

## Analysis of the Importance of Green Tea Polyphenol

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**Abstract:** Tea with scientific name of *Gambelia silences* is from prevalent and famous potable in the world and particularly in Afghanistan. The most important chemical combination of tea is poly phenol (green tea polyphenol) which has anti-oxidant attribute. Therefore, green tea alongside of drinking has lots of usages in various parts of human's life. In latest years it claimed that ascertainment and amplification of material and ornamental material which has medic specialty became more prospered. Lots of material from medic herbs probate as active material in ornamental things. Green tea polyphenol has too much popularity in parts of ornamental as meliorating of skin situation. This topic is a labor for collecting chemical features and academics information about green tea polyphenol for ornamental essential problems like senility, Rigidity, Skin blur, Head saltpeter, Hair abscission. This topic supplies the affection and mechanism action of green tea polyphenol and the conclusion of clinical tests on humans for ornamental materials.

**Keyword:** Epicatechin – EC, Epigallocatechin – EGC, Epicatechin gallate – ECG, Epigallocatechin Gallate – EGCG,

### 1. INTRODUCTION:

Increasing of the disposability expenditures in industry of ornamental and hygienic materials is one of the parts that are uplifting extremely. For example, checking and analysis of ornamental material in India between 2007 up to 2012 which is accomplished by RNCOS researchers shown that in last year's selling of ornamental materials has reached about 5,016 milliard dollar (23:2-25).

Herbs have been using in medicine and ornamental material since last centuries. Their potential has detected for treatment of different skin diseases, for prettification and for betterment of skin surface.

Gamelia sinensis is a member of Thecae family. Dry tea has big bask with white flowers and found in Asia and aboriginal China, But as commercial grown in Africa, Sirilanka, Malaysia and Indonesia.

Buds are used for producing of Eliang (Chinese black tea) and green tea. Unlike white and black tea production of green tea doesn't need for the oxidation of young tea leaves. Green tea grows up by the evaporation of new leaves in a high temperature. Therefore, it deactivates the oxidizing enzyme and polyphenol contents save changeless. Caffeine may be removed from green tea extracts to avoid from side effects. Extracts of green tea without caffeine are currently available. Anti-oxidizing extracts of green tea are called green tea (Catechin) that consists of four main (Epicatechin) liquids, are consist in:

(Epicatechin – EC) (Epigallocatechin-EGC) (Epicatechin gallate –ECG) (Epigallocatechin gallate –EGCG) Another components of that include three types of flavanone that also called Campfarol, corestin and merstin. Some enough amount of meristin has detected in tea and another digitations and this concentration of meristin will probably have some consequences on the environment of tea and its textures.

