

GULP ORAC TEA AS A HEALTHFUL BEVERAGE THAT REDUCES THE SMOG SIDE EFFECTS ON HEALTH

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Abstract

Smog, a blend of smoke and fog, denotes a hazardous amalgamation of air pollutants, predominantly ground-level ozone, and fine particulate matter, leading to a dense and foggy atmospheric condition. According to a survey Lahore is the second-largest city in Pakistan and has the highest rate of smog and most polluted city. According to the World Health Organization, levels of ambient particulate matter in Lahore far exceed ($10 \mu\text{g}/\text{m}^3$ and $20 \mu\text{g}/\text{m}^3$ respectively) the recommended values given by WHO and NEQS guidelines. This environmental issue has garnered global attention due to its damaging effects on human health and the environment. The origins of smog can be traced to industries, vehicular emissions, and other human activities that release pollutants into the air. It's important to note that while antioxidants found in foods with high ORAC values can be beneficial, they should be considered as the sole solution to counteracting the effects of smog and Gulp ORAC tea is one of them. This essay aims to explore the causes, consequences, and potential solutions to lessen the impact of smog in our country. Exposure to smog can certainly have severe impacts on respiratory and cardiovascular health. Exposure to smog-generated free radicals poses a threat to lung tissues, potentially causing damage. Antioxidants play a crucial role in neutralizing these free radicals, thereby reducing their harmful impact and safeguarding lung cells from oxidative injury. The study was performed to reduce the side effects of smog by using Gulp ORAC tea. This tea contains vitamin C, vitamin B6, Shogaols, beta-carotene, Glycyrrhizin acid, flavonoids, Chlorogenic acid, rosmarinic acids, caffeic, vanillic, and Epigenin. Adding Gulp tea to daily routine can boost immunity which helps to protect overall health and well-being by defeating the adverse impacts of smog. After seeing the complexities of the environment such natural remedies are the life protectors that help to improve overall well-being without causing any adverse health impact.

INTRODUCTION

Smog, a blend of smoke and fog, denotes a hazardous amalgamation of air pollutants, predominantly ground-level ozone, and fine particulate matter, leading to a dense and foggy atmospheric condition. According to a survey Lahore is the second-largest city in Pakistan and has the highest rate of smog and most

polluted city (Raza et al., 2021). According to the World Health Organization, levels of ambient particulate matter in Lahore far exceed ($10 \mu\text{g}/\text{m}^3$ and $20 \mu\text{g}/\text{m}^3$ respectively) the recommended values given by WHO and NEQS guidelines (Riaz et al., 2018). This environmental issue has garnered global

attention due to its detrimental effects on human health and the environment. The origins of smog can be traced to industrialization, vehicular emissions, and other human activities that release pollutants into the air (Chu et al., 2022). This essay aims to delve into the causes, consequences, and potential solutions to alleviate the impact of smog on our planet.

Several factors contribute to the formation of smog, including industrial emissions, vehicular emissions, and agricultural practices. These activities release pollutants such as nitrogen oxides, volatile organic compounds, and particulate matter into the atmosphere, which react with sunlight to form ground-level ozone and fine particulates (Wielgosiński et al., 2020).



The consequences of smog are manifold, encompassing adverse health effects, environmental degradation, and exacerbation of climate change (Frankowski et al., 2020). Prolonged exposure to smog can lead to respiratory illnesses, cardiovascular diseases, and even premature death. Additionally, smog contributes to the degradation of ecosystems, acidification of soil and water bodies, and loss of biodiversity (Javed et al., 2021). Furthermore, the presence of pollutants like black carbon in smog accelerates global warming by absorbing sunlight and heating the atmosphere (Ontawong et al., 2020b).

