

Investigating the antioxidant potential of ganoderma lucidum extracts essay

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1. Abstract *Ganoderma lucidum* (*G. lucidum*) , a basidiomycete putrefaction fungus, has been loosely used for wellness publicity and length of service in Asiatic states. Several types of bioactive substances have been isolated and identified from *G. lucidum* , such as nucleosides, steroid alcohols, triterpenoids, alkaloids, polyoses, unsaturated fatty acids, vitamins and minerals which are good identified for their pharmacological belongingsss.

. In the present probe A, adenosine and uracil content of the aqueous infusion of dried *G. lucidum* pulverization of Indian Himalayan Region (IHR) were determined by HPTLC. Further, phytochemical analysis (entire phenols, cut down power, entire flavonoids, , antioxidant potencies) and protective effectivity of aqueous infusion of *G.*

lucidum against hypoxia induced emphasis in H9c2 cardiomyoblasts utilizing *in vitro* checks and protective value was besides evaluated. Extract was identified as rich beginning of flavonoids, phenols, cut down power and besides with good endogenous antioxidant position. The present survey concluded high antioxidant potency of *G.*

lucidum in prolonging the antioxidant position in cells under O want. 5. Consequences5. 1 Assaies of non-enzymatic antioxidants of *G.*

lucidum infusionsTable3 shows the degrees of non-enzymatic antioxidants *viz* . entire phenolic (mg Gallic acid/g of infusion) and flavonoid (mg rutin/g of infusion) nowadays in aqueous infusion of *G. lucidum*. Table 3-Entire phenol and entire flavonoid content in *G. lucidum* infusion

Infusion Aqueous

	Infusion
Entire phenolic content	56.83 ± 1.31 (mg gallic acid /g of infusion)
Entire flavonoid content	100.38 ± 3.53 (mg rutin/g of infusion)

Values are the average ± SEM of three observations. 2 *In vitro* antioxidant potency of *G.*

lucidum infusions Table 4 shows the *in-vitro* antioxidant potency of aqueous and hydroalcoholic infusions of *G. lucidum* assayed by DPPH, ABTS and FRAP checks. Extract exhibited powerful antioxidant activity. Table 4-Antioxidant content in *G.*

lucidum infusion

	DPPH(mg Trolox /g of infusion n)	ABTS(mg Trolox /g of infusion n)	FRAP(mg Trolox /g of infusion n)
Infusion			

Aqueou		195.	
s	232.		17.
infusio	1±4.6	62±4.	4±3.1
n		3	

Values are the average \pm SEM of three observations. 3 Reducing potency of *G.*

lucidum infusions Fig. 3 depicts the cut downing power of *G. lucidum* infusion in comparing to ascorbic acid. The infusion shows some grade of cut downing power ; nevertheless, it was seen that their cut downing power was lesser to ascorbic acid which is known to be a strong reduction agent. Similar to the antioxidant activity, the cut downing power of the infusion increased with the increasing sum of the infusion ; the equation of cut downing power (Y) and sum of infusion (ten) was $Y = 0.$

$4761x - 0.0301$ ($R^2 = 0.993$) for aqueous infusion, demoing that the cut downing ability was important to the sum of infusion. The cut downing power of ascorbic acid and *G. lucidum* infusion was in the undermentioned order: ascorbic acid & A ; gt ; aqueous infusion.

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4 shows the HPTLC fingerprints developed from A, adenosine and uracil criterions in different concentrations, aqueous infusion of *G. lucidum* . The Roentgen degree Fahrenheit of adenosine, A and U was found to be 0.28, 0.

36 and 0.55 severally. The correlativity coefficient of 0.98 for adenosine and 0.99 for A and uracil severally was declarative of good additive dependance of peak country on concentration. The per centum of active marker compounds was calculated utilizing peak country, and the adenosine, A and uracil content (mg/g of dry infusion) severally in the aqueous infusion of G.

