6.3.3 Publications


Anti hyperglycemic and antihyperlipidemic activity of aerial parts of *Aerva lanata* Linn Juss in streptozotocin induced diabetic rats

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ARTICLE INFO

Article history:
Received 25 June 2012
Received in revised form 5 July 2012
Accepted 9 August 2012
Available online 28 August 2012

Keywords:
Antidiabetic
Antihyperlipidemic
*Aerva lanata*
Streptozotocin
Glibenclamide

ABSTRACT

Objective: To evaluate the effect of methanol extract (MEAL) and aqueous extract (AEAL) of the aerial parts of *Aerva lanata* Linn Juss (*A. lanata*) in streptozotocin induced diabetic rat.  

Methods: The streptozotocin induced diabetic rats were orally treated with vehicle normal saline, glibenclamide 8.5 mg/kg, MEAL 200 and 400 mg/kg and AEAL 200 and 400 mg/kg to the respective treatment groups. The blood glucose level, lipid profile, body weight on 0 day, 1 week and 2 week and biochemical parameters on 2 week of treatment were measured and are compared to the diabetic control rats. Results: MEAL, AEAL and glibenclamide were found to significantly (*P* < 0.05) reduce the blood glucose level, lipid profile, increase body weight and reduce serum glutamic–oxaloacetic transaminase (SGOT), serum glutamic–pyruvate transaminase (SGPT), creatinine, alkaline phosphatase (ALP), blood urea nitrogen (BUN) and total cholesterol to significant level. The antidiabetic activity was maintained from 1 week onwards till the end of the study. Conclusions: It has been concluded that MEAL and AEAL in addition to the antidiabetic activity, also possess antihyperlipidemic and the normal value of the hepatic biochemical parameters reveals the safety profile of the extract on liver function in the streptozotocin induced diabetic model.

1. Introduction

India is a rich source of medicinal plants and a number of plant extracts have been used in various systems of medicines such as Ayurveda, Siddha and Unani etc to cure various diseases. Only a few of them have been scientifically explored. Plant derived natural products such as flavonoids, terpenoids, alkaloids etc have received considerable attention in recent years due to their diverse pharmacological properties including cytotoxic and cancer chemopreventive effects (1). Herbal medicine is based on the premise that plants contain natural substances that can promote health and alleviate illness. In recent times, focus on plant research has increased throughout the world and the immense potential of medicinal plants used in various traditional systems has been established scientifically. Screening plants with such ethno medicinal uses is believed to increase the odds in discovering new medicines. Diabetes mellitus is a metabolic disorder characterized by disturbances in carbohydrate, protein and lipid metabolism and by complications like microvascular (retinopathy, neuropathy and nephropathy) and macrovascular (heart attack, stroke and peripheral vascular disease) complications (2). A world wide survey has reported that diabetes mellitus affects nearly 10% of the population. It has been predicted that the prevalence of diabetes in adults will increase from 155 million in 1995 to 350 million in 2030 as given by International Diabetes Federation (3). Currently available synthetic antidiabetic agents produce serious side effects like hypoglycemic coma and hepatorenal disturbances (4, 5). Patients are therefore using herbal medicines which have fewer side effects and have the potential to impart therapeutic effect in complicated disorders like diabetes and its complication (6). Following the WHO's recommendation for research on the beneficial uses of medicinal plants in the treatment of diabetes mellitus, investigations on hypoglycemic agents derived from medicinal plants have also gained momentum. Antidiabetic agents from medicinal plants could serve as a good source for drug design and much attention has been fixed on formulation of herbal medicine (*Aerva lanata* Linn Juss (*A. lanata*)) is an important source of chemicals of immense medicinal and pharmaceutical importance. The plant is distributed throughout Tropical India as a common weed in fields
Anticancer activity of aerial parts of Aerva lanata Linn Juss ex Schult against Dalton’s Ascitic Lymphoma

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Received 2 February 2011; received in revised form 4 May 2011; accepted 10 May 2011

Abstract

Background and Aim: Traditional medicine has a long history of serving people all over the world. In recent years, the use of traditional medicine information in cancer research received considerable interest. Aerva lanata Linn Juss has been used in traditional and folkloric medicine for the treatment of cancer. The aim of the present study was to evaluate the effect of methanol (known as MEAL) and aqueous extracts (known as AEAL) of the aerial parts of Aerva lanata Linn Juss against intraperitoneally injected Dalton’s Ascitic Lymphoma (DAL) cell lines in Swiss albino mice.

