the Greek word phyton, which means plant, & therapeia, suggests treatment) means the treatment & interference of diseases with plants, plant constituents & medicines containing these.

Herbal medicines have been in use since earlier trendy medicine existed. Observers of teams of wild monkeys, horses & carnivores have reported that these animals fastidiously eat certain plants or herbs to relieve issues, like parasites or alternative enteral diseases. Prior to the medieval witch hunt, the principal form of treatment in case of illness depend on the oral & written traditional knowledge of herbs. Subsequently allopathic medicines were fully

taken over the traditional medicine. The allopathic medicine can heal a wide range of diseases, but its high cost & occasional side effects are causing people to return to herbal medicines (Kala, C.P. 2005).

Overexploitation use of allopathic antibiotic flourished antibiotic resistance in human further as in animal, for exploitation of plant in treatment, that accommodate phytotherapeutic characteristics helps to scale back the risk in antibiotic resistance. The World Health Organization (WHO) has conjointly accepted the importance of ancient medication & has created ways, pointers & standards for herbal medicines. Certified agro-industrial technologies would like to be applied to the cultivation & process of healthful plants and the manufacturer of herbal medicine. In

India nearly 15-20 percent of the Ayurvedic medication is primarily based on animal derive substance. Seventy three percent of the population practices agriculture & animal farming as their main profession. These farmers are faced with several restrictions that limit the productivity of their animals.

Indian pharmacopoeia (IP) is an official regulatory document meant for overall quality control & assurance of pharmaceutical products marketed in India & thus, co-operating to the safety, efficacy, & cost-effective of medicines. IP is published by the Indian Pharmacopoeia Commission on fulfilment of the requirement of the Drug & Cosmetics Act 1940 & Rules 1945 under it. It contains a number of carefully chosen herbal monographs, extracts & formulations. Each monograph of a herb in the IP specifies the botanical name according to the binomial system of nomenclature, specifying the genus, species, diversity, & the quality specification. Medicinal herbs carry a vast range of pharmacologically active components & each herb has its own unique combination & characteristics. Many herbs (whole plant) contain ingredients which have various effect that are combined in the one medicine. It would be appropriate to weigh the risk-benefit ratio based on the scientific evidence & experience of a prescriber while prescribing such herbal medicines in the interest of animal health.

Phytopharmaceutics usually have broad-spectrum effect & less undesirable effects than the single substances. Therefore they are especially suitable for long-term treatment in chronic diseases, in geriatric & convalescent patients, for follow-up treatment, & in the prophylaxis of infectious, degenerative & metabolic diseases.

Furthermore they can be combined as supportive therapy for use with synthetical medicines. Partly they have effects, that are rarely elicited by synthetic medicines, such as antiviral, immune modulating or hepatoprotective effects. Furthermore for large animal practice the fact is of importance, that phytopharmaceutics seldom cause tissue-residues of legal interest & do not need any withdrawing periods.

Herbal remedies have been used by animal owners & veterinarians, however, the scientific based, species oriented veterinary phytotherapy is still in the stage of development. For these reason it is partly required to adapt the extensive knowledge of human medicine phytotherapy research for veterinary practice. Herbal medicinal products are occasionally used in eye & ear infections as well as in ecto- and endoparasitoses but more often in diseases of the liver, joints, kidney, heart & skin. Generally, phytodrugs are more commonly applied in chronic diseases as well as secondary treatment, wherein the time of treatment usually exceeds one month.

Approved indications for phytotherapy are respiratory diseases (secretolytics, secretomotoric), gastrointestinal disorders (spasmolytics, carminative, laxatives, antidiarrhoeics, therapeutics for ulcers), eczemas, dermatosis, treatment of wounds (cleaning of wounds, stimulating granulation), liver-bilious insufficiency (cholagogues, cholagogues), disorders of the cardiovascular system, overstraining of the locomotor system, convalescence (stomachics, roborants), mucosal inflammations, inflammations of the urogenital tract as well excitement conditions (sedatives). In equine & small animal practice phytotherapy meets the excess demand of animal-owners for “natural”, gentle treatment methods.; the

absence of withdrawing times is of importance in large animal practice.

### ***Moringa oleifera* ( Drumstick tree)**

*Moringa oleifera* is often called the "drumstick tree". Some common names contain horseradish, ben oil tree, or benzoil tree. Some parts of the moringa tree (leaves, pods, seeds, flowers, fruits and roots) are eaten as food and some are considered as a tree. *Moringa oleifera* is a fast-growing tree. Flowering begins in the first six months after planting. The fruit is a watery, three-sided brown color, 20-45 cm in size and contains dark brown seeds, about 1 cm in diameter. The seeds have three small, white wings, which are responsible for the smooth and air distribution of the seeds. The Moringa leaves are a highly nutritious and non-edible source of freshly cooked, cooked or stored powdered and approved for nutritional and therapeutic use in many developing parts of the world. Moringa has great potential to increase nutrition and support the immune system of poultry and animals. Seeds are eaten raw or dried. Moringa seeds contain a high percentage of sweet oil (30-40% of seed weight) and contain about 76% polyunsaturated fatty acids that can regulate cholesterol. *Moringa oleifera* leaves and seeds are a source of protein, iron, calcium, ascorbic acid vitamin A and antioxidant compounds such as carotenoids, flavonoids, vitamin E and phenolics. *Moringa oleifera* leaves can be used as a feed additive, to improve feed and livestock performance, or as a substitute for conventional plants to achieve more economically viable, natural and safe production. Bose., 2004 reported that moringa tree bark has toxic profiles due to its alkaloid content and hypotensive moringinine. The phytate content in *M.oleifera* leaves is about 3.1% which can reduce mineral availability in monogastrics. This plant can be dangerous if eaten too often or in large quantities. Therefore, it has been suggested that

more attention should be paid to how the plant is used in food.

### **MECHANISM OF ACTION & THERAPEUTIC EFFECT**

One of the most important diseases of poultry is avian coccidiosis and it is responsible for many deaths worldwide. The use of anticoccidial medication is the main way to control the disease; however, herbal remedies can be used as a remedy for coccidiosis in chickens. Ola-Fadunsin *et al.*(2013) examined the effectiveness of *M.oleifera* acetone release (1.0 to 5.0 g / kg body weight) against avian coccidiosis and found a direct effect on naturally infected chickens and mixed *Eimeria* species compared with poor control (untreated group) and good control (treated with toltrazuril, 7 mg / kg BW). The anticoccidial activity of *M.oleifera*, treated as a powdery mildew, as a prophylactic, or as an ethanolic extract, may be related to *M.oleifera*'s antioxidant properties (ascorbic acid, flavonoids, phenolics and carotenoids). These compounds prevent the formation of oocysts in the faeces, providing cellular protection against oxidative stress and reducing the severity of *E.tenella* infections by altering the level of peroxidation of intestinal lipid.

Allen *et al.*(1997) examined the antioxidant effect of ethanol extraction of *M.oleifera* leaf and fruit. After infection with *Eimeria* strains, the cell phone response produced free oxidative forms, which play an important role in the immune system. It was noted that antioxidant activity is due to the presence of polyphenols, tannins, anthocyanins, glycosides and thiocarbamates, which can remove free radicals, utilize antioxidant enzymes and inhibit oxidase due to adhesion membrane lining. Cytoplasmic and, thus, make these substances available for birds to use.

### **Moringa Antiviral Activity for Infectious Diseases in Chickens**

Newcastle disease is considered one of the most infectious and contagious diseases of domestic chickens and wild birds. It has a high rate of morbidity and mortality, which could lead to significant economic losses in the poultry industry worldwide. The main program of NDV vaccination controls but there are some challenges in this way, especially in rural areas with poor farms: the cost of vaccines is high, the cold system needed by these vaccines may not be available and birds small and large, may affect vaccination success. Improving the body's immune system through complementary methods, such as natural plants, can be a great way to combat infectious diseases.

