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Original article

Evaluation of antioxidant and stabilizing lipid peroxidation nature of *Solanum xanthocarpum* leaves in experimentally diethylnitrosamine induced hepatocellular carcinogenesis

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ABSTRACT

Solanum xanthocarpum Schrad. & Wendl, is a traditional edible leaves as a form of decoction, extracts used as a herbal medicine, and consumed for health promoting profiles. The present investigation was carried out to evaluate antioxidant status and lipid peroxidation level of anticancer activity of *Solanum xanthocarpum* (SXC) on Diethylnitrosamine (DEN) induced hepato carcinogenesis in male Wistar albino rats. Hepatic cancer was developed on the liver of Wistar rats treated by DEN or vehicle three times a week for 16 weeks. Tumour incidence, tumour volume, tumour burden, lipid peroxidation, antioxidant, liver marker enzymes and histopathological changes were assessed in DEN alone and in DEN + SXC leaves extract treated rats. Hundred percent tumour incidences with an imbalance in carcinogen metabolizing enzymes and cellular redox status were observed in rats treated with DEN alone. Oral administration of SXC aqueous leaves extract treatment at a dose of 150 mg/kg b.w. to DEN treated rats were prevented tumour incidence and restored the elevated activities of liver marker enzymes and antioxidant status to near normal with decreased lipid peroxide levels. The biochemical consistent with histopathological observations suggesting marked hepatoprotective effect of the leaves extract in a dose dependent manner. These results clearly suggest that SXC aqueous leaves extract treatment prevents liver damage, lipid peroxidation, protects the antioxidant defense system and anti-carcinogenic potential in DEN induced hepatic carcinogenesis.

1. Introduction

Solanum xanthocarpum Schrad. & Wendl (SXC), (Family: Solanaceae), commonly known as Yellow Berried Nightshade (syn-kantakari), also called as kantankathiri, kankari and kateri, is a traditional edible leaves as a form of decoction and extracts used as an herbal medicine in throughout India, mostly in dry places like a weed on roadsides and wastelands [1,2]. In previous studies shown that, SXC has most extensive phytochemicals and pharmacological studies showed SXC has alkaloids, steroids, saponins, flavonoids and glycosides as main active components [1,3] found that fruits from French plant (4.6%) were riches in solasodine glycoside than those of Nepalese origin (1.6%), besides plants of both natives contained traces of tomatidenol. In India, glycoalkaloid content of fruits collected from Jammu Kashmir is reported to be 3.5% (total alkaloid, 1.1%). Plant samples collected from culcutta contained solasodine (0.0287), plant contain diosgenin [4]. Reported that SXC are widely used by practitioners of the Siddha to treat respiratory diseases [5], and also it is one of the members of the dasamula (ten roots) of the ayurveda, which is considered to be a noxious weed [6], especially to treat asthma [7], diabetes [8], rheumatism, chest pain, stone in the bladder, flatulence and bronchospasm. In addition, report that solasodine, an alkaloidal constituent of SXC exerts antiandrogenic activity and antiinflammatory [9]. Demonstrated that SXC showed DPPH-free radical scavenging activity, hepatoprotective and antioxidant activity galactosamine induced hepatotoxicity in Wistar albino rats. Recently, SXC exerts to hepatoprotective activity in paracetamol induced liver damage [2].

Hepatocelluar carcinoma (HCC) is the most common cancer form of primary liver cancer. Globally, HCC is the fifth most

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prevalent cancer and third leading cause of cancer related death, highly aggressive. It displays a high popularity with 620,000 cases per year testified from China, Africa and South East Asia [10]. HCC a sharp prominent incidence of liver cancer has been form of dense tumour observed in African countries. Almost, 0.5–1.0 million new cases are identified every year and 595,000 deaths due to liver cancer occur mainly in developing countries [11]. The major risk factors are associated with development of hepatocarcinogenesis are alcohol consumption, fungal toxins contaminated foods, toxic industrial chemicals, air/water pollutants and hepatitis viral infection [12]. This cancer in South East Asia and low in developed western world countries substantially increases its incidence [13].

