Using tea in Nano-biomedical engineering and some of the new benefits of it

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ABSTRACT

Background: Nanotechnology is a promising field of interdisciplinary research. It opens up a wide array of opportunities in various fields like medicine, pharmaceauticals, electronics and agriculture. The potential uses and benefits of nanotechnology are enormous. Objective: In this article we were introducing some of these advances in nanotechnology with using the benefits of tea. Results: This article will discuss some of the benefits of new developments in the field of Nano-biomedical engineering applications that can be addressed in tea method for manufacturing dressing Nano rapid blood ligation with using acid Tannic within tea, and producing the anti-cancer nanoparticle using tea, and drinking water filtration using tea bags and also have some benefits in the field of health and medical treatment and coping with diabetes and the role of tea in preventing infections and seasonal allergies with the use of tea polyphenols are discussed in this paper. Conclusion: We’ve seen that by using this precious green leaves and a low-scale molecular synthesis (Nano level) we can achieve useful properties of the materials required and in some cases it lead to progress on its own, which in the past production of these materials was difficult or more expensive which with methods mentioned in this article can partly alleviate these problems and more progresses can be achieved.

INTRODUCTION

Tea is one of the most common drinks in all over the world, which is produced from the leaves of a shrub Camellia sinensis. About 98% of people drink tea as the first among all beverages available to use. The 75% of the estimated 2.5 million metric tons of desiccated tea that are produced annually is processed as black tea which is used by many countries. About 18–20 billion cups of tea are consumed daily in the world [4]. Iran is one of the top fifteen tea producing countries in the world. Iran contributes 1% to the total tea produced in the world while, China being the major tea producer contributes 33%. However, according to statistics, the trend shows a severe decrease in tea production in Iran. This trend has been attributed to various reasons; firstly, tea old, hence resulting in low yield and poor quality. Secondly, a large number of existing populations are of seed origin and seed grown tea cultivars are mostly heterozygous. Thirdly, the total area under tea plantation is 34000 hectares in Iran [1], and it is impossible to increase the area for tea plantation. Tea is good for health According to chemical studies, tea leaves contains more than 300 nutritious components needed by human bodies, and they are categorized as below:

Vitamins: Tea leaves contain a lot of vitamins, both water soluble and oil soluble. Only 10 minutes steeping of tea leaves in water will dissolve in average at least 80% of vitamins. Amongst all the vitamins, vitamin B2 and C are the most important. Vitamin B2 is easily deficient in Chinese meals, shortage of it can disorder metabolism and cause ulcers to mouth and tongues. Vitamin C has multi-functions, it can cure scurvy, it can also strengthen our resistance to illness, and protect us against cancers.

Minerals: Tea leaves contain more than 20 kinds of minerals, i.e. potassium, calcium, magnesium, copper, manganese, aluminum, zinc, natrium, phosphorus, fluorine, etc. Most of these minerals are essential to our bodies. Potassium regulates fluid levels within our body cells, fluorine strengthens our teeth and prevents dental caries, iron and copper play important role in production of blood, etc.

Amino Acid: Although the portion of amino acid in tea is little, they have many varieties and are much more fit to human needs, like thiamin, riboflavin, nicotinic acid and pantothenic acid, etc, all help elasticity of our...
blood vessels, prevent aging, and anti-radiation. Amino acid is also the main component of human protein, and protein is the basis of all living creatures.

Tea can be used to cure and prevent illness, and is good for health; it is because tea contains the follow substance:

Organic alkaline Tea consists of about 2 to 5% of alkaline, there are three kinds of alkaline in tea, namely caffeine, theanine and cocoanine. The values of these three organic compounds are very much the same. In general, they can refresh our nervous system and mind, increase efficiency, dilate blood vessels, strengthen our hearts, promote blood circulation of kidneys and help urination and perspiration, relax the smooth muscle, prevent asthma, chololithiasis, increase secretion of stomach acid and help digestion and arouse appetite.

Flavanoid Flavanoid is also known as tannin acid, constitutes to about 20 to 30 % components of tea, there are more than 30 kinds of elements in flavanoid, most of them have medical values, they produce capillaries, prevent internal bleeding, hinder arteriosclerosis, decrease the risk of blood clotting, high blood compressure or any coronary heart diseases, it can also kill bacteria and protecting us from cancer and is anti-radiation, etc.