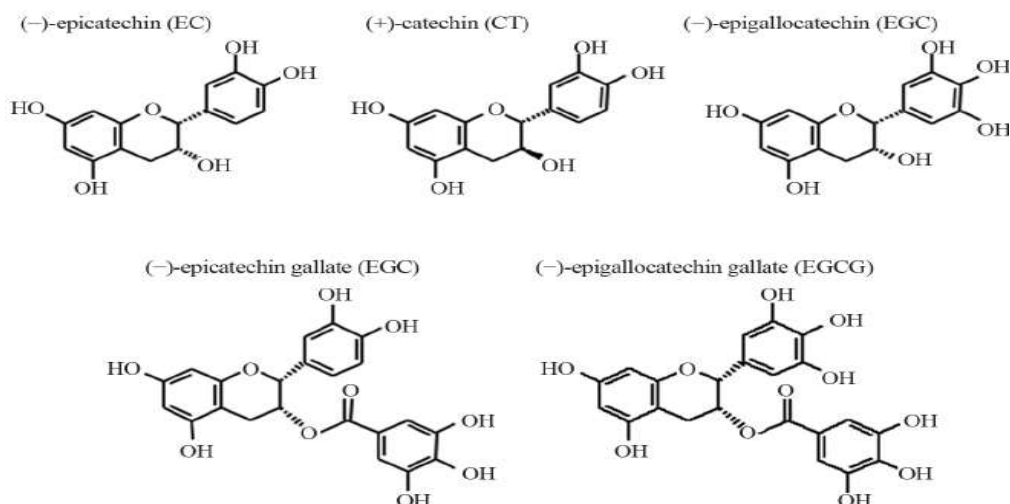


Figure 1: Formula and name of the major constituents of green tea

## 2. OBJECTIVES :

- To know the chemical attributes of green tea polyphenol
- To know about affection of green tea polyphenol on human's health
- To know Chemical importance and affection of green tea polyphenol on ornamental things

## 3. Chemical Features:

The extract of green tea is 25 times more active than vitamin C. It is said to be the AGCG is the reason of this. In alkaline solutions of GTC (PH>8) (Green tea catechin) it is fairly unstable. Whereas, in acidic solutions of GTC has shown a good stable process. The latest studies have shown that AGCG and AGC in an alkaline solution are more unstable than EC and ECG. it has described that EGCG and EGC in a buffer (Sodium phosphate) solution of human body doesn't circulate.

GTC is not resistant in a place with high temperature area. when converting AGCD into GCG probably have some changes of epimerization as generating of temperature. In this case this composition is inappropriate for green tea and its extracts.

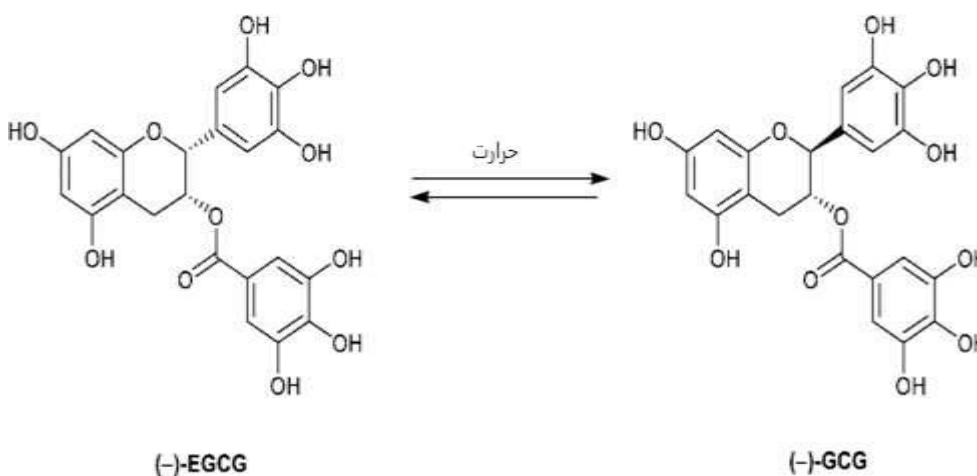


Figure 2 : Changing Epimerization

## 4. Biochemical Features:

The biochemical features of green tea are categorized in to 4 main parts: anti-oxidant, anti-cancer, anti – inflammation, anti-radiation. The green tea extracts include more and stronger anti-oxidant than vitamin C and vitamin E for human body. The affection of gas on polyphenol radicals which consist free lipid in green tea extracts can be seen obviously. The capability of GTB in green tea extracts for removing radicals which has free lipid are considerably higher about 50 times than extracts of Gingobalola. More researches have shown that an increased level of superoxide dismutase (SOD) and golotasium desmatuz (GSHPx) is possibly effective in prevention of GTC against lipid oxidation.

Furthermore, the feature of anti-cancer in extracts of green tea has been improving to a practical research point recently. Many other remakes, green tea extracts have rejecting affections in the bionts of cancer. In the laboratory examinations of caffeine and catechin that they are the main extracts of green tea. They will stop the progressing of cancer bionts and fertilizes the planned bionts death.

In addition, the extracts of green tea have the feature of anti-inflammation as widely. Therefore, it is possible for the curing of chronic inflammations.