Materials and methods: DAL cells were injected intraperitoneally (1 x 10⁶cells/ml/mouse) to the mice. The MEAL and AEAL at a dose of 200mg/kg body weight were administered orally for 14 consecutive days to the tumor bearing group of animals. Derived parameters, haematological parameters, serum enzyme and lipid parameters were measured and compared to the cancer control group. 5-Fluorouracil (20mg/kg) was used as a standard.

Results: Both MEAL and AEAL decreased average increase in body weight, reduced the packed cell volume, viable tumor cell count and increased the life span of DAL treated mice and brought back the haematological parameters, serum enzyme and lipid profile near to normal values. All the values were found to be statistically significant with cancer control group at p<0.01. These observations are suggestive of the protective effect of extracts in Dalton’s Ascitic Lymphoma (DAL).

Conclusion: All these findings enable to concluded that MEAL and AEAL possess a protective effect against DAL.

Keywords: Anticancer; Dalton’s Ascitic Lymphoma cell line; Aerva lanata Linn Juss; 5-Fluorouracil; Tumor volume; Lifespan

Introduction

Cancer is expected to claim 9 million deaths worldwide by the year 2015. A major problem in the use of chemotherapeutic agents in cancer treatment is the potential toxicity of these drugs to normal cells. Traditional medicine has aroused renewed interest as worldwide efforts continue the search for novel compounds that exhibit potent and selective anticancer properties. Aerva lanata Linn Juss (Family: Acanthaceae) is an important source of chemicals of immense medicinal and pharmaceutical importance. The plant is distributed throughout Tropical India as a common weed in fields and wasteland and is also found in Arabia, Tropical Africa, Sri Lanka, Philippines and Java [1]. India is a rich source of medicinal plants and a number of plant extracts have been used in various systems of medicines such as Ayurveda, Siddha and Unani to cure a range of diseases. Only a few of them have been scientifically explored. Plant derived natural products such as flavonoids, terpenoids and alkaloids have received considerable attention in recent years due to their diverse pharmacological properties including cytotoxic and cancer chemopreventive effects [2]. Aerva lanata is useful for curing diabetes, anorectal, demulcent and helpful in lithiasis [3]. It is also useful in cough, sore throat and wounds [4]. Aerva lanata has been reported to possess anti-inflammatory [5], diuretic [6] and nephro-protective actions in rats [7]. The whole plant of Aerva lanata showed significant antimicrobial activi-
Aerva lanata (Linn.) Juss. ex Schult. – An overview

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Received 14 January 2010; Accepted 19 October 2010

Aerva lanata (Linn.) Juss. ex Schult. (Family-Amaranthaceae) is an important source of chemicals of immense medicinal and pharmaceutical importance such as O-acetyl glycosides, β-sitosterol, daucosterol, syringic acid, vanillic acid, feruloyl tyramine, feruloyl homovanillamine, nuciferin and senecionine which are effective as diuretic, anthelmintic, antidiabetic, expectorant and in the treatment of lithiass and jaundice. Hence, considering the importance of A. lanata an attempt is made to present an overview of phytochemical and pharmacological activities of this plant.

Keywords: Aerva lanata, Amaranthaceae, Phytochemical constituents, Pharmacological activity.

IPC code: Int. cl. (2011.01) — A61K 36/21

Introduction

Aerva lanata (Linn.) Juss. ex Schult. (Family—Amaranthaceae) is known as Polpala. The plant (Plate 1) is prostrate to decumbent, sometimes erect herb, 30-60 cm in height, woolly, tomentose throughout; leaves simple, alternate, short petioled, densely tomentose, usually smaller in the flowering branches; flowers very small, sessile, bisexual, greenish or hairy white, often clustered in spikes, perianth calyce membranous, five free filaments of the five stamens connate at the base with alternating linear staminodes; fruit greenish, roundish, compressed article and seeds kidney shaped with shining black coriaceous testa. Plant is distributed throughout Tropical India as a common weed in fields and is also found to be growing in Arabia, Tropical Africa, Sri Lanka, Philippines and Java. It is commonly known as Chavy (Hindi), Singuplai (Tamil) and Bhadra (Sanskrit). The present review gives an overview of the traditional uses, phytochemical and pharmacological studies on A. lanata highlighting the correlation between the active constituents and various pharmacological activities.