To mitigate the impact of smog, various solutions can be implemented. These include reducing emissions from industrial and vehicular sources through the adoption of cleaner technologies and stringent regulations (Eriksen et al., 2023). Promoting sustainable agricultural practices and enhancing public transportation infrastructure can also help

reduce smog levels (Stanaszek- Tomal, 2021). Additionally, investing in renewable energy sources such as solar and wind power can mitigate the reliance on fossil fuels, thus reducing air pollution (Grebski et al., 2020).

Exposure to smog can indeed have severe repercussions on respiratory and cardiovascular health. Fine particulate matter and ozone, key components of smog, can infiltrate deeply into the respiratory system, triggering conditions such as asthma, bronchitis, and exacerbating allergies (Naureen et al., 2022). Prolonged exposure heightens the risk of cardiovascular diseases and premature mortality. Moreover, the environmental impacts of smog are far-reaching. It contributes to acid rain formation, which destroys soil, water bodies, and vegetation (all plant and trees collectively that belongs to specific area), as well as deteriorates structures and monuments. Reduced visibility from smog poses significant hazards to transportation and

air travel safety (Sajjad et al., 2020). Additionally, certain smog-forming pollutants, like black carbon, play a role in climate change by absorbing sunlight, thereby warming the atmosphere and worsening global warming while also influencing regional weather patterns (Zhu et al., 2020).

On the other hand, ORAC, standing for Oxygen Radical Absorbance Capacity, is a metric used to quantify the antioxidant capacity of substances. Antioxidants are renowned for their ability to neutralize harmful free radicals in the body, which can arise from exposure to environmental pollutants such as those found in smog (Moldoveanu et al., 2021a). Smog contains an array of pollutants like particulate matter, ozone, nitrogen oxides, and volatile organic compounds, which can induce oxidative stress in the body by inhalation. This oxidative stress can lead to cellular and tissue damage, particularly affecting the lungs and exacerbating respiratory ailments (Gangwar et al., 2020). Antioxidants present in foods rich in ORAC, such as fruits, vegetables, and certain spices, can potentially help combat the negative effects of smog on the lungs through several mechanisms:

Exposure to smog-generated free radicals poses a threat to lung tissues, potentially causing damage. Antioxidants play a crucial role in neutralizing these free radicals, thereby reducing their harmful impact and protecting lung cells from oxidative injury. Furthermore, smog exposure often induces inflammation in the lungs (Ontawong et al., 2020a). Antioxidants own anti-inflammatory properties that can help in relieving inflammation triggered by pollutants, thereby assisting in mitigating damage. By protecting delicate lung tissues from oxidative stress, antioxidants may contribute to maintaining their structural integrity and function, thereby supporting overall lung health (Janciauskiene, 2020). Additionally, certain antioxidants aid the body's natural detoxification processes, assisting in the elimination of pollutants and toxins absorbed from smog. This highlights the significance of integrating antioxidants into strategies aimed at explaining the adverse effects of smog exposure on respiratory health. It's important to note that while antioxidants found in foods with high ORAC values can be beneficial, they should not be considered as the sole solution to counteracting the effects of smog (Sdona

et al., 2022). Minimizing exposure to smog and other pollutants through measures

like using air purifiers, wearing masks in highly polluted areas, and supporting clean air initiatives are also crucial for maintaining respiratory health (Raza et al., 2021). Additionally, a balanced diet rich in various antioxidants and nutrients contributes to overall well-being, including lung health (Shang et al., 2021b). This study was performed to reduce the side effects of smog by using Gulp ORAC tea. This tea contains vitamin C, vitamin B6, Shogaols, betacarotifileno, Glycyrrhizin acid, flavonoids, Chlorogenic acid, rosmarinic acids, caffeic, vanillic, and Epigenin. These are all the ingredients of Gulp tea stands out against the damaging effects of smog. It contains antioxidant properties that helps in boosting body's defensive mechanism and aiding in mitigate the oxidative stress induced by pollution. By adding Gulp tea in daily routine, can boost the immunity that help to protect the overall health and well-being by defeating the adverse impacts of smog. After seeing the complexities of environment such natural remedies are the life savior that help to improve overall well-being without causing any adverse health impact