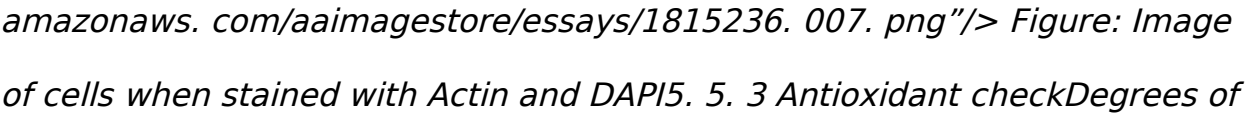
lucidum is shown in Table 5. The HPTLC densitometric scan obtained from A, adenosine and uracil criterions along with aqueous and alcoholic infusion of G. lucidum, the HPTLC scan of adenine adenosine and uracil criterion; G.

Fig. 6 Densitometric scan of standard path and Ganoderma lucidum infusions (Fig 6A); HPTLC chromatograms of A, adenosine and uracil criterion (Fig 6B); HPTLC chromatogram of aqueous infusion of Ganoderma lucidum (Fig 6C) Table. 5- Bioactive constituents in Ganoderma lucidum aqueous infusion

Nucleosides content	Aqueous infusion (mg/g of dry infusion)
Adenosine	5.07 ± 0.53
Adenine	0.71 ± 0.07
Uracil	1.64 ± 0.19

Values are the average \pm SEM of three observations. 5. 5 In-vitro bio efficaciousness rating of aqueous infusion of *G. lucidum* under hypoxic conditions. In -vitro bio-efficacy of *G.*

lucidum infusion was carried out to research protective consequence of *G. lucidum* infusion under hypoxic status (0. 5 % O₂ , 5 % CO₂ and 94 % N₂ for 24hrs) in rat cardiomyoblast H9c2 cell line. 5. 5. 1 Cell viabilityThe protective consequence of *G. lucidum* infusion (at 100-900 μ g/ml dose at) in H9c2 cell lines was determined by impersonal ruddy check. Hypoxia treated control cells showed lessening in cell viability which is reduced to 46.

amazonaws. com/aaimagestore/essays/1815236. 007. png"/> Figure: Image of cells when stained with Actin and DAPI. 5. 3 Antioxidant checkDegrees of GSH, GSSG, MDA in H9c2 cells treated with *G. lucidum* infusion under O₂ deprived environment as shown in Fig 8. GSHThe degree of endogenous antioxidants in cells on exposure to hypoxia was increased in comparing to untreated -normoxic control cells by 40.

62 %. The cell viability was increased in infusion treated hypoxic cells in comparing to normoxic infusion treated cells. The lessening in cell viability was observed in hypoxic cells when carbon monoxide -treated with aqueous infusion of *G.*

lucidum at concentration of 600 μ g/ml in comparing to hypoxic control shown in Fig. 8AGramGramThe degree of endogenous antioxidants in cells on exposure to hypoxia was increased in comparing to untreated -normoxic control cells by 32. 14 %. The cell viability was increased in infusion treated

hypoxic cells in comparing to normoxic infusion treated cells The lessening in cell viability was observed in hypoxic cells when carbon monoxide - treated with aqueous infusion of G. lucidum at concentration of 600µg/ml in comparing to hypoxic control shown in Fig.

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com/aaimagestore/essays/1815236. 011. png"/> Fig.

9: The hypoxia induced intracellular ROS degree in H9c2 cells against hypoxia exposure (24hrs) was measured. Experiment was carried out in triplicate and consequences are presented as Mean ±SE. 6.

DiscussionGanoderma lucidum is a basidiomycete white putrefaction fungus which has been prescribed since ages to forestall and handle different types of assorted human diseases in far eastern states like China, Japan, and Korea. Several types of bioactive substances have been secluded and identified from G. lucidum like polyoses, alkaloids, nucleosides, triterpenoids, steroid alcohols, and rare minerals (Boh et al. , 2007 ; Ziegenbein et al.