Traditional Uses

In the Traditional System of Medicine, the plant is being used as diuretic and anthelmintic, antidiabetic, expectorant and in the treatment of lithiass and jaundice. The plant is used for arresting haemorrhage during pregnancy, burn healing, as an anti-inflammatory, headache, skin diseases, to dissolve kidney and gall bladder stones, for uterus clearance after delivery and to prevent lactation. The plant extract is used to treat nasal bleeding, cough, scorpion stings, fractures and spermatorrhea. The flowers are used in dysentery, diarrhoea and bronchitis. The seeds find use in rheumatism and bronchitis. The leaves are used as anti malarial, in fever and to expel stones from kidney and also as an antidote for scorpion sting, spermatorrhea, urinary troubles and as an antirheumatic. The roots are used in headache, scabies, cough, as demulcent, diuretic, to cure diarrhoea, jaundice, cholera, dysentery and in snake bite.
In vitro Anthelmintic Activity of Aerial Parts of *Aerva lanata* Linn Juss

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**ABSTRACT**

Methanol and aqueous extracts of *Aerva lanata* Linn Juss were taken for anthelmintic activity against Indian earthworm *Pheretima postuma*. Various concentrations of both extracts were tested and results were expressed in terms of time for paralysis and time taken for death of worms. Piperazine citrate (10 mg/ml) was used as reference standard and normal saline as a control group. Dose dependent activity was observed in both the extracts and the result shows that the methanol extract possesses more activity than aqueous extract and thus may be useful as an anthelmintic.

**Keywords:** Anthelmintic, *Aerva lanata* Linn Juss, Piperazine citrate.

**INTRODUCTION**

The World Health Organisation (WHO) estimated that 80% of the population of developing countries rely on traditional medicines, mostly plant drugs for their primary health care needs. The use of medicinal plant is growing worldwide because of the increasing toxicity and allergic manifestations of the synthetic drugs. Helminth infections are among the most common infections in man, affecting a large proportion of the world's population. *Aerva lanata* Linn Juss (*Amaranthaceae*) is known as Polpala. The prostate to document, sometimes erect herb, 30-50 cm in height, wolly, tan to brownish. The plant is distributed throughout tropical India as a common weed in fields and wasteland and is also found to be grown in Arabia, Tropical Africa, Sri Lanka, Philipine and Java. It is commonly known as Chaya (Hindi), Sip圌rupal (Tamil) and Bhadra (Sanakiti). In the traditional system of medicine, the plant was used as diuretic [1], antihelmintic [2], anti-inflammatory [3], diuretic [4], urolithiasis [5], nephro protective action in rats [6], antimicrobial activity and cytotoxicity of *Aerva lanata*. [7]

The aerial parts of *Aerva lanata* used as anthelmintic traditionally. Literature survey reveals that there are no reports on systematic and scientific study of anthelmintic activity of this plant has been reported, an attempt has been made to evaluate the anthelmintic potential of aerial parts of *Aerva lanata*.

**MATERIALS AND METHODS**

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**Collection and authentication of plant material**

Plant material was collected from Tirunelveli district in Tamil Nadu, India during the month of November and it is identified and authenticated by Dr. Shibdharalayya N, Aast. Director Incharge from Regional Research Institute (AY), Bangalore and Voucher specimens (RRCBS- 5588) was deposited in the institute. The aerial parts of *Aerva lanata* Linn Juss were dried in the shade and it is milled into coarse powder by a mechanical grinder and it is stored in closed vessel for further use.

**Drug and chemicals**

The drug piperazine citrate (Glaxo SmithKline Pharmaceutical Ltd.) purchased from commercial sources and all other chemicals were of analytical grade.

**Preparation of Extract**

The air dried coarse powder of the aerial parts of *Aerva lanata* was extracted successively with organic solvents of increasing polarity like petroleum ether, chloroform, acetone and methanol using soxhlet's apparatus and water by maceration for 7 days. Each time before extracting with next solvent, the marc was dried in the air and it is then repackaged in the apparatus. After each extraction was completed, the extracts were cooled at room temperature, filtered and concentrated under reduced pressure in the rotary evaporator, it is then dried and kept in the desiccator. The extract of aerial parts of *Aerva lanata* were subjected to qualitative test for the identification of various active constituents.

**Anthelmintic activity**

Anthelmintic activity was carried as per the method reported by Ajayesha et al [8] with minor modifications. The assay