Literature Review

Nowadays, People are getting sick due to excessive levels of smog in Pakistan. According to a survey Lahore ranked as the most polluted city in Pakistan (Jabeen et al., 2021). Smog refers to a form of air pollution resulting from the interaction of various pollutants in the atmosphere, predominantly found in urban and industrial areas with high concentrations of emissions from diverse sources. The term "smog" combines "smoke" and "fog," depicting the characteristic appearance of the polluted air (Yasmeen et al., 2022).

In modern-day, there is a developing trust in natural remedies due to their minimal or nonexistent side effects, with Gulp ORAC tea being one such option. ORAC stands for Oxygen Radical Absorbance Capacity, measuring the antioxidant capacity of a substance (Munteanu et al., 2021b). Antioxidants are known for their ability to lessen harmful free radicals in the body, which can be produced due to exposure to environmental pollutants like smog (Farris et al., 2022).

Foods rich in ORAC, including fruits, vegetables, and certain spices, contain antioxidants that potentially aid in mitigating the adverse effects of smog on lung health. Gulp ORAC tea, comprising vitamin C, vitamin B6, Shogaols, beta-carotene, Glycyrrhizin acid, flavonoids, Chlorogenic acid, rosmarinic acids, caffeic, vanillic, and Epigenin, offers various health benefits due to its antioxidant content.

Health benefits of Gulp ORAC tea

Gulp ORAC (Oxygen Radical Absorbance Capacity) tea boasts a rich antioxidant profile, offering robust protection against free radicals. These antioxidants play a pivotal role in neutralizing oxidative stress within the body, thereby promoting overall health and well-being (Shang et al., 2021a). The elevated levels of ORAC in this tea bolster cellular defense mechanisms, shielding cells from the detrimental effects of free radicals. This safeguarding is essential for preserving cellular integrity and diminishing the risk of chronic diseases. Consistent consumption of Gulp ORAC tea has been linked to anti-aging advantages, as antioxidants combat the impact of oxidative stress on the skin and other tissues, potentially leading to a more youthful appearance and enhanced skin health (Fried et al., 2023).

Moreover, the antioxidants found in Gulp ORAC tea may contribute to cardiovascular health by mitigating oxidative damage to blood vessels and cholesterol. This protective action could potentially reduce the likelihood of heart disease and promote a healthier circulatory system

(Moldoveanu et al., 2021b). Furthermore, the antioxidant properties of Gulp ORAC tea augment the function of the immune system, aiding the body in defending against infections and illnesses. Such immune support is invaluable for maintaining overall health and vitality (Moldoveanu et al., 2021c).

Shogaols and its importance

Shogaols are indeed bioactive compounds present in ginger, particularly in its dried or processed forms. While there is limited research specifically focusing on the effects of Shogaols on lung health, ginger as a whole contains various compounds that have demonstrated potential benefits for respiratory health (Yocum et al., 2020). Shogaols exhibit anti-inflammatory properties, similar to other constituents found in ginger. Inflammation in the lungs can

contribute to conditions such as asthma, bronchitis, or chronic obstructive pulmonary disease (COPD). By mitigating inflammation, Shogaols may assist in improving certain symptoms associated with these conditions (Zhang et al., 2022).

Moreover, Shogaols, like many other compounds in ginger, can show antioxidant activity. Antioxidants are crucial in fighting with oxidative stress, which can inflict damage on lung tissues. By scavenging free radicals, Shogaols might aid in protecting lung cells from oxidative damage induced by pollutants or other environmental stressors (Pan et al., 2024).

