

Green tea extract

Its potential protective effect on bleomycin induced lung injuries in rats

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- The interest in the use of plant extracts in the treatment of several diseases is widespread in many parts of the world . Medicinal plants stand out as important sources of new therapeutic approaches being more safe & low cost .

Green tea , is a beverage that is popular worldwide. Polyphenols in green tea have been receiving attention for the maintenance of human health . The contribution of antioxidant activity in preventing diseases caused by oxidative stress has been focused upon.

Bleomycin is an antitumor antibiotic that was isolated from a strain of streptomyces verticillus. It has been used successfully to treat a variety of malignancies. The major limitation of bleomycin therapy is the potential for life-threatening interstitial pulmonary fibrosis. The mechanism of bleomycin–induced lung injury is not entirely clear .





• But it likely involves oxidative damage, relative deficiency of the deactivating enzyme bleomycin hydrolase, genetic susceptibility, and elaboration of inflammatory cytokines .

• Oxidative damage to the lung appears important in the pathophysiology of lung injury, and antioxidants may ameliorate the process .

In the present study, we have focused our attention on the potential effect of green tea extract to cause alteration on bleomycin induced pulmonary injury and fibrosis in rats.



↪ We have examined various parameters that indicated pulmonary injury and fibrosis such as lung hydroxyproline content, nitric oxide synthase .

↪ Various oxidative impairment in lung in terms of lipid peroxidation , generation of reactive oxygen species (ROS) , response of antioxidant enzymes and

↪ the role of green tea extract as antioxidant in ameliorating or preventing such toxicity.



STUDY DESIGN



Forty Adult Male Wister Rats

Fifteen rats received bleomycin dissolved in saline 15mg/kg i.p. 3times/week for 4 weeks

Treated group (15rats)treated with green tea extract 100mg/kg /day p.o. a week before bleomycin then until the end of experiment

N. control (10 rats), received once a day orally saline 1mg/kg for 4 weeks.

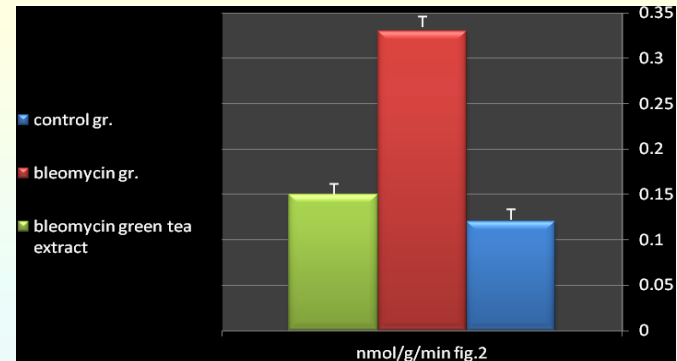
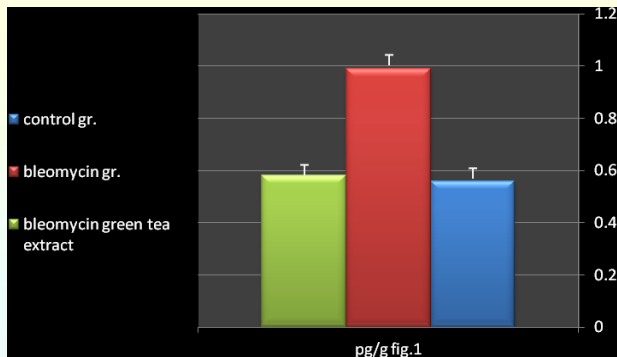


Fig.1. Effect of green tea extract 100mg/kg/day P.O. on lung hydroxyproline content in bleomycin-induced lung fibrosis (15mg/kg, i.p. 3 times a week) for 4 weeks in adult male rats. Values are expressed as mean \pm S.E.M., n= 15, #P< 0.05 compared with control group, *P< 0.05 compared with the bleomycin group.

Fig.2. Effect of green tea extract 100mg/kg/day on lung nitric oxide synthase activity in bleomycin - induced lung fibrosis (15mg/kg, i.p. 3 times a week) for 4 weeks in adult male rats. Values are expressed as mean \pm S.E.M., n=15, #P< 0.05 compared with the control group , *P< 0.05 as compared with the bleomycin group.