A parallel method of controlling the infection is the use of herbal remedies. The plants contain alkaloids, flavonoids, saponins and tannins, which can act as antiviral agents. Several studies have examined the concentration of moringa extract needed to provide excellent antiviral function. The effect of *M.oleifera's* aqueous seed aqueous against NDV was investigated by Chollom *et al.*,2012 Who used an ovo assay and reported that the concentration of the extract was directly proportional to the death of the virus and in proportion to the production of antibodies against NDV. According to these findings, *M.oleifera* seed aqueous extract has a strong antibacterial activity against ovo NDV; and it had an abundance of healthy food. These extracts contain high amounts of vitamins A, B and C, minerals (such as calcium ions, ions, potassium) and proteins, in addition to traces of carotenoids, saponins, phytates and phenolic constituents that may be responsible for the destruction of the immune system. The role of *M.oleifera* in immunomodulating responses may be linked to the enhanced production of factors responsible for growth, such as cytokines, which activate both innate and adaptive immunity.

### **The Antibacterial Effect of *Moringa oleifera* on Chickens Infectious Diseases:**

Bacteria that cause diseases and economic losses in poultry including *Escherichia coli*, *Salmonella spp.* And mycoplasma. Abiodun *et al.*(2015) reported the antimicrobial and phytochemical effects of *M.oleifera's* root extracts of *Escherichia coli* and found that moringa roots (aqueous extract) can be used to add antibiotics made to fight poultry diseases, especially those of *E. coli* origin. *Moringa oleifera* acetone extract has been reported to have antibacterial properties. The antimicrobial action of *M. oleifera* seed extracts may be due to the presence of lipophilic chemicals; these compounds can attach to the cytoplasmic membrane. The extraction of moringa seed ethanol can also contain antibiotic metabolites such as carboxylic acid, 2,4-diacetylphloroglucinol, a cell wall that lowers enzymes and chitinase.

### **Use of Moringa in the Animal and Poultry Industry:**

Almost all parts of *Moringa oleifera* are used as food. The leaves of *M. oleifera* is used as food or animal feed during the dry season or during droughts. The high protein content, good mineral profile and the presence of vitamins (especially A, B and C) in Moringa leaves make them a food for animals and poultry. They contain 30% to 40% edible fat (ben oil). Ben's oil provides the right amount of oleic acid, sterols and tocopherols, anti-acid and anti-inflammatory, antioxidant, anti-inflammatory, cardio-protection, anti-asthmatic and anticancer. Antiviral and antifungal effects against *Fusarium solani*, *Bacillus subtilis*, *Staphylococcus aureus* and *Pseudomonas aeruginosa* are caused by *pterygospermin*, which is found in moringa seeds. Patients with ailments are treated with their leaves to increase their iron levels and their roots and bark are used to treat heart problems. According to

Jabeen *et al.*,2008 the efficiency of the animal feed focus can be enhanced by the addition of *M. oleifera* leaves. Similarly, Sultana *et al.*(2008) reported that the addition of moringa soyabean diet leaves a significant impact on the growth (weight and weight gain) of chickens. The birds also had better health and a rate of feed conversion.

### **Andrographis paniculata (Kalmegh)**

*Andrographis paniculata* also known as Karmegh or "King of Bitters" belongs to the family Acanthaceae. It has been used in Asia for centuries to treat gastrointestinal tract and upper respiratory infections, colds, herpes, sore throat, and various other chronic and infectious diseases. The Indian Pharmacopoeia describes it as the main site of at least 26 Ayurvedic formations. In traditional Chinese medicine, *Andrographis* is considered to be an important cold-blooded medicine used to treat fever and fever, and to eliminate toxins from the body. It grows mainly in Southeast Asia, India (and Sri Lanka), Pakistan and Indonesia but is widely grown in China and Thailand, East and West Indies and Mauritius. AP is usually grown from seeds available in its native areas where it grows in pine, evergreen and forested areas, and on roads and villages. In India, crops are grown during the summer rainy season (kharif) crops.

### **MECHANISM OF ACTION & THERAPEUTIC EFFECT**

**Analgesic:** Reduces inflammation and reduces fungus from capillaries; Anti-inflammatory actions probably mediated, in part, adrenal function.

**Antibacterial:** The release of AP has antibacterial properties, or the AP appears to have a weak anti-bacterial action. It has excellent effect on reducing diarrhea and the symptoms that result from infection.

**Effects on HIV and Other Viruses:** *Andrographis* release can block the c-mos kinase enzyme (a gene involved in the

transmission of HIV and T-cell death) and therefore may support normal immune function. The hypothesis of AP mechanism in AIDS is that the release of drugs appears to cause apoptosis or planned cell death. In this process, cells divide to form cells that are then separated by body cells. HIV can produce apoptotic signals in uninfected immune cells. This could explain the massive T-cell destruction caused by HIV infection, which is much better than the number of viruses present. An AP study conducted at the Frederick Research Center showed that the release of the AP increased AZT's ability to prevent HIV recurrence. The effect of the combination was greater than that of any compound alone. An added benefit is that lower doses of AZT can be used. Some researchers believe that the release of AP can also help in the fight against other viruses, including the Ebola virus and viruses associated with herpes, hepatitis and the flu. In a study examining 27 types of "heat-reducing" and detoxifying therapeutic drugs, researchers at the China Academy of Traditional Chinese Medicine in Beijing reported that AP was one of the most effective antidepressants in HIV.

**Antipyretic:** It also helps reduce fever in humans and animals caused by multiple infections or toxins.

**Cardiovascular benefits:** In 1964, angioplasty was established. This method is used to treat blocked arteries (usually arteries). It has been shown that AP release may increase the time it takes for blood clots to form, thus reducing the risk of subsequent blood clots (restenosis) seen after angioplasty procedures. In studies conducted in rabbits given angioplasty, the removal of AP has been shown to significantly protect against blood clots. Rabbits receive AP three days before angioplasty and four weeks after surgery. While weight loss occurred in 100% of animals not given AP, only 70% of those who received AP showed a decrease. Decreases

caused by damage to the inner lining of the arteries and high cholesterol in the diet have also been found to be reduced by AP. Investigators reported that the AP's release activated fibrinolysis, a natural process in the body that eliminates clots. Another way to prevent heart disease is to control high blood pressure. Investigators reported that the release of AP produced antihypertensive effects (lowering blood pressure). Noradrenaline, a hormone secreted by the brain, works to block blood vessels and increase heart rate, blood pressure, and blood sugar levels. AP inhibits the increase in blood pressure caused by noradrenaline. Researchers believe that AP has this antihypertensive effect because it relaxes smooth muscles in the walls of blood vessels. This relaxation prevents the blood vessel from catching and reducing blood flow to the heart, brain, and other organs. AP stores blood, so oxygen, which flows to the brain. Bleeding to the brain can cause short-term memory loss, ringing in the ears, dizziness, headache, depression and poor mental function. The effects of AP are produced without toxicity and cost-effectiveness, making this amazing plant a great choice for heart treatment.

**Effect on the Advanced Neurological and Brain System:** Many chemicals do not enter the bloodstream and the brain. However, andrograph gold does just that and focuses on the brain and especially the spinal cord. Numerous studies have shown that AP products have a softening effect. In rats given barbital as anesthesia, the animal experienced a very rapid onset and anesthesia lasted longer. Also, less anesthesia would be given if given along with the AP. Studies show that AP products can work on barbital receptors in the brain.

**Effect on the Respiratory System:** Andrographolide has been used to treat tonsillitis, respiratory infections, and tuberculosis. In another study, AP was used to

treat 129 cases of acute tonsillitis. 65% of patients responded to treatment. The same authors used andrograph gold to treat 49 pneumonia patients. 35% of cases were found to show positive changes and 9 patients recovered completely. Tuberculosis is usually treated with the antibiotic rifampin. When used alone, rifampin treatment still results in the death of 22.5% of patients. The study uses a 2.5% injection solution and an andrograph gold given to provide 50 to 80 mg / kg body weight per day

**Outcomes of infertility:** AP has a clear contraceptive effect and the consequences of termination of pregnancy. In India, where AP is used for ailments such as diarrhoea, flu, and digestive disorders, it is recommended that the drug be used for short-term treatment only. This is due to the content of chemical contraceptives naturally.