Vitamin B6 and their health benefits

Vitamin B6, also known as pyridoxine, plays a crucial role in maintaining overall health, including supporting lung function indirectly through its involvement in various bodily processes:

Vitamin B6 plays a crucial role in bolstering the immune system by aiding in the production of antibodies and immune cells (Stach et al., 2021). A strong immune system is vital for protecting the body against various infections, including respiratory illnesses that may affect the lungs. Additionally, Vitamin B6 contributes to the regulation of inflammation by modulating the production of specific cytokines and immune cells involved in the inflammatory response (Mayengbam et al., 2020). Inflammatory processes within the lungs can exacerbate conditions such as asthma or chronic obstructive pulmonary disease (COPD) (Cheng et al., 2023).

Furthermore, Vitamin B6 is indispensable for the production of hemoglobin, the molecule found in red blood cells responsible for transporting oxygen throughout the body. Adequate oxygenation is essential for maintaining optimal lung function. Therefore, ensuring sufficient intake of Vitamin B6 is crucial for supporting immune health, regulating inflammation, and facilitating proper oxygenation, all of which are vital for preserving lung function and overall well-being (Zhu et al., 2023).

Homocysteine Regulation: Vitamin B6, along with other B vitamins, plays a crucial role in regulating homocysteine levels, an amino acid associated with cardiovascular health (Bajic et al., 2022). Elevated homocysteine levels have been linked to an increased

risk of cardiovascular diseases, which can indirectly impact lung health. While, vitamin B6 doesn't directly target lung function, its involvement in supporting the immune system, regulating inflammation, aiding in oxygen transport, and contributing to overall cardiovascular health indirectly benefits lung health (da Silva et al., 2020).

A balanced diet rich in sources of vitamin B6, such as poultry, fish, chickpeas, bananas, and fortified cereals, can help ensure adequate intake to support overall well-being, including lung function. By maintaining optimal cardiovascular health through the regulation of homocysteine levels and other mechanisms, vitamin B6 indirectly contributes to the well-being of the lungs (Ofoedu et al., 2021). Therefore, incorporating vitamin B6-rich foods into one's diet can play a part in promoting lung health alongside overall wellness.

Vitamin C and its health benefits

Vitamin C, also known as ascorbic acid, is a potent antioxidant that offers several benefits for lung health, particularly in situations involving exposure to smog and other environmental pollutants (Colunga Biancatelli et al., 2020). Vitamin C acts as a potent antioxidant, effectively scavenging free radicals produced by exposure to smog (Kaźmierczak-Barańska et al., 2020). These harmful free radicals have the potential to induce oxidative stress and harm lung tissues. By neutralizing these free radicals, vitamin C contributes to protecting the lungs from potential damage (Roa et al., 2020). Smog exposure is known to trigger inflammation within the respiratory system. Vitamin C possesses anti-inflammatory properties that can help alleviate the inflammatory response in the lungs, potentially diminishing the severity of inflammation caused by pollutants (Utlu et al., 2023). Additionally, vitamin C plays an essential role in bolstering the immune system. It enhances the functionality of various immune cells, which can aid in protecting the lungs against infections that may be exacerbated by smog exposure (De la Fuente et al., 2020). In cases of increased mucus production due to pollutants, vitamin C may have mild mucolytic effects, helping to loosen mucus and ease congestion, thereby supporting clearer airways (Cerullo et al., 2020). Vitamin C is involved in the synthesis of

collagen, a crucial component for repairing and maintaining the structure of lung tissues. This can contribute to the repair of any damage caused by oxidative stress from smog exposure (Righi et al., 2020).

Including foods abundant in vitamin C, such as citrus fruits, strawberries, kiwi, bell peppers, and broccoli, in one's diet can be beneficial for maintaining overall lung health, particularly in areas with elevated pollution levels (Doseděl et al., 2021). Nevertheless, it's crucial to recognize that while vitamin C can provide support, it cannot replace the importance of minimizing exposure to smog and other pollutants. Adopting a strategy that combines a diet rich in antioxidants like vitamin C with efforts to reduce exposure to pollution is essential for promoting lung health in smoggy environments (Carr et al., 2020).

