Assignment type Homework assignment

Service Essay writing

Field Chemistry (Pharmacology)

Question 1 question

Assignment topic Give three examples of medicines that can be easily be purchased at a

local Supermarket or pharmacy with no description. Provide the name and

what it Is made of and the reason why people take them and thoughts on the herbal

medicine. Do you believe it can work?

Herbal medicine or botanic medicine is the practice of using plants and plant extracts for therapeutic purposes. Herbal medicine has been commonly used over the years for treatment and prevention of diseases and health promotion as well as for enhancement of the span and quality of life. Herbal medicine is the fulcrum of complementary and alternative medicine which in recent times is increasingly gaining widespread popularity all over the world and gradually steaming towards integration into the mainstream healthcare systems. Herbal medicine includes preparation of biologically active natural products that consists largely on herbs or herbal materials. It is based primarily on the fact that plants consist natural compounds that help prevention of diseases or healing to the body at large. These medicines contain numerous chemical compounds that have medicinal effect and they include alkaloids, flavonoids, terpenoids, phenols and essential oils. These compounds alleviate various health conditions including immune support and respiratory alignment. Countless varieties exist depending on the geographic location and the common ones include ginger, garlic, turmeric, Echinacea, Valerian and chamomile. The three herbal medicines to focus on this essay are garlic, ginger and Echinacea

**Garlic (Allium sativum)** is widely used as a flavoring in cooking but however it can be used as a medicine taken to prevent and treat a wide variety of conditions and diseases. Garlic has been used to treat bronchitis, hypertension, liver disorders, diabetes and fevers. Garlic is used today by people for the prevention of lung cancer, prostate cancer, colon cancer, and stomach cancer.

Garlic has a variety of bioactive compounds including organosulfur compounds, saponins, phenolic compounds and polysaccharides. The major active compounds of garlic are its organosulfur compounds such as diallyl thiosulfonate (allicin), diallyl sulfide, diallyl trisulfide and S allyl cysteine sulfoxide (alliin). The bioactive compounds found in garlic contribute to its medicinal value. Allicin and organosulfur compounds have been shown to possess potent antimicrobial properties and they inhibit the growth of a wide range of bacteria, viruses, fungi and parasites. These antimicrobial properties help in combating infections and supporting immune function hence leads to the well being of the human body

Garlic contains several antioxidants including flavonoids and sulfur compounds and these compounds assist neutralize harmful free radicals in the body and hence reduces oxidative stress and protects cell from oxidative damage. By reducing oxidative damage garlic bioactive compounds helps lower the risk of chronic diseases such as cardiovascular diseases and certain types of cancer

Organosulfur compounds in garlic exhibit potential anticancer properties. Studies have shown that these compounds inhibit the growth of cancer cells, induce apoptosis and inhibit the formation of blood cells that supply tumors with blood hence this anticancer mechanism inhibits development of cancer by blood supply limitation hence a major therapeutic potential of garlic

Bioactive compounds especially allicin and SAC possess anti inflammatory properties which help reduce inflammation in the body and potentially alleviate symptoms of inflammatory conditions. Chronic inflammation is associated with various diseases including cardiovascular disorders, arthritis and certain cancers which are potentially inhibited by be use of bioactive compounds of garlic

Garlic has enzymes including alliinase which play a crucial role in the formation of allicin. Other enzymes present in garlic include peroxidases and polyphenol oxidases which contribute to its antioxidant activity which prevents cell damage. Enzymes aid the breakdown and metabolism of other compounds in garlic influencing their bioavailability and health effects

These bioactive compounds work synergistically to provide the health benefits associated with garlic consumption. The concentration of these compounds in garlic can also differ depending on some factors such as garlic variety, cultivation conditions and processing methods. Additionally, individual responses to garlic can differ when using garlic as medicine hence sometimes advisable to seek consultation first.

There are many reasons why people take garlic as a herbal medicine and the most common reason is due to its potential health benefits. Garlic is believed to have positive effects on cardiovascular health since it helps lower blood pressure by promoting vasodilation and inhibiting the production of substances that constrict vessels. Garlic also reduce cholesterol levels including LDL and it inhibit platelets aggregation which prevent the formation of blood clots within the cardiovascular system.

Garlic is known for its antimicrobial properties particularly against bacteria, viruses, fungi and parasites.Garlic contains many bioactive compounds that are beneficial for the immune system. Garlic polysaccharides have an immunomodulatory effect and regulate the expressions of IL-6, IL-10, TNF-α, and interferon-γ in RAW 264.7 macrophages. Compared with black garlic, polysaccharides in fresh garlic exhibit a more potent activity in immunomodulation.It may help boost the immune system making it more effective in defending against infections. Studies show that garlic stimulate the immune activity of immune cells and enhances the production of antibodies thereby strengthening the natural defense system of the body and defense mechanisms.

