

## White-Rot Fungi *Phellinus* as a Source of Antioxidant and Antitumor Agents

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**Abstract :** Introduction: The Genus *Phellinus*, locally known as Phansomba is a well-known traditional folk medicine. Especially, in Western Ghats of India, many tribes use several species of *Phellinus* for various ailments related to teeth, throat, tongue, stomach and even wound healing. It is one of the few mushrooms which play a pivotal role in Ayurvedic Dravyaguna. Aim: The present study focuses on to investigate phytochemical analysis, antioxidant, and antitumor (in vitro and in vivo) potential of *Phellinus robiniae* from South India, Kerala Material and Methods: The present study explores the following: 1. *Phellinus* samples were collected from Ranni, Pathanamthitta district of Kerala state, India from *Artocarpus heterophyllus* Lam. and species were identified using rDNA region. 2. The fruiting body was shadow dried, powdered and extracted with 50% alcohol using water bath at 60°C which was further condensed by rotary evaporator and lyophilized at minus 40°C temperature. 3. Secondary metabolites were analyzed by using various phytochemical screening assay (Hager's Test, Wagner's Test, Sodium hydroxide Test, Lead acetate Test, Ferric chloride Test, Folin-ciocalteu Test, Foaming Test, Benedict's test, Fehling's Test and Lowry's Test). 4. Antioxidant and free radical scavenging activity were analyzed by DPPH, FRAP and Iron chelating assay. 5. The antitumor potential of Water alcohol extract of *Phellinus* (PAWE) is evaluated through In vitro condition by Trypan blue dye exclusion method in DLA cell line and In vivo by murine model. Result and Discussion: Preliminary phytochemical screening by various biochemical tests revealed presence of a variety of active secondary molecules like alkaloids, flavanoids, saponins, carbohydrate, protein and phenol. In DPPH and FRAP assay PAWE showed significantly higher antioxidant activity as compared to standard Ascorbic acid. While, in Iron chelating assay, PAWE exhibits similar antioxidant activity that of Butylated Hydroxytoluene (BHT) as standard. Further, in the in vitro study, PAWE showed significant inhibition on DLA cell proliferation in dose dependent manner and showed no toxicity on mice splenocytes, when compared to standard chemotherapy drug doxorubicin. In vivo study, oral administration of PAWE showed dose dependent tumor regression in mice and also raised the immunogenicity by restoring levels of antioxidant enzymes in liver and kidney tissue. In both in vitro and in vivo gene expression studies PAWE up-regulates pro-apoptotic genes (Bax, Caspases 3, 8 and 9) and down-regulates anti-apoptotic genes (Bcl2). PAWE also down regulates inflammatory gene (Cox-2) and angiogenic gene (VEGF). Conclusion: Preliminary phytochemical screening revealed that PAWE contains various secondary metabolites which contribute to its antioxidant and free radical scavenging property as evaluated by DPPH, FRAP and Iron chelating assay. PAWE exhibits anti-proliferative activity by the induction of apoptosis through a signaling cascade of death receptor-mediated extrinsic (Caspase8 and Tnf- $\alpha$ ), as well as mitochondria-mediated intrinsic (caspase9) and caspase pathways (Caspase3, 8 and 9) and also by regressing angiogenic factor (VEGF) without any inflammation or adverse side effects. Hence, PAWE serve as a potential antioxidant and antitumor agent.

**Keywords :** antioxidant, antitumor, Dalton lymphoma ascites (DLA), fungi, *Phellinus robiniae*

**Conference Title :** ICMFFB 2017 : International Conference on Mycology, Fungi and Fungal Biology

**Conference Location :** Berlin, Germany

**Conference Dates :** May 21-22, 2017