#### ***Tinospora cordifolia* (GILOY)**

*Tinospora cordifolia* also known as giloy, guduchi, amrita or nectar are now home remedies for humans and animals. The remedy belongs to the family of the Menispermaceae and can be found growing and growing on fences, trees, and in the tropical regions of India, Sri Lanka and Myanmar. It is long, large, hilly and has 300-meter steep slopes with sweet leaves, brown bark and water, sweet stems, yellow axillary flowers with freshly planted flowers, subglobose drupes and pea-sized fruits. Most flowering begins in June with fruit in November. Medicinal properties are present in this plant so supplements are made in powder or dry form in animal feed for the purpose of preventing diseases and improving health. *Tinospora cordifolia* is used to treat fever, weakness, diarrhea, dyspepsia, urinary tract infections, secondary syphilis, gout, weakness, skin diseases, viral hepatitis and anemia and rheumatoid arthritis, jaundice and diabetes. Various chemical elements are present in this plant such as alkaloids, terpenoids, lignans and

steroids because different natural functions are noted.

#### ACTIVITIES AND TREATMENT RESULTS

**Macrophage Activation:** Signing of the molecule glucan (1,4) - alpha-D-glucan has antibodies as it stimulates the immune system through macrophages activation by signaling TLRs 6, cytokine production and NF transmission -kappa B.

**Antineoplastic activity:** In experiments, it was found when extracting dichloromethane guduchi was injected into mice with Ehrlich ascites carcinoma 25, 30, 40, 50 and 100 mg / kg dose dependence was noted for free survival. A dose of 50mg / kg of giloy extract was found to be a large dose of neoplastic action. 12 hours of Upto fell from glutathione activity that increased later.

**Improved phagocytosis and antibody production:** This giloy material is used to prevent various diseases such as steroid treatment, implants, immunity, chemotherapy, HIV / AIDS etc. In the experiment, it was found that when added strong and strong giloy gums @ Weight loss @ 10mg / kg for 14 days, increased antibody production in red blood cells. The aqueous extraction at 5 microgram / ml injection resulted in a 200% increase in the potency of phagocytic macrophages. It stimulates the immune system, reticuloendothelial system, cell bone marrow, stem cell proliferation and enhances the growth factor of haemopoietic and IL-3. The significantly less specific immune response and cells can also be stimulated by *Tinospora cordifolia*. Karan Fries pregnant cows supplemented with *Tinospora cordifolia* @ 60g / day 45 days before calving and 120g / day 45 days after calving lead to complete growth of leukocyte, lymphocyte, neutrophil count and proliferation -neutrophil lymphocyte ratio.

**Improve memory and learning:** Giloy is used in the treatment of neurodegenerative diseases

as a cognitive enhancer and a powerful immunomodulator.

**Effect of allergen rhinitis:** Treatment of patients with giloy discharge reduces eosinophil and neutrophil counts while goblet cells are absent. This remedy can also be used for forms of hypersensitivity.

**Immunomodulator in the free cell system:** Giloy has shown inhibition of photosensitized oxidative damage and caused an increase in thiobarbutaric acid activity in the liver. The lightly purified immunomodulator caused inhibition of the degradation of catalase and superoxide dismutase activities in the liver spleen / homogenate found in mice inhibiting lipid peroxidation and restoring the activity of both enzymes. As a result of attempts to feed the giloy to white pekin ducks affected by aflatoxicosis were studied. The results showed that feeding on a giloy (100 / liter of water) for seven months removes the sores of aflatoxicosis and helps the birds gain weight. While the mouse was treated with *Tinospora cordifolia*, an increase in immunoglobulin levels was recorded with a significant increase in the number of white blood cells and bone marrow cells indicating a stimulating effect on the haemopoietic system. When *Tinospora cordifolia* dried powder (100 mg / kg BW) was given to the local cow by mixing it in a concentrate mixture for a period of 5 days, the feeding of *Tinospora cordifolia* showed an important immune effect.

**Introduction of carcinogen enzymes / metabolism of drugs and anti-oxidant system to mice:** Use of giloy hydroalcoholic extraction with distilled water (80:20) @ 50 and 100 mg / kg bodywt / 15-day period in both increased levels of soluble acid sulfhydryl and cytochrome P acid in line with increased enzyme activity such as Cytochrome P (450) reductase, GSH S-transferase (GST), Cytochrome b reductase, DT-diaphorase (DTD), catalase, GSH reductase and GSH peroxidase. Giloy ethanol extraction has a

very high flavonoid and phenol content indicating complete antioxidant activity.

**Cardioprotective action in ischemia-perfusion caused by myocardial infarction:** *T. cordifolia* ethanolic extracted from mice reduced the size of the infarct while causing a decrease in lipid peroxidase levels of serum and heart cells.

**Anti-ulceractivity:** Herbomineral formulation, Papticare (containing *T. cordifolia*) when administered in various doses causes pylorus ligation, an increase in the pH of the gastric juice and membrane-bound enzymes such as  $\text{Ca}^{2+}$  ATPase and  $-\text{Na} + \text{K} + \text{ATPase}$  and reduce to total acidity.

**Increases food intake and weight gain:** Increased food supplementation of giloy supplementation has been observed in Muzzafarnagri rams, buffaloes, black Bengal goats, broiler chicks. The inclusion of rumenotonic drug in which the giloy was present in the combined calves improved appetite, digestion, regenerative growth and improved rumen eco-system.

#### ***Allium sativum* (Garlic)**

Garlic is a member of the Alliaceae family, and has long been widely known as an important spice and popular remedy for various ailments and disorders.

The word garlic could have come back from the Celtic word 'all' which means fragrance. Garlic has gained a name in varied cultures like prophylactic and herbal remedies. Garlic has compete a vital role in diet and medication throughout history. Ancient Chinese and Indian medication suggested garlic to assist respiratory and digestion and to treat Hansen's disease and infections (Rivlin, 2001). Within the Middle Ages, garlic additionally compete a vital role within the treatment of varied ailments. Avicenna (1988) in his known book, *Al Qanoon Fil Tib* (The Canon of Medicine), praised garlic as a helpful ingredient within the treatment of arthritis,

toothache, chronic cough, constipation, insect infections, snake bites and insects, gynecologic diseases, and in infectious diseases (such as antibiotics). One of the foremost organic compounds, allicin is not in garlic till crushed or sliced; damage to the garlic bulb activates the catalyst allinase, which has alliin and allicin. Allicin has antimicrobial effects against several viruses, bacteria, fungi and insects. The plant is that the part used "garlic clove of garlic".

#### **MECHANISM OF ACTION & THERAPEUTIC EFFECT**

Garlic and its preparations are well known as agents for the interference and treatment of heart disease. The wealth of scientific literature supports the suggestion that the utilization of garlic has necessary effects on lowering blood pressure, preventing coronary-artery disease, lowering serum cholesterol and lipid, preventing platelet aggregation, and increasing fibrinolytic activity.

In vivo animal experiments, intravenous garlic extracts made a small reduction in both systolic and diastolic pressures (Sial and Ahmed, 1982) and oral injections extracted from a hypertensive animal came normal blood pressure (Chandekar & Nojain, 1973). It has been instructed that the mechanism of action of the antihypertensive drug perform of garlic is due to its effect-like autacid, that reduces blood resistance (Rashid and Khan, 1985). The removal of adult garlic was higher than placebo in lowering systolic blood pressure in patients with uncontrolled high blood pressure. Garlic treatment in mice with hypercholesterolemia, caused by a high steroid diet, significantly reduced serum cholesterol, lipid, and LDL, however had no impact on serum HDL. In in vitro trials, garlic administration suppressed LDL oxidization and enhanced HDL, which can be one in every of the protecting effects of the helpful effects of garlic on heart health (Rahman and Lowe, 2006). Long-term use of garlic and its



preparations within the identification of coronary-artery disease caused by high cholesterol diets, has shown a 50% reduction in atheromatic lesions, particularly within the arterial blood vessel (Jain, 1977).