Activity of antibacterial present in a Japanese extracts of green tea by the name of (S.Mutans). and the level of maltose decrease in the mouth after drinking green tea. Therefore, the extracts of green tea are possibly effective in hygienic protections of mouth and teeth.

Table (1) Medicinal uses of green tea polyphenol (GTP)

source	Mechanism	Application
3:44	Inhibition of $\beta$ -lactamases, HIV reverse transcriptase, collagenase, umbilical cord synthesis and other enzymes.	Antibacterial
4:23	Adjust the inhibition of low pelvic inflammation, decrease secretion, decrease cell growth.	Anti-inflammatory
5:44	Decreased ROS growth and cell death.	Anti-radiation
7:32	Inhibition of catechol methyltransferase enzymes carboxylic acetyltransferase, fatty acid synthesis and prevention of intestinal fat absorption.	Anti-obesity

4:12	Reduce Fat Production Produce Antimicrobial Effects on Acne	Anti-acne
4:12	By reducing dietary fat, antioxidant and anti-inflammatory absorption	Non-alcoholic liver disease
8-5:15	Increased levels of glucose transporter VI.	Diabetes
7:12	Inhibitory effect on Helicobacter pylori infection	Diarrhea
8:83	Inhibition of viral infection and urinary disorders is performed by adenine	Antiviral
9:129	Includes brain aging	Neuroprotection

**Green tea catchin in ornamental material for anti- wrinkle senility**

**5. Senility and anti-cancer:**

Free radicals have been recognized for improving of acidic oxidation, proteins, and lipids. And they can be harmful in the internal structure of DNA. Free radicals also organize the features of protein activator and factor of nucleus (NF-Kb). It is responsible for producing metalloproteins that analyze the available colognes which cause wrinkles of skin. In order they organize the overwriting of inflammation like intro lookin and tumor of alpha. These mediations of anti-inflammation activates NF-Kb and AP-1 through level of bionts and causes more damages. These are all the collected occurrences that are responsible of senility in the skin. The green tea and AGCG in addition that they are effective for absorbing free radicals that consist NF-KB and AP-1 with UV organized together and will defeat metalloproteins and collusions. More than this it has shown that polyphenol in green tea prevents from the activity of vitro and increase the rate of Biocentis colognes in the fibroblast of humans. Diana Santo Domingo the expert of skin diseases and her competitors accomplished a random small experiment by the name of Dosocore and they used from a cream containing 2,5 % EGCG on the cavities of the face.

Four volunteers that were healthy with remarkable telangiectasia have used ECGC in one side their faces and legal control cream in another side of their faces. After six weeks' biopsies removed from the spots of ECGC. For measuring VEDF and HIF-1a have used from immune Histochemical.

HIF-1a in cured sites ECGC decreased the result was altogether the epidermis of colored in the cured sites with 28.4 % in a positive legit. However, 13.5% of those sited have been cured by ECGC. The localized cure with ACGC on HIF-1a and VEGF has affected and can be used as deterring potential factor of telangiectasias.

**6. Optic Protections:**

The composer material of a diet that contains polyphenols help for protection of skin against internal light and adapts skin features that belong to structure and operation of contexture. The research results that has been accomplished by tube sing -K and its counterparts shown that the skin of humans being can be cured by using green tea extracts or by one of its compositions. EGCG and ECG is one of the most effective features for repressing purple radiation and also has been shown that extracts green tea can decrease the harms of DNA that come by purple radiation and the most possible reason is its negative effects of anti-oxidant and anti-inflammation. It is considered that the using of green tea extracts and some of its components may possible to decrease the negative effects of some indign sunlights to the human skin like optic protection. In other studies they have shown which using from green tea keeps the human skin from 24 hours up to 72 hours against sunlight. It also decrease the number of sunburn cells in the face 30 minutes before exposing in front of Ultraviolet of UVB and while using concentration of 1 up to 10 percent.