, 2006) . In the current survey, HPTLC Fingerprinting and phytochemical analysis (entire polyphenols and flavonoids, cut down power, antioxidant potencies) of G. lucidum aqueous infusion from Indian Himalayan Region were studied and evaluated. 6. 1Analysis of non enzymatic antioxidants in G. lucidum Aqueous infusion of G.

lucidum is rich in entire phenoplasts and flavonoids contents. Phenolic resins are the most of import works compounds holding possible antioxidant activity which is supposed to be chiefly due to redox belongingss and it plays

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a major function in neutralizing and absorbing free groups, cut downing vest and three O and break uping peroxides (Costantino et al. , 1992) .

Consequences attained in the current survey conveying out the presence of good measure of phenolic compounds in the GL infusions (Sheena et al.

, 2003 and 2005 ; Soniamol Joseph et al. , 2009) . Some of these reported pharmacological effects of GL are attributed to the being of these of import ingredients. 6. 2 In vitro antioxidant potencyof G. lucidum The consequences showed that the infusion of G. lucidum showed powerful extremist scavenging activity, which is in harmony with earlier studies (Sheena et al.

, 2003 and 2005 ; Soniamol and Joseph et al. , 2009 ; Zhang et al. , 2003 ; You et al. , 2002 ; Yen et al.

, 1999) . 6. 3 Reducing potency of G. lucidum infusionThe cut downing power of G. lucidum infusion, which may be an of import mark of the antioxidant activity, was determined utilizing a modified Fe (III) to press (II) decrease analysis. It will be of import to advert that old studies have revealed the higher antioxidant power of G. lucidum infusion (Sheena et al.

, 2003 and 2005 ; Soniamol ; Joseph et al. , 2009 ; Zhang et al. , 2003 ; You et al. , 2002, Yen et al. , 1999, Mau et al.

, 2002 ; Lee et al. , 2001 ; Hu et al. , 2002) . In the current survey a comparatively good antioxidant power was besides observed in both the infusions. 6.

4 Identification and quantification of marker compounds by HPTLC The infusion used in the current survey was described with check of marker compounds (A, adenosine and U) by HPTLC fingerprinting. Nucleosides are involved in the transition and ordinance and of different physiological procedures in the organic structure, which in bend green goods map through pyrimidine and purinergic receptors. Further to being conceivers in nucleic acerb synthesis, bases were given to heighten immunisation response, influence metamorphosis of fatty acids, adds to press soaking up in intestine and better GI piece of land fix after harm. In add-on, nucleosides and nucleobases in *G. lucidum* are reported to be capable of keeping thrombocyte aggregation and collection and cut downing the elevated serum aldolase degree of experimental theoretical account mice (Gao et al. , 2007) . It had been implied that the enhanced dietetic nucleoside-nucleotide mixture may be associated with decrease in the age-induced weakening of encephalon morphology and some memory undertakings (Chen et al.

, 2000) . 6. 5 Evaluation of biological efficaciousness utilizing in-vitro check under The protective effectivity of aqueous infusion of *G. lucidum* in cellular system against hypoxia (24 hour exposure) was investigated in H9c2 rat cardiomyoblast cell line. On direction of aqueous infusion of *G. lucidum* in H9c2 cells under hypoxia, a dosage of 600µl/ml resulted in improved survivability of cells. As such, 600µl/ml of dosage was optimized for the progress bio efficient rating of aqueous infusion of *G.*

lucidum . The consequences seemingly brought out that aqueous infusion of *G. lucidum* hold sustained good endogenous antioxidant position (GSH, GSSG, MDA) . The enhanced protective effectivity of aqueous infusion of *G. lucidum* might be due to existence of more phenoplasts and nucleosides (A, adenosine and U) in aqueous infusion of *G.*

lucidum as enumerated by HPTLC. Due to presence of these metabolite makes, aqueous infusion a foil and may add or account for their antioxidant behaviour and contribute in prolonging the antioxidant position in cells under O want.