The impact of garlic inhibition on coronary-artery disease is due to its ability to scale back lipid content within the blood vessel membrane. Allicin, S-allyl amino acid, introduced from extracts of garlic and diallyldi-sulfide, introduced into garlic oil by active compounds responsible for anti-atherosclerotic activity (Gebhardt and Beck, 1996; Yu-Yah and Liu, 2001). Plasma fibrinolytic activity in animals, that is reduced in cholesterol intake, is greatly enhanced once these foods are supplemented with garlic.

Several human studies on the function of plasma fibrinolytic have found that garlic enhanced fibrinolytic activity in healthy people and in critically ill infarction patients. It has been shown that previous treatment with garlic considerably inhibited intracellular  $Ca^{2+}$  mobilization, thromboxane-A<sub>2</sub> (a potent platelet aggregator) synthesis and guarded against thrombocytopenia induced by collagen or arachidonate application in rabbits.

These comments suggest that garlic can help prevent thrombosis. Garlic has conjointly been shown to forestall platelet aggregation or adhesion in human studies. It has been shown that the release of aged garlic inhibits the binding of ADP - platelets that are made up of weak coagulation factor. This suggested that the release of aged garlic inhibited platelet aggregation by inhibition of GPIIb / IIIa receptor and enhanced CAMP (Allison *et al.*, 2012). In addition, garlic was reported to scale back the chance of vascular infections, plasma viscosity, and unstable angina and increase the vascular properties of capillary and capillary perfusion .

**The anti-tumor effect of garlic:** Many in vivo and in vivo studies have suggested cancer-

preventing effects of garlic preparations and their beneficial properties. Garlic has been found to contain large amounts of potent bioactive chemicals with anticancer properties, particularly allylsulfide derivatives. Differential findings from garlic have been reported to measure the growing number of cellular mechanisms in carcinogenesis, such as DNA adduct formation, mutagenesis, free radical degradation, cell proliferation and differentiation and angiogenesis. The growth rate of cancer cells is reduced by garlic, with the inhibition of the cell cycle that occurs in the G<sub>2</sub> / M phase. In 1990, the U.S. The National Cancer Institute launched the Designer Food Program to identify which foods played a major role in cancer prevention. They conclude that garlic can be a very powerful food with anti-cancer properties. Garlic has a variety of anti-tumor effects, including tumor cell growth and immunomodulatory effects. In mice, garlic and its constituents have been reported to inhibit the growth of chemicals in the liver (Kweon *et al.*, 2003), colon (Knowles and Milner, 1993), esophagus (Wargovich *et al.*, 1988), lung, skin and abdomen in both rat and human studies. Diallyl trisulfide (DATS), an organosulfur compound isolated from garlic, has been shown to have anticancer activity in both in vitro and in vivo studies. The cytotoxicity of DATS targeting epithelial prostate cells is reduced in contrast to PC-3 cancer cells .

Possible anticarcinogenic mechanisms of garlic and its components may include inhibition of carcinogen activity, intensification of toxins, extracts and DNA protection from carcinogens activated (Tadi *et al.*, 1991). In addition, DATS reduced tumor weight and the number of mitotic cells within the tissue. DATS reduced mitosis in tissues, reduced histone deacetylase activity, increased H3 and H4 acetylation, inhibited cell cycle progression, and reduced pro-tumor markers (survival, B1-2, c-Myc), mTOR, EGFR,

VEGF) (Wallace *et al.*, 2013). Garlic components have been found to inhibit the binding of carcinogens to DNA, improve the degradation of carcinogens, have anti-drug properties, and regulate cell proliferation, apoptosis, and immune responses. Ajoene, a solid sulfur-soluble garlic garlic mixed with a natural mixture made of garlic, has been shown to induce apoptosis in leukemic cells over other blood cells in cancer patients. Ajoene created apoptosis in human hair cells by promoting peroxide production, 3-like and caspase-8 activity. Garlic mediates the effect of eicosapentaenoic acid, suppresses breast cancer, and counteracts the effect of linoleic acid, a promoter of breast cancer.

The anti-proliferation activity of ajoene has been demonstrated against a panel of human cell lines (Li *et al.*, 2002). In addition, allicin inhibits the proliferation of endometrial mammary cancer cells and colon cancer. Growth inhibition is associated with cell accumulation in the W1G1 & G2 / M cell cycle. So allicin is also responsible for the anti-aging effect of garlic. Diallyl sulfide and diallyl disulfide, inhibit the activity of arylamine N-acetyltransferase and 2-aminofluorene-DNA in human promyelocytic leukemia cells (Lin *et al.*, 2002). Reducing the risk of other lesions by using selenium-rich plants, such as garlic was suggested (Finely, 2003). DATS inhibited the growth of melanoma A375 cells and basal cell carcinoma cells by increasing levels of active intracellular oxygen and DNA damage and by reducing endoplasmic reticulum and mitochondrial-mediated apoptosis.

**Diabetes:** Although experimental studies have shown a transparent hypoglycaemic effect of garlic, the effect of aldohexose on human blood remains moot. Various studies have shown that garlic will lower blood glucose levels in diabetic animals. Garlic was effective in lowering blood sugar to streptozotocin and alloxan-induced

polygenic disorder in rats and mice. Short-run edges of garlic in dyslipidemia in diabetic patients are incontestible (Ashraf *et al.*, 2005). Garlic considerably reduced serum total cholesterol and LDL cholesterol and moderately raised HDL cholesterol compared with placebo in diabetic patients (Ashraf *et al.*, 2005). S-allyl aminoalkanoic acid, a living element found in garlic, restores erectile perform in diabetic mice by inhibiting the formation of oxygen species by altering the expression of the NADPH oxidase subunit. The treatment of Metformin and Garlic in patients with diabetes for 12 weeks reduced blood clotting (FBG), however the proportion amendment in FBG was considerably greater with metformin added with garlic than metformin alone (Kumar *et al.*, 2013). The positive effect of garlic in diabetes mellitus is principally because of the presence of a variable sulfur compound, like allin, allicin, diallylsulfide, S-allyl aminoalkanoic acid, ajoene, and allyl mercaptan. Garlic extract has been reported to be effective in reducing insulin resistance.

**Effect of garlic on chemically induced hepatotoxicity:**

Various studies have shown that garlic will protect liver cells from certain toxins. Acetaminophen may be a leading analgesic and antipyretic drug employed in several countries. Overdose is understood to cause hepatotoxicity and prototoxicity in humans and mice. Although more than 90% of acetaminophen is converted to sulphate and glucouronide conjugate and excreted in the urine, a tiny low fraction is related to totally different liver chemicals. This will absorb the proteins of sensitive cells and create toxins. It has been shown that garlic protects against hepatotoxicity caused by acetaminophen. Gentamycin conjointly causes hepatic damage as a result of elevated liver enzymes (aspartate transaminase and alanine aminotransferase) and slashed plasma albumin levels. The dietary supplement

of garlic powder protects mice against artificial gentamycin- hepatotoxicity, improves antioxidant status, and corrects oxidative stress.

**Anti-microbial effect of garlic:** Garlic has been used for centuries in various societies to combat infectious diseases. Historically, it is believed that Louis Pasteur described the effects of garlic germination in 1858 for the first time, although no evidence is available. Recently, garlic has been shown to be effective in comparison with a wide range of bacteria that use gram-negative, and acid-fast, *Klebsiella*, *Micrococcus*, *Bacillus subtilis*, *Clostridium*, *Mycobacterium*, and *Helicobacter*. It has been documented that garlic has a barrier between the beneficial intestinal microflora and potentially harmful enterobacteria.

