

Evaluation of antioxidant and polyphenolic content of a Sri Lankan poly herbal formulae and assessment of its *in vitro* antiproliferative activity and mechanism of action on RD and MCF-7 cancer cells compared to healthy CC1 cells

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Objectives: The objective of the current study is to evaluate the presence of antioxidants, polyphenolics in a traditional Sri Lankan poly herbal drug and determination of its anti-proliferative activity.

Materials & Methods: The total phenolic content (TPC) and antioxidant activity was determined *in vitro*. The cell viability was determined by MTT assay. Brine shrimp assay and LDH leakage was conducted to determine the cytotoxicity. GSH content were assayed to determine the oxidative stress exerted by LPG. Rhodamine 123 staining, caspase 3 activity, DNA fragmentation were used to identify the apoptosis mechanisms associated with LPG. RD cells, MCF-7 cells and, CC1 cells were used in all experiments.

Results: The TPC% of the LPG was 5.31±0.14% of GAE and antioxidant capacity is comparable to ascorbic acid. LPG exhibited strong cytotoxic activity against RD and MCF-7 cell lines with MTT assay. A 50% leakage of LDH was observed at concentrations less than 30 µg/mL and 10 µg/mL for both RD and MCF-7 cells respectively

after 24 hour exposure. While, LPG exhibited strong cytotoxic activity against RD and MCF-7 cells, the brine shrimp and CC1 cells results (EC₅₀>100 µg/mL) suggest that the LPG have minimum cytotoxicity towards the normal healthy cells. The reduction of GSH content and elevation of cell survival with exogenous GSH prove that the LPG act via induction of oxidative stress. Rhodamine 123 assay shows the mitochondrial involvement in cell death by depletion of Δψ inducing downstream events in apoptosis only in RD cells. This results in increase in caspase-3 activity eventually LPG induced apoptotic cell death. Disparity to RD cells, the MCF-7 cell does not show any features of apoptosis even in the presence of high concentrations of LPG.

Conclusion: In conclusion, the present study suggested that the LPG exerted an anti proliferative activity via oxidative stress dependent apoptosis in RD cells but not in MCF-7 and healthy CC1 cells.

Biography

Wageesha N D A received his Undergraduate Education from the Institute of Chemistry Ceylon, Sri Lanka, and his MPhil in Biochemistry from University of Sri Jayewardenepura, Sri Lanka. He is currently a Senior Lecturer in Biochemistry and Chemistry at Department of Biochemistry and Chemistry, the Faculty of Medicine, South Asian Institute of Technology and Medicine, Sri Lanka. His current research interest involves cancer research and is currently pursuing his PhD in the field of development of novel anti-cancer drug based on traditional medicinal knowledge. His work has been presented at scientific conferences and published in journals. He received "Kandiah Graduateship Award" for Post Graduate research from the Institute of Chemistry, Ceylon in 2010 for his research work.

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