Vegetable oil 3% of tea is vegetable oil, it is a kind of compound for making cell membranes, it can create antibiotics in a very short time, it is anti-radiation, and can improve blood functions and is anti-blood clotting.

Tea contains so many elements good for human health and nutrition, tea drinking has a special meaning in our health and can cure hundreds of illnesses, there are in general traditionally 24 kinds of treatments of tea:

- Lack of sleep
- Calm the nerve
- Brighten the eyes
- Refreshing mind
- Quench thirst
- Balance body temperature
- Quench summer heat
- Anti-toxic
- Help digestion
- Improve eye sight
- Remove oils
- Smoothen breathing
- Prevent constipation
- Cure dysentery and diarrhoea
- Prevent phlegm
- Cure rheumatism
- Strengthen teeth
- Cure heart pain
- Heal ulcer and tumor
- Cure fatigue
- Vitalizing
- Prolong age
- Help urination and perspiration
- Others (Like root of tea plant can cure ulcers of mouth, burning the tea leaves can fear off mosquitoes)

Nanotechnology is a novel scientific approach that involves the use of materials and equipment capable of manipulating physical as well as chemical properties of a substance at molecular levels. On the other hand, biotechnology involves using the knowledge and techniques of biology to manipulate molecular, genetic and cellular processes to develop products and services and is used in diverse fields from medicine to agriculture. Changes in agricultural technology have been a major factor shaping modern agriculture. Among the latest line of technological innovations, nanotechnology occupies a prominent position in transforming agriculture and food production. The development of nano-devices and nano-materials could open up novel applications in plant biotechnology and agriculture. Currently, the main thrust of research in nanotechnology focuses on applications in the field of electronics, energy, medicine and life sciences.

Nanotechnology is a promising field of interdisciplinary research. It opens up a wide array of opportunities in various fields like medicine, Pharmaceuticals, electronics and agriculture. The potential uses and benefits of nanotechnology are enormous. The current global population is nearly 7 billion people, with 50% living in Asia. A large proportion of those living in developing countries face daily food shortages as a result of environmental impacts or political instability, while in the developed world there is surplus of food. For developing countries, the drive is to develop drought and pest resistant crops, which also maximize yield. The potential of nanotechnology to revolutionise the health care, textile, materials, information and communication technology, and energy sectors has been well publicized. The application of nanotechnology to agriculture and food industries is also getting attention nowadays. Investments in agriculture and food nanotechnologies carry increasing weight because their potential benefits range from improved food quality and safety to reduced
agricultural inputs and improved processing and nutrition. While most investment is made primarily in developed countries, research advancements provide glimpses of potential applications in agricultural, food, and water safety that could have significant impacts on rural populations in developing countries. This review is concentrated on modern strategies used for the management of water, pesticides, limitations in the use of chemical pesticides and potential of nano-materials in sustainable agriculture management as modern approaches of nanotechnology [5]. This review is focused on modern strategies for Using tea in Nano-biomedical engineering and some of the new benefits of it.

Methodology:
Nanoscale science and nanotechnology have been demonstrated to have great potential in providing novel and improved solutions to many grand challenges facing agriculture and society today and in the future. This review highlights some of the most promising and important nanotechnology applications in agriculture; and recommends several strategies for advancing the best scientific and technological knowledge presently being examined. In addition, implications for human and environmental health, and technical, financial and capacity-related challenges as they relate to developing countries are identified.

Finally, some suggested mechanisms for partnerships and collaborations are also identified and suggested. Today, advances in nanotechnology which has been introduced as an interdisciplinary science is no secret [2]. In this article we were introducing some of these advances in nanotechnology with using the benefits of tea.