The antibacterial activity of garlic is broadly enhanced by allicin. It is known that allicin has the function of converting sulfhydryl and is able to inhibit sulfhydryl enzymes. Cysteine and glutathione fight the all-encroaching activity of allicin. Garlic extract with allicin has been shown to have bacteriostatic potential in certain vancomycin-resistant enterococci. Preventive synergism was observed when used in combination with vancomycin. Allicin is thought to convert sulfhydryl groups into the enzyme TN1546 transposon, which includes vancomycin resistance, and increases vancomycin resistance. Garlic cloves and ginger rhizomes, extracted from 95% ethanol, are suggested to have antibacterial activity and can be used to prevent drug-resistant diseases. *Pseudomonas aeruginosa* was the most sensitive of these compounds. Garlic has also been suggested as a treatment for multidrug-resistant tuberculosis.

**Anti-protozoal properties:** Numerous studies have shown that extracts are effective against several protozoa including *Candida albicans*, *Scenedosporium* proliferation, roundworm, *Opalina ranarum*, *Balantidium* entozoon,

*Entamoeba histolytica*, Trypanosomes, Leishmania, Leptomonas and Crithidia.

Due to the emergence of side effects and resistance to synthetic drugs, garlic was recommended for the treatment of giardiasis. The repressive activity of garlic in giardia was noted for impurities at 25pg / mL and a lethal dose was established at around 50 pg / mL. Garlic was developed as an anti-giardial, remove symptoms in all patients within 24h and to fully take away any sign of giardiasis in the cell within 72h in a dose of garlic tablets prepared at 1mg / ML.

**Antifungal Properties:** Antifungal activity was first established in 1936 by Schmidt and Marquardt while working with epidermophyte cultures. Several fungi are sensitive to garlic, including *Candida*, *Torulopsis*, *Trichophyton*, *Cryptococcus*, *Aspergillus* (Hitokoto et al., 1980), *Trichosporon*, and *Rhodotorula*. The release of garlic has been shown to scale back oxygen uptake, reduce body growth, inhibit the synthesis of lipids, proteins, and nucleic acids (Adetumbi et al., 1986), and damage the membranes.

A pure allicin sample was shown as associate antifungal. Removal of allicin in response to solvent release has reduced the killing activity. The activity has conjointly been determined with the properties of garlic, diallyl trisulfide, against cryptococcal meningitis, ajoene, and *Aspergillus*. Thiol reduced this activity, suggesting inhibition of thiol oxidation by allicin. Inhibition of respiratory function is thought to be due to inhibition of succinate dehydrogenase. *Candida* adhesion is greatly reduced when garlic is extracted. Also, this effect is reduced by the incorporation of thiol compounds. The addition of ajoene to different fungal growth compounds, as well as *Aspergillus niger*, *albicans*, and *Paracoccidiode*, has led to a reduction in concentrate less than that of allicin. Studies enamored mature garlic (without allicin or

allicin-based nutrients) did not show in vitro antifungal activity. However, when given to infected rats, the quantity of determined species was reduced by 80% (Tadi *et al.*, 1991). Garlic is reported to possess shown anti-rot effects in two species, the airborne bacterium *Botrytis cinerea* and *Trichoderma harzianum*. Significant satisfaction with the use of garlic than nystatin has been reported by a patient with denture stomatitis (Bakhshi *et al.*, 2012).

**Antibacterial properties:** Compared with the antibacterial action of garlic, very little work has been done to investigate its antimicrobial properties. A few studies have reported that garlic extract showed in vitro activity against influenza A and B, cytomegalovirus, rhinovirus, HIV, herpes simplex virus 1, herpes simplex virus 2, viral pneumonia and rotavirus. Allicin, diallyl trisulfide and ajoene have all been shown to be effective. Allyl alcohol and diallyl disulfide have also proven to be effective in combating HIV-infected cells. No activity was observed with allicin or S-allyl cysteine. It seems that only allicin and allicin-based substances are effective. Taken together, the beneficial effects of garlic extract make it medically useful.

#### ***Hydrastis Canadensis* (Goldenseal)**

Goldenseal (*Hydrastis canadensis*) is a small North American plant that produces raspberry as a fruit. Goldenseal root was used by Native Americans as a dye for clothing and to treat inflammation and infections of the eyes and skin. *H. Canadensis* as the basal branch of the Ranunculaceae (buttercup family), however close to the Berberidaceae family (Ro, Keener & McPheron, 1997). It is best known for the gold, eyebalm, eyeroot, gold root, ground raspberry, Indian dye, Indian turmeric, jaundice root, orange root, yellow root, yellow pucoon.

There has been widespread use of Hydrastis extract as a well-known herbal medicine in other traditional remedies such as Ayurved, Unani, etc. in addition to the use of homeopathy, in

small doses. Previous goldense studies have identified berberine and protoberberine alkaloids (NTP 2007) in various extracts. In fact, of the three major alkaloids, namely, "canadine", which stimulate the cervical muscles, "hydrastine" and "berberine", which are known to have anti-spasmodic and anti-bacterial effects are very important in providing various biological functions. Of these, berberine has been reported to cause cell cycle arrest and apoptosis in the line of gastric carcinoma SNU-5 cell.

#### **Mechanism of action & Therapeutic effect**

**Antimicrobial Activity:** In a system of antimicrobial testing *H. canadensis* has been shown to show important functions against many drug-resistant strains of *Mycobacterium tuberculosis*, other types of *Mycobacterium* and other viruses. The Bioassay-directed fraction produced berberine in the active site, but berberine alone was less effective than raw extracts. Scazzocchios and colleagues received H-results. Canadensis was effective against both Gram strains of micro-organisms. In this case the activity of canadine was similar to that of berberine, but canadine provided a more potent inhibitory activity, especially Gram organisms tested - *Staphylococcus aureus* (2 strains) and *Streptococcus sanguis* - based on kill times and very low concentration (MIC values). Also the extraction of the whole plant showed equal or higher antibacterial activity compared to individual alkaloids. Similar to *H. Canadensis* has been shown to inhibit the growth of resistance to *Neisseria gonorrhoea*, whereas berberine alone was not effective. The extraction of canadensis inhibited the growth of *Helicobacter pylori* in experimental plant experiments using a micro-dilution assay. Berberine also reduces *E coli* & *Streptococcus pyogenes* adherence in epithelial cells. Reduction of *E.coli* load in intestine in these ways may also reduce the flow of pathogenic

bacteria in the urinary tract, which is why it helps prevent urinary tract infections .

**Immunological Activity:** Despite the widespread belief that *H. canadensis* is an immunostimulant, there are few studies to prove the claim (Bergner.,1997). Studies in mice exposed to the KLH antigen show an immunoglobulin (IgM) response that increased during the first two weeks of treatment, but failed to improve the IgG response. Berberine has been shown to inhibit the production of TNF- $\alpha$  and prostaglandin PGE2 from macrophages caused by influenza A virus, in an in vitro study .

**Cardiovascular effects :** Studies involving berberine have shown many beneficial effects on the cardiovascular system. These include positive inotropic, antiarrhythmic, vasodilatory and antihypertensive effects. *H.canadensis* releases high-density lipoprotein receptor (LDLR) expression on HepG2 (hepatic) cells, thereby reducing cholesterol and lipid accumulation in plasma and liver in vivo (Abidi *et al.*, 2006). In this study alkaloid canadine showed more activity in LDLR expression than berberine.

