RESEARCH PAPER

Asian Journal of Bio Science, Vol. 4 Issue 1 : 33-37 (April to September, 2009)

In vitro cytotoxic effect of leaves and stem bark of *Azadirachta indica* on human colon, liver, neurablastoma and prostate cancer cell lines

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(Accepted : January, 2009)

Cancer still remains the major cause of mortality and morbidity all over the world. In the search of potential anticancer agents from the medicinal plants, the present research work was carried out to examine the anticancer properties of *Azadirachta indica* leaves and stem bark against human cancer cell lines via., ethanolic, hydro-ethanolic and aqueous extracts using sulphorhodamine B (SRB) dye. All the three extracts from leaf part and stem- bark showed *in vitro* cytotoxicity against all the human cancer cell lines at 100µg/ml. At lower doses (10 and 30 µg/ml) aqueous extract from leaf part was found to be more active than ethanolic and hydro-ethanolic extracts in dose dependent manner. Results showed the potent anticancer effect of *Azadirachta indica* (leaves and stem bark) on human cancer cell lines of colon, liver, neurablastoma and prostate origin and the plant can be explored for probable anticancer lead molecules for the drug development.

Key words : *Azadirachta indica*, Human cancer cell lines, *In vitro* cytotoxicity, Anticancer.

INTRODUCTION

Azadirachta indica A. Juss., commonly known as neem and belongs to the Meliaceae family is well known in India and its neighbouring countries for more than 2000 years as one of the most versatile medicinal plants. It possesses a wide spectrum of biological activity and every part of this tree has been used as traditional medicine for house hold remedy against various human ailments (Chopra *et al.*, 1956; Chatterjee and Parkash, 1995). This plant shares high reputation in tradition where as its goodness is extensively documented in Ayurveda, Unani and Homeopathic medicine and has become a cynosure of modern medicine (Schmutterer, 1995). Several pharmacological activities and medicinal utilities have been described, especially for leaf and stem bark. The leaf of this plant and its constituents have been demonstrated to exhibit immunomodulatry, anti-inflammatory, antihyperglycemic, antiulcer, antimalarial, antifungal, antibacterial, antiviral, antioxidant, antimutagenic and anticarcinogenic properties (Subapriya and Nagini, 2005). In addition, leaves of *Azadiractita indica* has been reported to possess hepatoprotective (Chattopadhyay, 2003), antifertility (Khillare and Shrivastav, 2003), antiulcer (Chattopadhyay *et al.*, 2004), antimalarial (Udeinya *et al.*, 2008) and anti-inflammatory (Okpanyi and Ezeukwv, 1981) activities. Compound nimbolide, (a limonoid) isolated from leaves and flowers showed cytotoxic effects on human choriocarcinoma (BeWo) cells (Kumar *et al.*, 2008) and flavanones which are present in the flowers contains antimutagenic constituents against heterocyclic amines (Nakahara *et al.*, 2003) Oil from the leaves and bark possess a wide spectrum of antibacterial action against gram-negative and gram positive microorganisms (Satyavati *et al.*, 1976). Bark extract has also shown insecticidal (Oigiangbe *et al.*, 2007) and antimalarial (Aliero, 2003) activity. Current investigation was carried out to determine the *in vitro* cytotoxic potential of the plant against human cancer cell lines of colon, liver, neurblastoma and prostate origin, for developing the potent anticancer agents from the plant.

MATERIALS AND METHODS

The plant was collected from Nagrota region of Jammu, J&K, India, in the month of April and authentication was done by Dr Yashpal Sharma, at the herbarium of the Botany Department, University of Jammu, Jammu. The collected plant material (leaves, stem and bark) was chopped, shade dried and ground into powder. Powdered dried plant material was then extracted with different solvents at room temperature.

Preparation of plant extracts:

For the ethanolic extract, dried and powdered plant material (100g) was percolated with 95 % ethanol (500ml), and evaporated to dryness under reduced pressure. Hydro-ethanolic extract was prepared by percolating