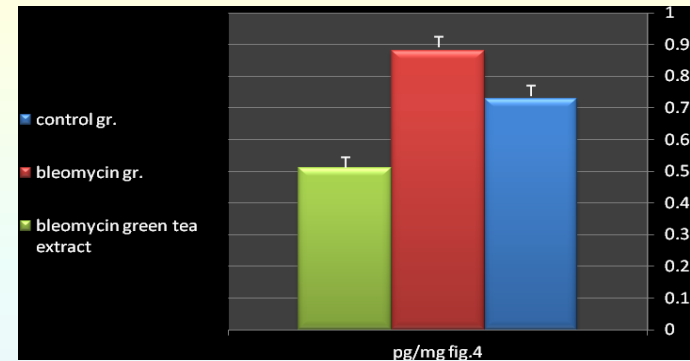
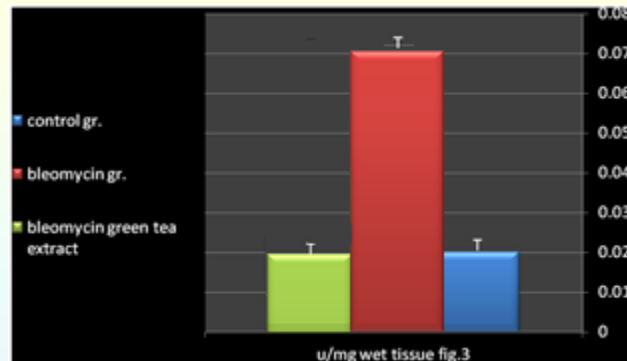


Fig.3. Effect of green tea extract 100mg/kg/day P.O. on lung myeloperoxidase activity in bleomycin-induced lung fibrosis (15mg/kg. i.p. 3 times a week) for 4 weeks in adult male rats. Values are expressed as mean \pm S.E, n=15, #P<0.05 as compared with control group *P< 0.05as compared with the bleomycin group.

Fig.4. Effect of green tea extract 100mg/kg/day P.O. on lung platelet activating factor content in bleomycin-induced lung fibrosis (15mg/kg, i.p. 3 times a week) for 4 weeks in adult male rats. Values are expressed as mean \pm S.E.M. , n=15, #P.< 0.05 as compared with the control group , *P< 0.05 as compared with the bleomycin group.

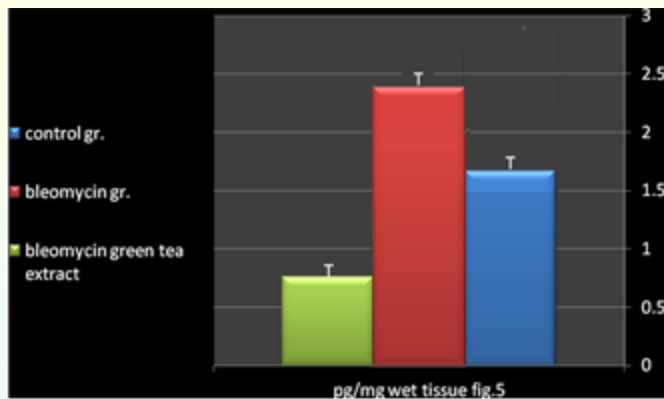


Fig.5. Effect of green tea extract 100mg/kg/day P.O. on lung tumor necrosis alpha activity in bleomycin - induced lung fibrosis (15mg/kg,i.p. 3 times a week) for 4 weeks in adult male rats. Values are expressed as mean \pm S.E, n=15, #P<0.05 as compared with control group* P< 0.05as compared with the bleomycin group.

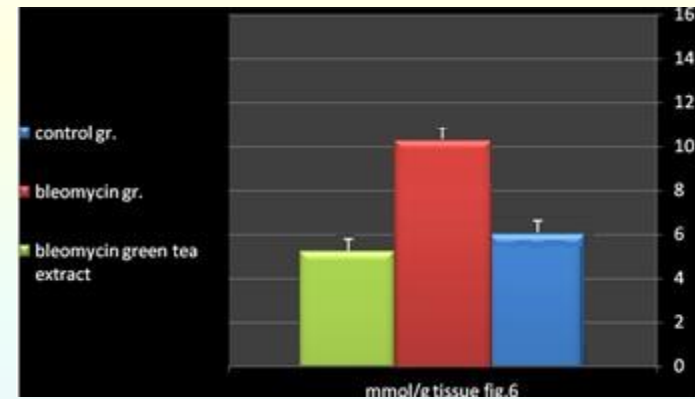


Fig.6. Effect of green tea extract 100mg/kg/day P.O. on lung angiotensin converting enzyme activity in bleomycin -induced lung fibrosis(15mg/kg, i.p. 3 times a week) for 4 weeks in adult male rats. Values are expressed as mean \pm S.E.M. , n=15, #P<.0.05 as compared with the control group , *P< 0.05 as compared with the bleomycin group.