RESULTS AND DISCUSSION

Nano dressing to rapidly stanch the bleeding using Tannic acid in tea:
For stanching the bleeding in the fastest possible time, there is a material from natural dairy product that designed for dressing which can be useful in reducing military and civilian casualties. Dressing with a special gas cortical thrombin (another coagulant protein in the blood) and acid Tannic (available in black tea that has antibacterial properties) in nanoscale can be treated easily be used by the soldiers or medicines. Ability to facilitate the packaging of these gases dressing is very interesting, because it is possible to package and storage them and then, when needed, can be used very quickly. Today all hemostatic agents (stanching the bleeding) that are currently used, have some defects in applications. For example is not possible that use ligature (Tourniquet), which stretched like elastic wristbands, in neck injuries. Chitosan bands that were accepted by the United States Department of Defense, are only applicable in simple injuries. Ferrous handy dressings that are prevalent in the civil hospitals, are needs to be treated thrombin solution before placing it on the wound, so it cannot be used on battlefields. Idea for this is that get special dressing gases into blood coagulant protein before using that will provide a ready for use packages by soldiers and doctors. Currently this handy dressing is an alternative for us because they are soft and flexible, and they can be applied to a wide variety of wounds with no need for too much pressure on wound. For impact assessment, research put a soaked in thrombin gas bandage on bleeding spleens of an animal, and by applying the minimum pressure of thumb of an scholar for 60 seconds, the bleeding stopped. While the gas bandage with low levels of thrombin at least needs 160 seconds to stop the bleeding, and even after 12 minutes, cotton pieces with no thrombin layers are not able to clot blood. Direct absorption of gases in blood coagulation can be life-saving, because in the operating rooms and battlefields that the clinical standard are not provided, this will provide the possibility for faster performance.

Production of anticancer nanoparticles with using tea:
According to the Researches, if we stew One Pot of Darjeeling Tea (a Black Hindi Tea That grows At Region with The same Name) and adding gold salts to it, These Salts By Available Herbal Chemical Materials in Tea That are Famous for good Effects On Health, will be restored. While this Chemical Materials regulate the Size of Particles, they increase the Probability of Absorption by Cancerous Breast and Prostate Cells and increasing the capability of Using as a Drugs that aim Cancer. These Particles have also more Stability levels At Biological Environments. Discovering the Production of Nanoparticles using non-Toxic Materials of Tea, have a huge impacts on Medical and Technological Applications. Nanoparticles of Gold have a lots of Applications in Medical and Other fields of Technology but Now Synthesis of This Nanoparticles Needs the Toxic Reagents and this makes them Inappropriate for using them Inside of Body. Natural Chemical Materials that are used in this Method, are Safe for body and accomplished Reaction will not produce any Subsidiary Toxic Production, and it just have an Unpleasant Slightly Taste of Cold Tea.

Filtration of Water with tea bag:
Researchers At Two Different Universities has invented Two Effective methods of Filtration of Water which one of them used Tea bag and other one was used Nano Technology And Particles of Silver. Until Today, lack of access to beverage water remains one of the largest difficulties of millions of people all around the
world, but development and progresses in Nano Technology and Innovation of New water filters that more similar To Tea Bags Can Suggest so many Effective solutions.

Filter Tea Bag was the ideas of professor Called Kluet at the University of astlin Bush in The Czech Republic that was aimed to provide low-cost but effective way to purify unsafe water in impoverished areas of the world. This filter is compatible with standard size of bottle openings, which means that the filters are interchangeable and compatible with water quality that must be filtered, will be at a cost of between one and five cents per liter. As Kluet says, the easiest way to visualize these filters, is visualizing them in the form of tea bags. This filter is covered with using plastic outer shell called "biocide", i.e. the filter can purify water while it will also destroy bacteria. Also it located within the activated carbon filter that can destroy chemical contamination of water. The filtration capacity of the filter is very easy to remember: one bag = one liter of water. These filters are recyclable and fully absorbed the natural environment. All the technologies in the world have their own specific limitations, for example, it cannot be used to filter sewage water into drinking water, but if the water is heavily polluted that there is one million bacteria per ml of it, these bags can reduce them to 10 bacteria per ml. According to the report of World Health Organization of United Nations lack of clean water and poor hygiene every year caused the death of 1.6 million children in worldwide. Therefore Kluet wants these effective filters to as soon as possible distribute in various countries around the world.