**Cancer-fighting effects:** Berberine (like berberine sulphate) inhibits the activity of two tissues that promote compounds in cell culture in a dose-dependent manner, and produces significant reductions in plant yield and percentage of mice carrying the tumor. Methods of berberine anticancer activity include DNA and RNA, inhibition of N-acetyltransferase (NAT) in tumor cells, inhibition of cyclooxygenase II (Cox-2), inhibition of telomerase and topoisomerase, anti-inflammatory effects and cell rupture, multidrug signaling, antioxidant activity, inhibition of nuclear factor- $\kappa$ B activity, inhibition of metastases and improved drug resistance. Little work has been done on *H. Canadensis* itself. In the form of a powerful homeopathic drug (200C), *H. Canadensis* reduced the amount of chemical-induced tissue

in mice compared with controls, while lowering its levels of high-dose enzymes ALP, GPT, and GOT (Kumar *et al.*, 2006). In a separate study the homeopathic 'mother tincture' (equivalent to 1:10 herbal tincture) was highly cytotoxic in a wide range of cancer cells, while in Ehrlich carcinoma cells a power of 200C showed high cytotoxicity. Maternal tincture with a power of 30C, but not a power of 200C, causing apoptosis in DLA cells .

### ***Panax ginseng* (Ashwagandha)**

It is known as ashwagandha, Indian ginseng, *Andania somnifera*, poisonous gooseberry, or winter cherry. It is a plant in the family Solanaceae or nightshade. Several other species in the *Andania* genus are morphologically similar. Although widely used as a medicinal herb in Ayurvedic medicine. The word "somnifera" means "sleep - to encourage" in Latin. The word, ashwagandha, is a combination of the word ashva, meaning horse, & gandha, meaning scent, indicating that the root has a strong horse-like scent.

Veda, an old document of personal information referred to ashwagandha as herbal and health food and is regarded as 'Indian Ginseng' in the traditional Indian medical system. In fact, it is mentioned as an official drug in Indian Pharmacopoeia as well (Indian Pharmacopoeia, 1985). Besides its use as a general tonic (Devi, 1999). The main chemical elements are "alkaloid & ginsenosides". In addition, various components of this plant have been reported to have antiserotogenic, anticancer and anabolic properties and have beneficial effects in the treatment of arthritis, depression, and geriatric disorders (Singh *et al.*, 2001).

Owis *et al.*, (2005) found an antimicrobial activity in the extraction of ashwagandha roots that fight various viruses including *Salmonella typhimurium*. Toxicity research reveals that active plant compounds look safe.

## **MECHANISM OF ACTION & THERAPEUTIC EFFECTS :**

### **Antioxidant effects :**

The brain and nervous system are more susceptible to damage than other tissues because they are rich in lipids and iron, both of which are known to be essential for the production of active oxygen. Free nerve damage can be involved in common illnesses and non-neurodegenerative diseases, e.g., epilepsy, schizophrenia, parkinson's, Alzheimer's and other diseases. Other major free enzymes such as superoxide dismutase (SOD), catalase (CAT), and glutathione peroxidase (GPX) are responsible for the antioxidant activity of neuronal tissue in the brain. Decreased activity of these enzymes leads to the accumulation of free oxidative radicals and leads to degradation effects. The active regimens of WS, sitoindosides VII-X and withaferin A (glycowithanolides) increase in these levels of enzymes. The increase in these enzymes will represent an increase in antioxidant activity and a protective effect on neuronal tissue. WSG is a bioactive compound isolated from WS roots with anxiolytic and anti-depressant actions. Chronic stress (CS) can lead to many adverse physical conditions including dementia, dysfunction, sexual dysfunction, stomach ulcer, glucose homeostasis, and changes in plasma corticosterone levels. In another study it was found that WS methanolic extract for 15 days significantly reduced the index of ulcers, abortion volume, free acid, and total acidity. Significant increases in total carbohydrate and total amount of carbohydrate / protein are also shown.

**Stress and anxiety:** WS prevented gastric ulcer based on depression compared to standard drug ranitidine. In a study conducted by Bhattacharya et al chronic electroshock stress (14 days) there was a significant decrease in the levels of nor-adrenaline (NA) and dopamine (DA) in the frontal cortex, pons-medulla,

hypothalamus, hippocampus, and the striatal, hypothalamic region respectively, with an increase in the level of 5-hydroxytryptamine (5HT) in the frontal cortex, pons medulla, hypothalamus and hippocampus. EuMil, a polyherbal formulation that incorporates WS as one of its 14-day therapeutic ingredients has made it generally a regional disruption of the NA, DA, 5HT region, caused by chronic pressure.

**Nootropic effect:** WS also shows nootropic-like effect in inexperienced and amnesic mice. The slightly improved WS activity of acetylcholinesterase (AChE) in the lateral septum & globus pallidus, also reduced AChE activity in the vertical diagonal band. These changes were associated with the strengthening of the M1- muscarinic-cholinergic receptor binding in the lateral and medial septum and in the anterior cortices, while the binding sites of the M2 - muscarinic receptor-binding were enlarged in many areas including the cingulate, frontal, parietal & retrosplinal hemisphere. The data suggest that chemicals affect events specifically in the cortical and basal forebrain cholinergic-signal transduction cascade. The drug-induced increase in cortical muscarinic acetylcholine receptor potential may partially explain the effects of developing and enhancing WS release memory in animals and humans.

### **Antiparkinsonian Properties:**

Parkinson's disease is a neurodegenerative disease characterized by selective dopamine (DA) loss of substantia nigra pars compacta. The events, which cause and / or mediate the loss of nigral DA neurons, however, remain unclear. Neuroleptic-induced catalepsy has long been used as an animal model for drug testing for Parkinsonism. Administration of haloperidol or reserpine has significantly caused catalepsy in mice. WS strongly inhibits haloperidol or reserpine-induced catalepsy and offers hope for

the treatment of Parkinson's disease. The Antiparkinsonia effects of WS release have been reported due to its strong antioxidant, antiperoxidative & free radical quenching properties in various disease conditions.

**Antivenin:** Venom hyaluronidases help to quickly disperse the toxins by destroying the integrity of the upper matrix of the affected tissue cells. The hyaluronidase inhibitor (WSG) is purified from WS. Glycoprotein inhibits hyaluronidase activity of cobra (*Naja naja*) & viper (*Daboia russelii*) venom, indicated by a zymogram assay and skin tissue for different function. WSG completely inhibited enzyme activity in the concentration of 1: 1 w / w risk in WSG. Exotic use of the plant is cured as a remedy in rural India for people attacked by snakes which seems to have a scientific basis. In a study by Lizano et al antitoxin - WS-separated PLA2 glycoprotein reduced PLA2 activity of *Naja* and venom. The effects of these new groups of PLA2 toxin inhibitors on bee biology and in the development of novel regenerative reagents in the treatment of snake envenomations.

**Anti-inflammatory properties:** WS root extract also acts as an anti-inflammatory. It performs an anti-inflammatory action by blocking the cyclooxygenase pathway.

**Immunomodulation & hematopoiesis:** The role of WS as an immunomodulator has been extensively studied. WS root extraction enhanced the total number of white blood cells. In addition, this release inhibited the delay in hypersensitivity reaction and enhanced phagocytic activity of macrophages. Recent studies suggest a possible mechanism after the increased cytotoxic effect of exposed macrophages released by the WS. Nitric oxide has been shown to have a significant effect on macrophage cytotoxicity against microorganisms and plant cells. Iuvone et al showed that WS increased NO production in mouse macrophages

in a concentration-dependent manner. This effect was due to the increased production of untreated nitric oxide synthase, an enzyme that is made in response to inflammatory mediators and is known to inhibit the growth of many bacteria. In another study, Glycowithanolides and a combination of sitoindosides IX and X isolated from WS, both produced significant stimulation and activation of peritoneal macrophages, phagocytosis, and increased lysosomal enzyme activity.

The release of WS root significantly increases hemoglobin concentration, red blood cell count, white blood cell count, platelet count, and body weight. There has also been a marked increase in haemolytic antibody responses associated with human erythrocytes showing immunostimulatory activity. The effect of WS was also studied by the activity of macrophages found in mice treated with carcinogen ochratoxin A (OTA). OTA treatment of 17-week-old mice significantly reduced the chemotactic activity of macrophages. The production of Interleukin-1 (IL-1) and tumor necrosis factor alpha (TNF - $\alpha$ ) has also been significantly reduced. WS has shown potent inhibition of the filling system, mitogen increased lymphocyte proliferation and delayed hypersensitivity reaction. In a study by Gautam et al., Weight loss in the oral administration of WS fluid was tested in laboratory animals vaccinated with the DPT vaccine (Diphtheria, Pertussis, Tetanus). Treatment of vaccinated animals with 15 days test kicks has led to a significant increase in antibody titers in *B. pertussis*.