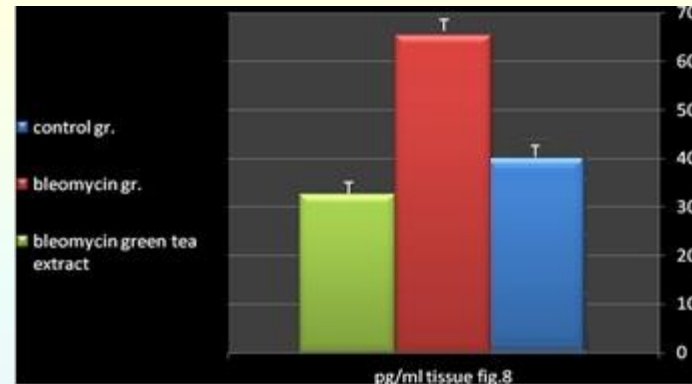
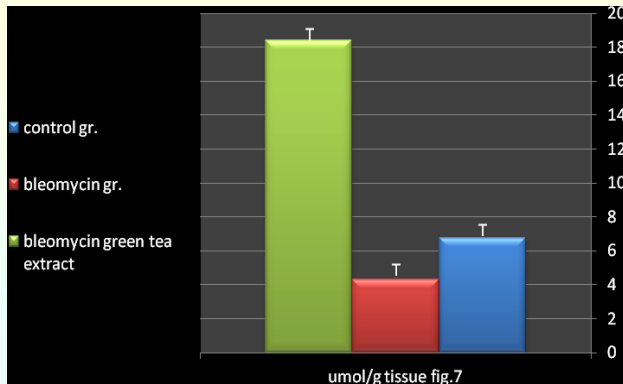


Fig.7. Effect of green tea extract 100mg/kg/day P.O. on lung reduced glutathione concentration in bleomycin -induced lung fibrosis (15mg/kg, i.p.3 times a week) for 4 weeks in adult male rats. Values are expressed as mean±S.E., n=15, #P<0.05 as compared with control group* P<0.05as compared with the bleomycin group.

Fig.8. Effect of green tea extract 100mg/kg/day P.O. on lung transforming growth factor 1β in bleomycin -induced lung fibrosis (15mg/kg.i.p.3 times a week) for 4 weeks in adult male rats. Values are expressed as mean ±S.E. , n=15, #P<.0.05 as compared with the control group , *P< 0.05 as compared with the bleomycin group.

Histological Results

Fig.9. Photomicrographs of rat lung sections. (A) Normal control rat showing alveolar spaces and alveolar septum (arrow). (B) Bleomycin treated rat showing collapsed and narrow alveolar spaces. The pulmonary interstitium is markedly infiltrated with inflammatory cells that leads to thickening of interalveolar septa (arrow). (C) Green tea extracts plus bleomycin-treated rat lung showing more patent alveolar spaces (a) & reduced interstitial infiltrations (H & E stain x200).