Advantages of Black tea for diabetes:

Chinese scholars have studied on the amount of polysaccharide present in green tea, oolong tea and black tea. The aim was to examine the impact of these three types of tea in the treatment of diabetes. Polysaccharides are kind of gluseed that containing Starch and cellulose. These compounds can be useful for people who have diabetes because they cause glucose absorption delay.

Role of Tea Black at Confronting With Diabetes:

Black tea is rich in antioxidants that boost the immune system to deal with high blood pressure. A study has shown that advantages of black tea does not end here, and is also useful for dealing with diabetes. We know that Diabetes is a troublesome condition that affects millions of people around the world. So the best thing to do is to change lifestyle, eating right, exercise, and weight control from the beginning to prevent this bitter sugar disease. Researchers believe that drinking black tea that we drink is useful for boosting the immune system and fights diabetes. Black tea has a lots of antioxidant properties.

In addition, black tea is rich in antioxidants and can boost the immune system to deal with high blood pressure. Results of a Chinese study has shown that advantages of black tea does not end here, and it's also useful for dealing with diabetes. This tea in around the world is the second popular drink after the water. So scientists are more interested to explore different properties of it.

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In 2008 the results of a Scottish study has shown that black tea can deal with type 2 diabetes. Chinese scholars have concluded that polyphenols and antioxidants in tea that helps prevent damage to cells can also help control insulin function. Scottish research conducted in 2008 had shown that black tea fights diabetes better than green tea. However, green tea can burn fats better than black tea. Because the compounds in green tea helps to burn fat. These two types of tea also prevent the heart diseases. In 2005 also a research had been done on this issue. Reviews were done on rats have shown that black tea and green tea are both effective for dealing with diabetes. The results showed that both teas are also effective for preventing diabetic cataract disease. In 2005, researchers announced that black tea and green tea have an appropriate non-toxic combination that reduces the blood sugar level. In fact, drinking tea is a simple and inexpensive way to prevent or delay diabetes and complications from this disease. Researchers gave black and green tea to laboratory rats for 3 month. After studies it was found that these two types of tea prevent cataracts disease caused by diabetes and have a positive impact on blood sugar. According to this calculation, we must say that a 65kg person should daily drink a liter or 4 cups of black tea. Also this amount of tea shouldn't be eaten with lots of sugar, because sugar increases the risk of diabetes mellitus or type 2 diabetes. Also keep in mind that drinking tea immediately after a meal reduces the absorption of iron.
**Incredible benefits of tea:**

MRSA bacteria is a bacteria that grows only in part of face and their growth increases is cold seasons, especially in autumn and winter. In the fall and winter people drink hot coffee and tea have 5 percent less respiratory infections than those who do not do this. During a two-week study, people who daily drunk 5 cups of black tea, was five times more power to deal with the virus in their bodies. Doctors nowadays performing experiments that burn this germs to reduce the amount of colds and eliminate it.

**Benefits of green tea polyphenols:**

Poly Phenol Available At Leaf Tea Cause Reduction Weight. Studies has shown that regular consumers of green and regular tea have more proportionate fat around their abdomen. Green tea and regular tea contains chemicals that are fat oxidation wave. Compounds in green tea can prevent cancer and green leaves contain polyphenols, polyphenols can prevent cancer progression. Green tea can prevent prostate cancer. Regular tea cause healthy heart and reducing blood pressure. Generally fat of meals will increase the blood concentration. Tea will dilate blood vessels and thus reduces blood pressure. Green tea increases bone density. Osteoporosis is the major concern of the World Health Organization. Polyphenols in green tea, strengthens bones and helps prevent osteoporosis. In addition, tea strengthens the muscles and reduce inflammation. Further investigation has shown that green tea is one of the most important factors for bone recovery. Drinking tea will improve memory and concentration.

**Conclusion:**

Nanotechnology applications have the potential to change agricultural production by allowing better management and conservation of inputs to plant production. Researchers in nanotechnology can do a lot to benefit society through applications in agriculture and food systems [7]. We’ve seen that by using this precious green leaves and a low-scale molecular synthesis (Nano level) we can achieve useful properties of the materials required and in some cases it lead to progress on its own, which in the past production of these materials was difficult or more expensive which with methods mentioned in this article can partly alleviate these problems and more progresses can be achieved.

**REFERENCES**