Heinrich and his counterparts in 12 weeks studies that controlled by palasbo, sixty volunteer women in a group randomly selected. Participants used a drink contains green tea with polyphenol and 14.2 mg catechin. Protection of skin from the light and its structure and functionality in the very beginning of first week, seventh week and 12<sup>th</sup> week has measured. After exposing the spots of skin under 1.25 erythemia caused of ultraviolet it decreased about 16 up to 25 percent after 6 to 12 week considerably. The skin features structural that is affected are as follows...

Attraction - Burliness - Malting - congestion, and homeostasis of water. Using the green tea polyphenol during 12 week will increased the blood stream and oxygen transporatition on skin. Using of polyphenol in drinkable material will have protection of the skin against harmful radiation of UV, and strengthens the women skin and its quality.

**7. Whitening of the skin:**

The ultraviolet radiation is recognized as a whole one of the main feature of skin pigment. When it faces with ultraviolet radiation malateset will increase the nitrite-oxide of internal cells that is caused for creating water fall signals of trwinez. The reflection of ultra violet also affects through parakrin.

The productions for whitening unterwines is also the removers of cytokine. The different derivatives of glick-acid of flavonol are separated from green tea and some of them has been recognized as one of the removers. Kim and

her cooperators reported that EGCG and hinkitol not only the remover of terozines but also is one of the effective attribute for increasing MITF productions, Ellagic acid of green tea polyphenol as a strong anti-oxidant, and remover of teringenos also found in the green tea.

The effects of lightening of skin by Ellagic acid has not realized completely but probably as blocking of copper in place where that terosinaz exist for decreasing its activities and for restraining reproduction of malanosits and for generating melanin. More than this the activities of anti-oxidant of Ellagic acid and vacating of ROS (the active chemical material that contain oxygen ) will help in the effects of whitening skin.

### **8. Infection of skin (Biodegradable):**

When the skin is under the attack of microbes like viruses and bacteria's often it reflects in the way of infection. The inflammation also can caused by internal elements like self-sickness as a result the skin wastes produce and the skin is apparently is changed. Recently the feature of antimicrobial of GTP is formally recognized. Many reports shown strong relation between GTP and prevention from inflammation by some viruses like Barr virus-Epstein-adenovirus and infloza. C.E Isaacs and cooperators studied the inter connected viruses of the skin infection by the using of biont model .and found that EGCG,HSV deactivated(Alpha herpes human virus). It is suggested that the features of anti-virus GTPS is the reason of strong connection of protein that has low connection in surface virus protein and also their abilities are shown from the way of plasmatic membrane that they prohibit the particles of viruses in the cells as the epidermics layer is placed. The cells carry in the external part and finally they die .

### **9. Anti-dandruff:**

As epidermis level replace itself for ever cells carry to outside and at least die. These blobs are very small in most of the people until it can be visible. In this way the special conditions cause that circulating of blood in died cells of skin in big and fat masses that look as white or gray powder on head skin, and clothes, known as dandruff.

The green tea removes the dries of the skin without removing the layer of skin. Researches accomplished experiments for studying more about the infection of skin on an animal model that is cleared the red dry skin has more production of cells than normal rate. Stephan and his cooperators shown which the animals that they are cured by green tea have more and active production of cells on their skin.

The recent researches about hair have shown that green tea is also useful for the hair of the head. On the bases of a study in 2007 that is done by Dr.stephan from the university of gorgin show that the green tea is a hope for curing the dandruff in the head. It is considered that green tea organizes recycle develop of skin cells with a protein named caspase-14. Also it has shown that green tea relieves the skin and decrease the inflammation. W

### **10 Green tea and hair growth:**

The article about green tea and hair that is broadcasted by the central scientist of research in the centre of sytama cancer in Japan, pointed that green tea causes to decrease the generation of Tumor Necrois Factor Alpha-(TNF). TNF-alpha is effective in the hair falling. They have appointed that that using much extent of green tea causes for increasing of sexual hormones and change into dihydrotestestrone DHT.