**Antitumor properties:** Chemopreventive effect has been shown in the study of WS root extraction in skin cancer induced in mice given to WS before and during exposure to skin cancer that causes the 7,12-dimethylbenz [a] anthracene agent. Significant decrease in incidence and the average number of skin lesions was shown compared with the control

group. In addition, reduced glutathione levels, SOD, CAT, and GPX in exposed tissues were restored to the following adjacent values following withdrawal management. Chemopreventive activity is thought to be part of the antioxidant / free radical scavenging activity of the extract. Withaferin most effectively inhibited growth of breast and colon cancer cell lines than doxorubicin. These results suggest that WS release may inhibit or inhibit tumor growth in cancer patients and enhance the developmental capacity of chemotherapeutic agents. In another study WS was tested for its antitumor effect on adenomas produced by urethane-in mice in older albino mice. Treatment for WS also reversed the adverse effects of urethane on total leukocyte count, lymphocyte count, body weight and death. WS is widely used in Ayurvedic medicine system to treat tissue, inflammation, arthritis, asthma, and high blood pressure. Chemical research on the roots and leaves of this plant has revealed bioactive antioxidants. Previous studies have shown that anolides inhibit the enzymes of cyclooxygenase, lipid peroxidation, and proliferation of tumor cells. Several genes that regulate cell proliferation, carcinogenesis, metastasis, and inflammation are regulated by activation of nuclear factor-kappaB activation caused by a variety of inflammatory factors and carcinogenic agents, including tumor necrosis factor (TNF), interleukin -1 beta, doxorubicin, and tobacco smoke are reduced. The pressure was not specified by cell type, as both NF - kappaB function was ineffectively blocked by anolides. Depression occurred with inhibition of the inhibitory subunit of IkappaB alpha kinase activation, IkappaB alpha phosphorylation, IkappaB alpha degradation, p65 phosphorylation, and subsequent p65 nuclear translocation. NF-kappaB expression dependent on the verb-induced action of TNF, TNF receptor (TNFR) 1, TNFR- associated with

mortality, TNFR -associated factor 2, and IkappaB alpha kinase were also suppressed. As a result, anoli suppressed the expression of TNF-induced B-regulated antiapoptotic (inhibitor of apoptosis protein 1, Bfl-1 / A1, and FADD-like interleukin -1 beta-converting enzyme-inhibitory protein) and -metastatic (cyclooxygenase -2 and intracellular adhesion molecule -1) genetic products enhanced apoptosis induced by TNF and chemotherapeutic agents, and inhibited cellular invasion of TNF and NF-kappaB receptor activator ligand - induced osteoclastogenesis. Overall, it is suggested that it is anolides that inhibit NF-kappaB and NF-kappaB-gene regulation, which may explain the ability of anolides to increase apoptosis and prevent attacks and osteoclastogenesis.

**Hypolipidemic Effect:** WS root is reduced by total lipids, cholesterol and triglycerides in hypercholesteremic animals. On the other hand, greatly increasing plasma HDL-cholesterol levels, HMG-CoA activity reduces the activity and bile acid content of the liver. The same practice has also been reported in bile acid, cholesterol and the release of neutral sterol in animals with hypercholesteremic disease by the management of WS. In addition, a significant decrease in lipid-peroxidation occurred in WS-controlled animals compared to their normal counterparts. However, the WS powder root also works in general studies to reduce lipid profiles. In another study with the extraction of Andania fruit coagulans in a high-fat diet that caused the rats to hyperlipidemic for 7 weeks, significantly reduced serum cholesterol, triglycerides and lipoprotein levels. The drug also showed hypolipidemic activity in triton - indosed hypercholesterolemia. The hypolipidemic effect of Andania coagulans fruits is reported to be comparable to that of an Ayurvedic product containing Commiphora mukul.



**Sexual Behavior:** WS root removal has caused significant impairments in libido, sexual function, sexual potency, and erectile dysfunction. These effects were reversed in stopping treatment. The antimusculine effect was not due to changes in testosterone levels but was caused by hyperprolactinemic, GABAergic, serotonergic, or analgesic activities. The roots of WS can damage a man's sexual ability.

**Antibacterial effect:** Both the extract of water and alcohol from the plant (roots and leaves) were found to have strong antibacterial activity in the bacterial population, as demonstrated by the invitro Agar Well Diffusion Method. Methanolic extracts were also removed using various solvents and the butanolic sub-fraction had significant control function against bacterial overgrowth including *Salmonella typhimurium*. Oral administration of wet discharge successfully eliminated salmonella infection in Balb / C mice as manifested by increased survival rate and low bacterial load on various vital organs of infected animals. Of the six experiments released, only methanol and hexane extraction on both leaves and roots showed strong antibacterial activity. Hydroalcoholic extraction of ashwagandha with garlic can be recommended as another treatment for endometritis, repetitive reproduction in cross-breed cattle with conventional treatment.

**Cardiovascular protection:** WS can be helpful as a general tonic, due to its positive effects on the cardiopulmonary system. The effect of WS was studied on cardiovascular systems in dogs and frogs. Alkaloids have long periods of hypotensive, bradycardiac, and respiratory actions in dogs. Studies have shown that the hypotensive effect is mainly due to ganglion inhibition and that the depressive action in the upper brain centers also contributes to hypotension. Alkaloids regenerate vasomotor

and respiratory centers in the dog's brain stem. Cardio-inhibitory action in dogs has been shown to be due to the inhibition of ganglia and to direct cardiodepressant action. Alkaloids produce very important fast but short-term cardio-depressant effects with a mild but long-lasting cardiostimulant effect on normal hypodynamic frog hearts. In another study, left ventricular dysfunction was observed as a decrease in heart rate, left ventricular rate of positive and negative pressure change and high ventricular end-diastolic pressure in the control group was recorded. WS has shown strong cardioprotective activity in the experimental isoprenaline model for myonecrosis in mice. Enlargement of endogenous antioxidants, maintenance of myocardial antioxidant status and significant restorative hemodynamic reversal may contribute to its protective effect.

#### ***Zingiber officinale* (Ginger)**

Ginger (*Zingiber officinale*) is commonly found in the wetlands of the wetlands as a perennial herb with a toxic tree that can grow up to 2 m high. This plant can be named differently in different parts of the world, for example Jeung or Sang Keong in Chinese, Adi or Adrack in Hindi, Jabe or Aliah in Indonesia, Gember in Dutch, Gingembre in French, Ingwar in German, Zenzero in Italian, Jengibre in Spanish.

Ginger belongs to the Zingiberaceae family and contains about 85 species of aromatic herbs. The tuberous rhizome of ginger is a special structure of the stem that grows horizontally just below the soil surface. In general, more than 60 active ingredients are known to be present in ginger, which is broadly divided into flexible and incompatible compounds. Nutraceutical chemicals generally claim to have medicinal value including ginger, shogaol, gingerdiols, Igenol, paradols, and zingerone. which are gingerols which are thought to be the most active ingredients in the pharmacy. Zingerone is produced from gingerol during

drying, with a low pungency and a pleasant and dominant aroma. Ginger has a sialagogue action, which stimulates saliva production, making swallowing easier. Evidence that ginger helps to eliminate chemical nausea and vomiting is inconclusive and not recommended for clinical use of this or any other form of nausea (Marex *et al.*, 2013). Studies have not found clear evidence of injury by taking ginger during pregnancy, although its safety has not been established and it is a suspected risk of mutagenicity. Labania, (2005) and Abu Baker (2013) compare the ability of ginger to improve uterine function and ovary. Ghusoon and AL-Neamah, (2016) have investigated that cadmium chloride causes toxic changes in the uterus and eggs of rats and this change was enhanced after ginger delivery, which provides strong evidence of the beneficial role of plant antioxidants in improving cadmium -chloride poisoning in a female mouse.