ORAC value

The ORAC (Oxygen Radical Absorbance Capacity) value is a laboratory test utilized to measure the antioxidant capacity of various substances, including fruits and vegetables (Munteanu et al., 2021a). While there is no direct evidence linking ORAC value specifically to lung health amidst smog exposure, research indicates that antioxidants may offer protective benefits against oxidative stress and inflammation induced by air pollution (Sakurai et al., 2022). Air pollution, including smog, has the potential to instigate oxidative stress within the lungs, thereby triggering inflammation and other respiratory complications (Shahriyari et al., 2022). An investigation was done on the impact of particulate matter (PM) pollution on HaCaT cells revealed that chlorogenic acid, which is present in water celery extract, mitigated the production of reactive oxygen species (ROS) and lipid peroxidation induced by exposure to PM10. A separate study identified that standardized *Smilax china* L. root extract, which includes chlorogenic acid, decreased the generation of reactive oxygen species (ROS) in A549 human lung epithelial cells provoked by tobacco smoke condensate (Dai et al., 2021).

Role of flavonoids

Flavonoids are significant contributors to promoting lung health and mitigating various lung diseases,

including chronic obstructive pulmonary disease (COPD), lung cancer, acute respiratory distress syndrome (ARDS), and asthma (Fan et al., 2022). These naturally occurring compounds possess antioxidant, anti-inflammatory, and anti-allergic properties, which are pivotal in their therapeutic efficacy against lung inflammatory disorders (Beigh et al., 2022). Research indicates that flavonoids, notably quercetin, exhibit favorable effects on COPD and can potentially impede the advancement of pulmonary conditions. Experimental studies and theoretical analyses have supported that flavonoids demonstrate a stronger inhibitory effect against lung cancer (Yao et al., 2022).

Moreover, specific flavonoids have been linked to protective effects against asthma and obstructive lung diseases. Epidemiological evidence supports the concept that a substantial intake of apples, ample amount of flavonoids, may offer protection against asthma and COPD (Mondal et al., 2020). To conclude, flavonoids play a crucial role in maintaining lung health owing to their antioxidant, anti-inflammatory, and anti-allergic characteristics. They exhibit promise in mitigating the progression of diverse lung diseases (Gulati et al., 2021).

Epigenin and its role

Epigenin, also referred to as β -guaiainine, is a significant constituent of dietary fiber and has demonstrated diverse health advantages, including its potential in addressing air pollution and its impact on lung health (Cicek et al., 2021). Although direct evidence linking Epigenin specifically to lung health amidst smog exposure is lacking, certain studies indicate its potential protective effects against oxidative stress and inflammation induced by air pollution (Çetin et al., 2023).

Epigenin, a flavonoid present in several plants such as parsley, celery, and chamomile, possesses a range of properties that could potentially promote lung health, especially in addressing the consequences of smog exposure (Mushtaq et al., 2023).

Conclusion

As we know that rate of smog is gradually increasing day by day in different countries and Pakistan is one them that declared as a most polluted country. As discussed in this review article, there are many

diseases are linked with smog including respiratory diseases, lung diseases and chest infections. After knowing all the benefits of Gulp ORAC tea as it contain huge amount of antioxidants, flavonoids, vitamin C, and vitamin B6. These compounds can help to boost the immunity and protect the human from different diseases that caused by smog. All the ingredients of Gulp tea stands out against the damaging effects of smog. It contains antioxidant properties that helps in boosting body's defensive mechanism and aiding in mitigate the oxidative stress induced by pollution. After knowing the complexities of environment these natural therapies are the life rescuer that help to improve overall well-being without causing any adverse health impact. In summary, ORAC tea is a beneficial beverage that provides a multidimensional approach to lessening the adverse effects of smog. This natural remedy offers a promising solution to navigate the adverse effects of smog by supporting a healthier lifestyle and a cleaner environment.

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