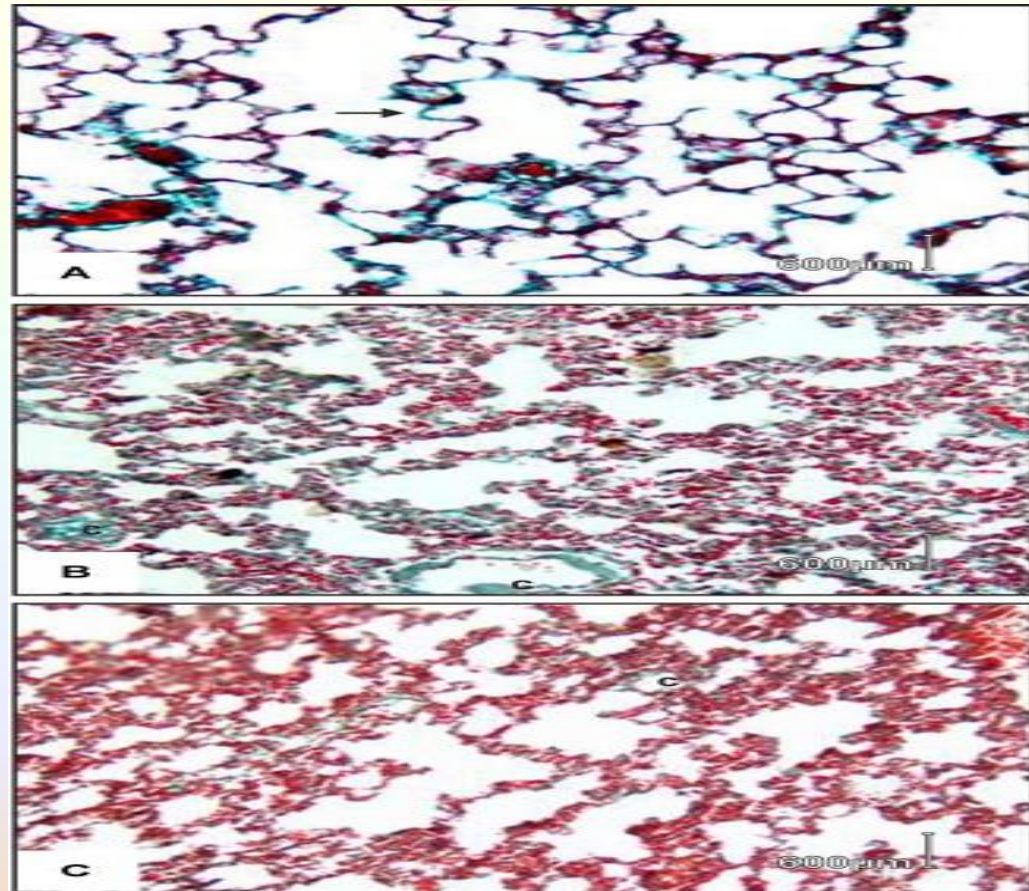
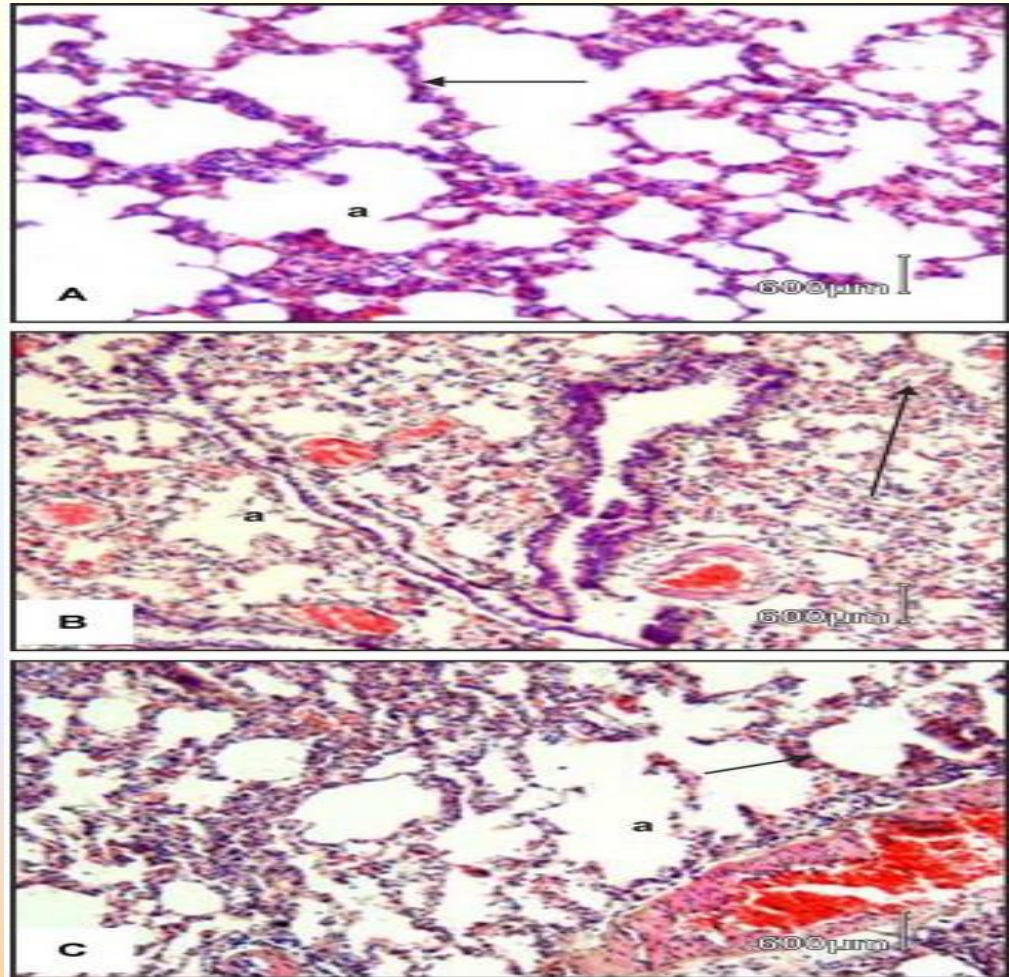


Fig.10: Photomicrograph of rat lung sections. (A) Normal control rat showing the distribution of pulmonary interstitial reticulin indicated by Thin green color (arrow). (B) Bleomycin-treated rat showing the excessive collagen deposition in the interstitial lung tissue. (C). Green tea extracts plus bleomycin– rat lung showing marked reduction of interstitial deposition of collagen (Masson trichrome x200).



CONCLUSION

- In conclusion, we expect that green tea polyphenols have the potential to prevent organ failure and, in particular, provide a promising therapeutic approach to lung disorders. As green tea is already one of the most popular beverages worldwide, its role should be elucidated in the direct and indirect prevention of chronic diseases. For more explanation to the potential mechanisms of green tea polyphenols for protection against organ damage concomitant with chronic diseases, further research is needed on the pharmacokinetics of tea constituents as well as exploration at the cellular level.

