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Screening of *Solanum nigrum* for its antioxidant activity against cancer

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Abstract
Herbs and shrubs were always considered to be rich source of many bioactive components. Herbal medicine is still the mainstay of about seventy five to eighty percent of the world population, mainly in the developing countries, for primary health care because of better cultural acceptability, better compatibility with the human body and lesser side effects. However, the last few years have seen a major increase in their use in the developed world (Kamboj *et al*., 2000). Antioxidants are chemicals that interact with and neutralize free radicals, thus preventing them from causing damage. They are also known as free radical scavengers (Valko *et al.*, 2007; Diplock *et al.*, 1998; Davis *et al.*, 2012).

Keywords: medicine, rich, antioxidant, radical, damage

Introduction
Cancer is a disease in which a cell or a group of cells represents uncontrolled growth invasion. Cancer is one of the most life threatening diseases and serious public health problems in both developed and developing countries (Poonam *et al*., 2012).
Cancer can be treated by surgery, radiation therapy, chemotherapy and immunotherapy. Cancers that are most often cured are breast, cervix, prostate, oral, colon and skin, if they are diagnosed early. Improving the quality of life of patients living with cancer and dying from cancer is therefore an urgent humanitarian need.
Solanum nigrum L. (Kaambal) (Kashmiri) has been traditionally used to treat pathological ailments like fever, ulcers, bacterial infections, fungal infections, jaundice and liver disorders (Creasy *et al.*, 1981; Capizzi *et al*., 2003; Sudhir *et al.*, 2000 and Borgia *et al*., 1981).
The history of *Solanum nigrum L*. dates back to ancient China and the Mediterranean region as a highly popular laxative drug and a general tonic (Dashputre *et al.*, 2010). It is used as purgative and astringent tonic; its stimulating effect combined with apparent properties renders it especially useful in tonic dyspepsia (Chintana *et al*., 2012). Powdered roots are sprinkled over ulcer for healing. Leaf and berries are eaten either raw or boiled, sprinkled with salt and pepper. Some workers have worked out anticancerous activity of *Solanum nigrum* L. (Anindyajati *et al*., 2010) but very little is known about the mechanisms involved.

Results
Antioxidant activity
The DPPH radical scavenging assay is used for preliminary screening of the plant extracts for their antioxidant activity. The proton radical scavenging action is known to be an important mechanism of antioxidants.
One of the major concerns in present study was to select and one extract for *in-vivo* investigation. Screening of extracts was done on the basis of *in-vitro* investigations. *In-vitro* antioxidant and anticancer activity against melanoma cell line was investigated in present study. Many observational studies, including case control studies and cohort studies, have been conducted to investigate whether the use of dietary antioxidant supplements is associated with reduced risks of cancer in humans
Many investigators reported about antioxidant activity of *S. nigrum L*. (Vadivel *et al.*, 2010, Syed *et al.*, 2014) [7, 8]. From exhaustive literature survey it was revealed that there was no comparative study between petroleum ether, chloroform and ethyl acetate extract. Hence, in present study antioxidant potential of these extracts was ascertained on the basis of DPPH assay, 1,1-Diphenyl-2-picrylhydrazyl (DPPH), is a kind of stable organic radical.

Table 1: Comparison of % Inhibition data of DPPH free radical Scavenging assay by petroleum ether, ethyl acetate and chloroform extract *of Solanum nigrum* L.

S.no	Conc.	Pet ether	Ethyl acetate	Chloroform
01	50	18.67±0.42	27.85±0.34	18.67±0.45
02	100	25.04±0.21	40.89±0.22	41.48±0.34
03	250	29.63±0.33	55.41±0.12	56.00±0.44
04	500	35.41±0.22	58.22±0.14	60.44±0.21
05	750	49.33±0.45	62.22±0.26	68.74±0.37
IC_{50} Value		801.58 µg/ml	355.5 µg/ml	346.15 µg/ml

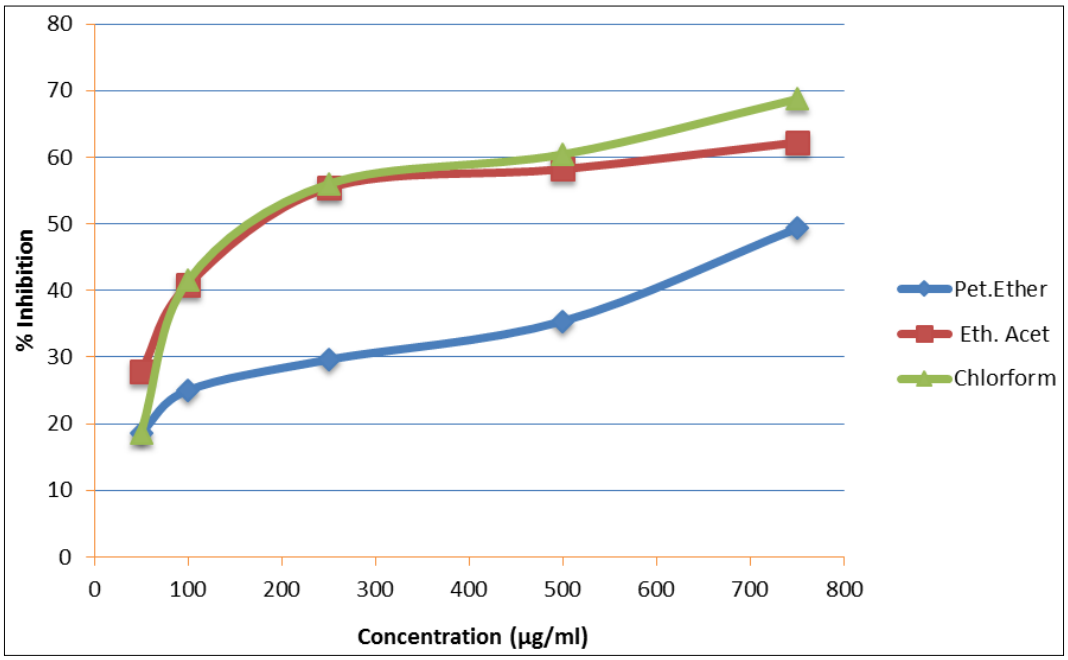

Fig 1: Representing comparison of regression curves of petroleum ether, ethyl acetate and chloroform extract of *Solanum nigrum* L.

Conclusion

These results showed that greater rate of DPPH scavenging activity of chloroform extract may be due to presence of high phenolic or flavonoid compounds. IC_{50} value was determined from the plotted graph of scavenging activity. The Higher percentage inhibition or the lowest IC_{50} indicates the strongest ability of the extracts to act as DPPH radical scavengers. Out of all the extracts, chloroform extract showed the lowest $IC_{50,}$ 346.1µg/ml as compared to ethyl acetate and petroleum ether extracts having IC_{50} values 355.5 µg/ml and 801.5µg/ml respectively. These results showed that the lowest IC_{50} value of chloroform extract may be due to high content of phenolic or flavonoid contents and will exhibit more potent antioxidant activity as compared to ethyl acetate and petroleum ethyl acetate and petroleum ether extracts having IC_{50} values.

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