Diethylnitrosamine (DEN) is a representative chemicals family of carcinogenic *N*- nitrosamine compounds has been distributed in processed meat, tobacco smoke and whiskey [14]. The International Agency for Research on Cancer (IARC) has classified DEN is well known hepatotoxin, hepatocarinogen and mutagenic agent despite the lack of epidemiologic data [15]. In liver, it generates a metabolism of progressive, proliferative, highly mutagenic tumour lesions and neoplastic lesions. Recent findings have been suggested that *N*-nitroso compound cause a wide range of tumours in all animal models [16]. Liver has an efficient anti-oxidant defense system to inactivate reactive oxygen species (ROS), which are over whelmed under conditions of oxidative stress and cause damage on critical cellular biomolecules such as lipids, proteins and deoxyribonucleic acid (DNA). DEN is recommended to cause an uncompromised cohort of free radicals in the liver, which in turn increases the demand of antioxidant enzymes. Subsequently, it leads to oxidative stress and the free radicals participate in DEN-induced HCC [17]. In order to sustain cellular health, it is indispensable to have a specific and effective chemical scavenger to target multiple types of radicals. Most of the commercially based antioxidants supplements are single oxidant [18].

There were no scientific studies on the potential of SXC against HCC. The present investigation was carried out to evaluate the liver marker enzymes, antioxidant status and lipid peroxidation level histopathological analysis of *solanum xanthocarpum* (SXC) on diethylnitrosamine (DEN) induced HCC in male Wistar albino rats.

2. Materials and methods

2.1. Animals

Male Wistar albino rats, weighing 130–150 g, procured from the Small Animal Breeding Centre, Muthayammal College of Arts and Science, Tamil Nadu, India. Animals were acclimatized under

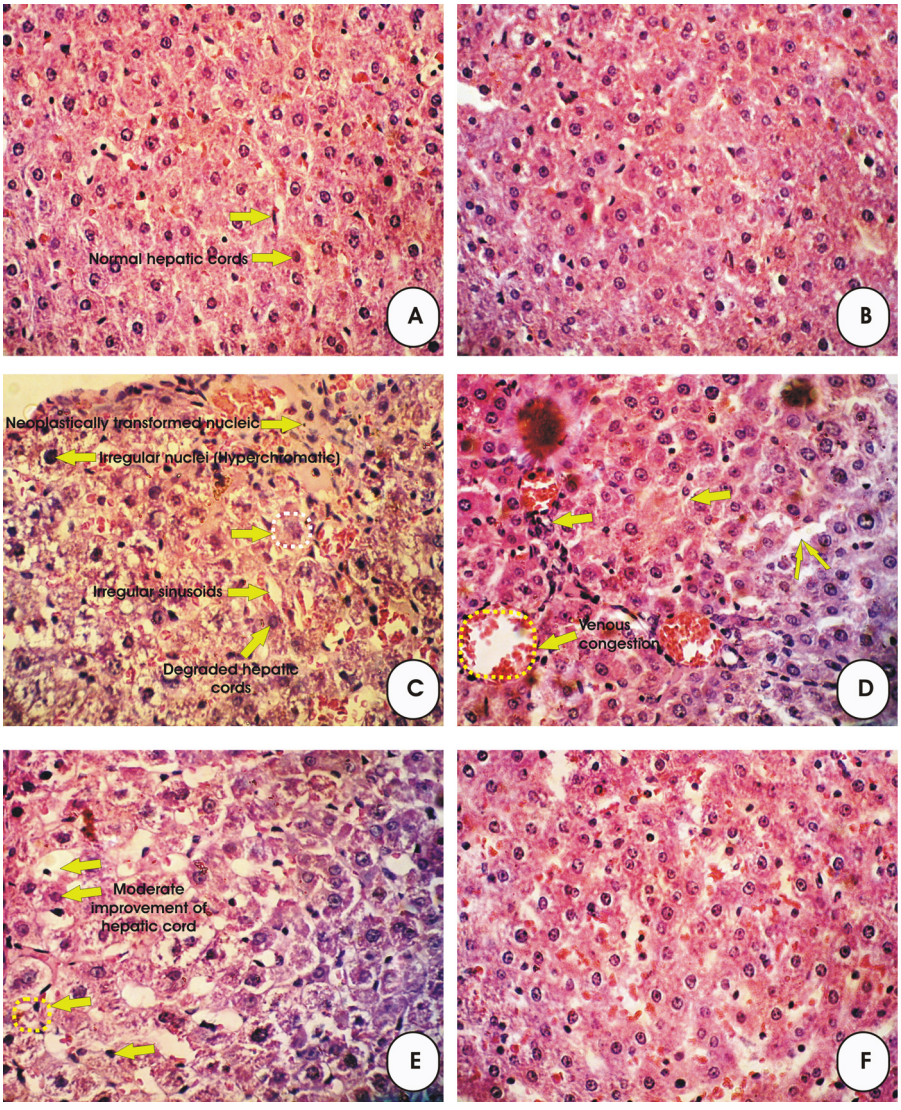

Fig.1. Experimantal study.