DHT is a hormone that causes of growing hair in teenage period. In this way according to the descriptions of Medical association of America some of men and women have follicles of hair that they are responsible for negative answers for DHT. Therefore the decreasing rate of DHT in the blood flowing can protect the follicles of the hair for people that they are suffering from baldness by DHT another study in the year of 2005 by Charles in the medicine university of Dew in Los Angles that is done on the mice as a model have been accomplished, 60 rats that they had the same model and dividing in 2 groups. In one group have given potable water and in other group have given water containing polyphenol extracts of green tea. 33 percent of the rats that they have used the polyphenol water have experienced hair growing, another group that only used water none of them had experienced the growth of the hair. The study on 2007 that is done by the medical faculty of national university civil, Shown the effects EGCG on hair Follicles and bionts of the skin and also the kind of existence Follicles in hair and the controller of hair growing that has role in hair falling for men. The Korean researchers have examined the EGCG on the planted follicles in the laboratory on the scalps of the head In the comparison of controlled plants, treated plants with EGCG have shown the increasing of hair follicles lifetime, increasing of hair growth and reproduction of skin proteins. The researchers also have found some chemical changes that is caused increasing of hair growth in treated samples of EGCG. 10 percent of EGCG in ethanol for 10 continuous day in tow part of leg for three ordinary volunteers have done and then the cured areas have removed in dimension of 1.5×1 . The samples of tissue which consist hair follicles carefully drain to alone follicles of hair. Skin papiles separate under sterio microscope as selective and it separate in alone bionts for analysing. According of researcher explanations it has proved that the events happened in vitro exactly the events has happened in vivo too. Therefore the chemicals changes that happened on the scalp of the head by using of 10 % EGCG that cures in ethanol. The affections of EGCG for different cells of hair follicles and for growth of the hair are not known yet and need for more investigations.

The green tea is not famous only for drinking it is also capable for removing of tensional symptoms. The latest researches have shown that green tea possibly effective for removing the skin problems by the help of EGCG in green tea. This will help for budding of cells in during of their death. And it is one of the possible way that can be useful for leaving the tensional symptoms. Dr. Stephen Hsu from the George medical university in the department of ecology and dental has found that EGCG can cause the death of skin cells on the near of skin surface divided in rejuvenation and setting back. However, Dr. Stephen confessed that the full advantages are not recognized yet and he believes this will help for the strengthening of skin state.

He told: If the skin cells around the trauma or inflammation doesn't have betterment in the time it will not cure in different time. If we can extend the reproduction of skin cell, then we can accelerate the curing of the trauma and avoid from manifestation of it. The symbols of tensional are by tears on the skin and ulcers, this problem can be protected by the green tea and it is huge hope to remove the tensional symbols.

Table 2: Summary of the use of cosmetics in polyphenol green tea

Mechanism	Application
UV-induced erythema inhibition and antioxidant effect	Optical protection
It inhibits collagenase activity and increases the rate of collagen biosynthesis in human fibroblasts.	Aging and anti-wrinkle
Inhibition of influenza-inoculated virus in cell culture	Skin infection (antimicrobial)
Inhibits the production of tumor neural factor alpha (TNF-alpha)	Hair growth and hair loss
Inhibition of inflammation, by regulating caspase-14 expression, is a protein that controls the life cycle of a skin cell.	Dandruff

**11. CONCLUSION:**

Considering the above mentioned in the researching article we conclude that green tea is having many special features and wide spread chemical materials some of them are more important that cause of color and taste of green tea. Polyphenol in green tea is one of the interested material for making fashion tools.

In this short survey the information about human that has effects on the skin have been described. Altogether, however it is possible to be small effects but they are remarkable and can change the appearing of the skin. As each substance can be advantageous it must be resistance in production storage and consuming. It should not be poisonous for consumers. And it should be effective in the target place. for increasing the cosmetic materials of the skin it needs many studies. For example, having needs for exact tools like uniforms that must be available for increasing the provoke of the skin.

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