Garlic support digestive health by stimulating the production of digestive enzymes which aid the breakdown of food and the absorption of nutrients. Another reason is garlic possess anticancer properties since its bioactive compounds such as organosulfur, flavonoids and allyl derivatives inhibit the growth and proliferation of cancer cells, induce apoptosis in cancer cells and prevent the formation of tumors hence garlic serves as a good anticancer therapy aiding in oncology and studies are still underway to understand how garlic aids the cancer treatment and cancer prevention by scientists.

Garlic is also an important source of several essential vitamins including vitamin c, vitamin B6, selenium and manganese. These nutrients play a crucial role in immune function and overall health. Garlic also offers renal protection since it was shown to alleviate nephrotoxicity. The aqueous extract of garlic was shown to reduce oxidative stress in the kidney of diabetic rats. In addition, the extract improved the renal plasma biochemical factors induced by alloxan in Wistar rats hence garlic proven to provide renal protection which is a medicinal function of garlic on the renal system

Another reason why people take garlic as an herbal medicine is because garlic has both anti-obesity activity and anti-diabetic activity. Garlic oil has anti-obesity properties and has been shown to counteract the influence of a high fat diet on the weight of body and adipose tissues. Garlic has been shown to reduce pancreatic cell injury, oxidative stress and pathological changes in streptomycin induced type 1 diabetes. With these medicinal importance people usually opt to take garlic for their general health.

**Ginger (officinale Zingiber)** is among the commonly used herbal medicines. Although often consumed for culinary purposes, it is taken by many patients to treat various condition. Ginger has been shown to be effective for pregnancy induced and postoperative nausea and vomiting. Today health care professionals recommend ginger to treat nausea, vomiting from motion sickness and cancer therapies. It is also used to treat mild stomach upset, to reduce pain of osteoarthritis and may be even used in hearth disease. Among others include digestive aid, pain relief, respiratory health and cardiovascular health

The biochemistry of ginger shows that ginger contains several bioactive compounds which make ginger have its medicinal value. Gingerol found in ginger is the main bioactive compound in ginger and has several medical significances. It possesses properties like anti-cancer properties, antioxidant properties and anti-inflammatory properties and this protects cells from damage or apoptosis. Medicinal properties of ginger including the alleviation of nausea, arthritis and pain have been associated primarily with gingerols found in ginger. It also possesses additional properties like anti allergic properties to various central nervous system activities and studies are underway on other medical importance of gingerol.

Shogaol are the other bioactive compounds of ginger and they are important biomarkers used for quality control of many ginger containing products due to their diverse biological activities. Shogaol is a derivative of gingerol and it has similar therapeutic properties but it is considered more potent. Shogaol exhibit anti-inflammatory effects in a variety of cell types including leukocytes, aids digestion and has shown promise in cancer prevention by inducing apoptosis in cancer cells hence aids in the oncological treatment at large. 6 Shogaol has been demonstrated to exhibit anticancer, antioxidative and anti-inflammatory actions more effectively than 6 gingerol due to the electrophilic Michael acceptor moiety presence.

Ginger essential oil derived from the rhizomes of ginger contains various volatile compounds including sesquiterpenes (such as zingiberene), monoterpenes and other aromatic compounds. Ginger oil is used in aromatherapy and massage for its warming and stimulating effects and these leads to muscle relaxation, relief muscle pain, improve circulation and boost energy levels

Zingerone is another bioactive compound of ginger and acts as antioxidants and studies show that zingerone primarily acts on reactive oxygen species, free radicals and also antioxidant sparing activity to elicit a positive beneficial response from the cells. Apart from the redox properties, zingerone has known pharmacological and biological activities including anti-inflammatory, anticancer, antimicrobial activity and hepatoprotective activity. Gingerols, shogaols, and cancer gingerols and shogaols have been studied for their potential anticancer effects. They have demonstrated inhibitory effects on cancer cell growth and proliferation as well as apoptosis induction which means they help promote death of cancer cells.