#### **Mechanism of action & Therapeutic effects**

**Cattle :** Ginger roots contain ingredients such as Aryl alkanes that provide a bitter ginger flavor that enhances animal appetite and also improves nutritional value that ultimately results in an increase in food intake. Ginger is probably caused by an improved concentration of bile acid in the liver and its excretion from the body, which increases the digestion and absorption of lipids. It also helps to increase the absorption of essential nutrients and increase the stability of the feed and has a beneficial effect on the intestinal ecosystem by preventing the growth of pathogenic micro-organism.

Methanolic ginger extract shows a significant anti-leech effect ( $33.33 \pm 11.40$  min) which is manifested by causing paralysis and death in the short term. Leech infection can cause serious complications such as fatal dyspnoea, haemoptysis or haematemesis and other prevention problems if left untreated.

**Equine:** Ginger extraction has a promising effect on the recovery time of horses competing in endurance, jumping or chase events. Ginger extraction did not affect other physiological responses to exercise, such as heart rate, blood pressure, runtime fatigue, concentration of plasma lactate, basal temperature or column temperature. However, further analysis of the chemicals present in ginger extract is necessary to determine whether those chemicals can be retrieved through drug tests commonly performed in competition. In the current animal culture, many experts and horse owners turn to herbal remedies for pain cases when the horse does not respond or respond negatively to over-the-counter medications, such as omeprazole or ranitidine, or when they try to prevent future cases of wounded horses. Among herbal remedies, ginger is the most proven herbal remedy for ulcers in horses.

**Poultry:** The European Union has banned the use of antibiotic feed additives and nutritionists are trying to find alternatives, one of the best alternatives. Drinking ginger rhizome is one of the potential herbs with a variety of medicinal effects. For broilers and layers, this plant is used in a variety of ways, doses and lengths. Although reports on the effectiveness of ginger in poultry diet vary, there are indications that feeding this plant material can promote growth and weight gain in broilers, chicken egg laying features and may be involved in improving intestinal function and anti-oxidation in chickens. Most researchers have submitted that because of the effect of this natural product, the digestive tract would be emptied earlier and the use of feeds would be encouraged. The first result of Sutardi *et al.*, 2015. He has also suggested a few promising antimicrobial properties of wild ginger from Indonesia, and it may be used to treat chronic respiratory infections in chickens caused by *Mycoplasma gallisepticum*.

### ***Serenoa repens* ( Saw palmetto)**

*Serenoa* or saw palmetto, a native shrub-like palm of the Southern United States, together with Florida, Mississippi, Georgia, South Carolina, and Louisiana (Anderson and Oakes., 2012). Growing in acidic, basic, moist, or dry soil (Anderson and Oakes., 2012), *S. repens* is the most abundant palm tree in the United States (Bennett and Hicklin, 1998). Its succulent fruit ripens from August to October. Native Americans have used several elements of the *Serenoa* plant. *Serenoa* leaves are used to accustomed create roofs and baskets (Bennett and Hicklin., 1988). In addition, various communities throughout the United States have used palms in traditional medicine (Sosnowska and Balslev., 2009). The main target has been on the employment of plant-based therapies to treat bladder disorders, some of which include *S. repens* (Sosnowska and Balslev., 2009 and Lindshield, 2013). Phytosterols are pockets in plant cells and are cholesterol-like molecules (Ostlund, 2002). Phytosterols, particularly preparations of  $\beta$ -sitosterol, have been used successfully to treat the symptoms of benign prostatic hyperplasia (BPH) (Higdon., 2007). The major fatty acids present in *S. repens* are lauric, myristic, palmitic, stearic, oleic. And linoleic (Penugonda and Lindshield., 2014).

Benign prostatic hyperplasia is a non-cancerous growth of the prostate. The fatty acids and phytosterols of *S. repens* may act to inhibit the enzyme 5 $\alpha$ -reductase (De Monte *et al.*, 2014). This enzyme can contribute to BPH by converting testosterone into dihydrotestosterone. Benign prostatic hyperplasia has been shown to be related to a lower level of health in men, which may include reduced sexual function like erectile dysfunction (Bruskewitz., 2003). Treatment for BPH can thus improve male impotence and erectile function. Although supplements and derivatives from *S. repens* have been used in randomized clinical trials, few

studies have examined the composition of the various preparations used in randomized clinical trials (Penugonda and Lindshield.,2013). Studies have shown *S. repens* to have few side effects in treating BPH, whereas surgery and less invasive medical approaches will cause erectile and ejaculatory dysfunction (Orabi *et al.*,2011).

### **MECHANISM OF ACTION & THERAPEUTIC EFFECT**

Saw palmetto, also known as *S. repens*, is a fruit juice used to treat benign prostatic hypertrophy. A hexane ring separated from saw palmetto showed antiandrogenic and estrogenic effects in vitro. Two methods have been shown to potentially cause antihypertrophic effects. First, saw palmetto inhibits dihydrotestosterone and, secondly, inhibits the activity of 5- $\alpha$ - reductase. Two randomized, double-blind, double-blind studies have been published showing increased urine flow, decreased residual urine, decreased prostate size, and decreased urination frequency. In another study, saw palmetto was shown to be more effective in reducing urine residues and improving urine output than conventional prescription drugs, finasteride. A review of well-managed studies was provided by Wilt and colleagues. Saw palmetto was well tolerated with very serious side effects with limited intestinal complaints.

### **CONCLUSION:**

The use of herbal remedies in medicine is becoming progressively well-liked and many educational studies are now available. Extensive research data is accessible on the effect of herbs, from their therapeutic effect or from the point of view of their active ingredients. Some of these can be found in the suggested topic. The study of herbal medicine has had a profound effect on increasing my knowledge and serving to my patients. WHO, the World Animal Health Organization of the United Nations is trying to address the One World Health problem.

Research should continue to identify new biological agents that demonstrate anti-bacterial and anti-inflammatory activity in several drug-resistant bacteria without adverse effects on animals. The new discovery of phytochemicals will allow them to better understand their pharmacological effects, their therapeutic potential, and their drug-acquisition ways. Therefore, these refined or extruded phytochemical compounds is also a viable option for improving the treatment of zoonotic diseases in humans and animals. Other research as well as clinical trials should be conducted to gain in-depth knowledge of the use of phytochemicals such as drugs in veterinary medicine. There are certain herbs or supplements that are not compatible with or allopathic medicine. Simple examples of these are glucosamine sulfate, vitamin C, and the homeopathic remedy *Arnica montana*. These supplements all have a slight anticoagulant effect. When combined with NSAIDS, like meloxicam, phenylbutazone, or aspirin, there may be gastrointestinal bleeding or potentially dangerous intestinal bleeding. This should be taken into account when planning major surgeries.

#### **Ethical Approval and Consent to participate**

Not applicable

#### **Consent for publication**

As a corresponding author, I Sumitra Debnath certify that the entire article is an original creation and none of the material in the manuscript has been published previously, or has not been accepted or considered for publication elsewhere. I also certify that I have not assigned, licensed, or otherwise transferred any right or interest in the manuscript to anyone.

#### **Availability of supporting data**

Not applicable

#### **Competing interest**

As corresponding Author, I Sumitra Debnath confirm that the manuscript has been read and approved for submissions by all the named authors. This manuscript is original, has not been published before and is not currently being considered for publication elsewhere. The following authors have affiliation with organization with direct or indirect financial interest in the subject matter discussed in the manuscript.

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#### **Author's contributions**

- SUMITRA DEBNATH : Writing-original draft preparation, methodology, software, supervision.
- ARCHANA HAZARIKA : Conceptualization
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