The reasons why most people take ginger as a medicine is because ginger has more health benefits and its therapeutic properties. The common use of ginger is in respiratory health whereby it is used to deal with issues like common cold, cough and bronchitis. It can also provide relief from congestion and improve breathing. Also ginger plays a key role in cardiovascular health whereby it lowers blood pressure, reduces cholesterol levels and improving blood circulation by reports from recent studies

Ginger is used to relieve digestive issues like nausea, indigestion and bloating hence helps in digestion. Ginger also has anti-inflammatory properties that help reduce inflammation and pain in conditions such as arthritis and muscle soreness. It is also used for pain relief in managing types of pain like headaches, menstrual cramps and other mild pains within the body leading to relief hence a good option to use. Due to its antioxidant content and antimicrobial activity, it helps to strengthen the immune system and reduce risks of infections and support overall immune function

**Echinacea** is one of the common herbs in America today. It is a native American plant named for the pricky scales in its large conical seed head which resembles the spines of an angry hedgehog. Several laboratory and animal studies suggest that echinacea contains active substances that boost immune function, relief pain, reduce inflammation and have hormonal antiviral and antioxidant effects. For this reason, professional herbalist may recommend echinacea to treat urinary tract infections, vaginal yeast infections, ear infections as well as slow healing wounds. Preliminary studies show that echinacea may help inhibit colon tumors when combined with cichoric acid hence an anticancer medicine.

Echinacea is believed to have several bioactive compounds including polysaccharides, alkamines, caffeic acid derivatives and flavonoids. These bioactive compounds are the ones which make echinacea have a medical value. The polysaccharides include arabinogalactans and heteroxylans and these compounds are known and believed to stimulate the activity of immune cells such as macrophages and natural killer cells thereby enhancing the immune response. The polysaccharides also have antioxidant properties and help reduce inflammation and hence prevents cell damage.

Flavonoids are also the bioactive compounds of echinacea and they include apigenin, luteolin, quercetin and rutin. Flavonoids are known for their antioxidant and anti-inflammatory properties. They may help reduce oxidative stress, modulate immune response and inhibit the activity of certain enzymes involved in inflammation. More research on flavonoids is underway to understand their potential antimicrobial, antiviral and anticancer effects and more knowledge is needed to understand their mechanisms of action and their clinical applications which is done by medical researchers and scientists.

Alkamides such as echinacein and dodeca- 2E,4E,8Z,10E/Z-tetraenoic acid isobutylamides are unique foe echinacea plant. These compounds are thought to have immunodulatory effects helping enhance the activity of immune cells and regulate release of inflammatory molecules. Alkamides also may possess analgesic (pain relieving) properties and therefore may be used as a pain killer by individuals.

Echinacea contains caffeic acid derivatives including cichoric acid, echinacoside and caftaric acid. Cichoric acid is believed to stimulate the production of immune cells and may have antiviral properties. These compounds are also believed and known to have antioxidant and anti-inflammatory effects. Caffeic acid derivatives may also support wound healing and have potential anticancer effects. It has also volatile oils which combine with polysaccharides and hence makes echinacea have a medical value.

The reason why many people use echinacea as a medicine is because it is a popular remedy which support immune function and treat various ailments. Echinacea supports the defense mechanisms against infections. It is often taken at the onset of cold flu symptoms to reduce their duration and illness. It is preferably used by people because it is considered safe for most individuals as it has mild side effects. The mild effects can include skin rash, allergic reactions and even gastrointestinal upset to some.

Other reasons why people use it is because of its anti-inflammatory effect which reduce inflammation within the body. It has also been used to support the treatment of conditions such as rheumatoid arthritis and inflammatory skin conditions and more research is underway for more understanding on this effect. Echinacea has also been used to promote wound healing and reducing skin inflammation. Studies suggest that it can help wound healing by stimulating immune response and reducing oxidative stress but further studies are required to confirm these effects of echinacea.

Echinacea may also be used to alleviate symptoms of upper respiratory tract infections such as the common cold by reducing the severity and duration of these symptoms. Studies suggest that echinacea extract exerted an antiviral action on the development of recurrent cold sores triggered by the herpes virus when taken prior to infection hence makes it advantageous to the person opting to use it as an herbal medicine due to its biological roles it plays in the entire body.

After the above information on these three herbal drugs, we have clearly seen the biochemistry of these drugs and the mechanisms the bioactive components found in them which leads medical relief. The drugs can work however its important to note that further research is underway and these herbal medicine despite their crucial role, they should never be seen as substitute for medicine. The advantage is their readily availability and can be cheap compared to medicine but several considerations have to be done like cases of underlying health conditions. Incase of underlying conditions its advisable to seek advice first from professionals since sometimes they can have tragic effects

In conclusion, ginger has shown promising effects in relieving nausea and vomiting, reducing muscle soreness and helpful in the digestive system. Garlic has shown potential benefits in reducing blood pressure, supporting immune function and reducing cholesterol levels too. Echinacea may have the potential to reduce the duration and severity of the common cold. Despite these conclusions, the evidence is not conclusive and more high-quality studies are needed to give more understanding and the main thing to consider is not to prefer then more than the actual medicine from health professionals.

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