EUROPEAN JOURNAL OF BIOMEDICAL AND PHARMACEUTICAL SCIENCES
http://www.ejbps.com

ISSN 2349-8870
Volume: 3
Issue: 7
142-149
Year: 2016

ELWA (*ALOE BARBADENSIS*): A REVIEW

[1]Mohd Aslam, [2]Anwar Husain Khan* and [3]Shabana Rehman

[1]Asst. Professor, Dept. of Ilmul Advia, F/o Medicine (Unani), Jamia Hamdard, New Delhi.
[2]Asst. Professor, Dept. of Manafeul Aaza, F/o Medicine (Unani), Jamia Hamdard, New Delhi.
[3]Research Scholar, Dept. of Ilmul Advia, F/o Medicine (Unani), Jamia Hamdard, New Delhi.

*** Corresponding Author: Dr. Anwar Husain Khan**
Asst. Professor, Dept. of Manafeul Aaza, F/o Medicine (Unani), Jamia Hamdard, New Delhi.

Article Received on 11/05/2016 **Article Revised on 31/05/2016** **Article Accepted on 21/06/2016**

ABSTRACT
Elwa (*Aloe barbadensis / A.vera*) also known as Sibr in Unani medicine. It belongs to the family Liliaceae. In Unani system of medicine it has been used in various ailments of body since antiquity. Habbe-e-Mudir is based on aloe dry concentrate (Musabbar) and prescribed in amenorrhoea. Habb-e-Iyarij and Iyarij-e-Faiqra are purgative and diuretic Unani compounds, which are used for cleansing stomach, intestines and kidneys, while giving treatment for rheumatism. It has also been credited with Antioxidant, Anti-Inflammatory, Anti-hyperthyroidism, Anticancer, Antiprotozoal, Antidiabetic and Anti-hyperlipidaemic activities. In this article an attempt has been made to summarize the literature on *elwa* as per classical Unani text and recent pharmacological studies.

KEYWORDS: *Aloe barbadensis / A.vera, elwa.*

INTRODUCTION

Elwa (*Aloe barbadensis / A.vera*) also known as Sibr in Unani medicine. It is the dried juice obtained by the inspissation, which flows from the transversely cut bases of the large leaves of various species of Aloe. It belongs to the family Liliaceae.

Elwa is quite popular among succulent ornamental plants. It is valued chiefly for its ornamental foliage consisting of fleshy and strongly cuticularised leaves, which are usually prickly at the margin and are arranged in rosettes. Elwa has long been in use for a host of diseases, particularly connected with the digestive system, and have also been used for wounds, burns and skin troubles. In Unani medicine, Habbe-e-Mudir is based on aloe dry concentrate (Musabbar) and prescribed in amenorrhoea. Habb-e-Iyarij and Iyarij-e-Faiqra are purgative and diuretic Unani compounds, which are used for cleansing stomach, intestines and kidneys, while giving treatment for rheumatism, paralysis and other nervine disorders (Khare, 2004). Elwa forms one of the constituents of several proprietary laxative preparations. It is also used in early stages of tuberculosis, dyspepsia, uterine disorders and rectal fissures and as an anthelmintic, cholagogue and emmenagogue (Anonymous, 1972; Wallis, 1985; Ali, 1998; Evans, 1989). In Ayurveda it is prescribed in the diseases of liver, spleen, internal tumours, chronic cough and fever, as well as in vitiated blood, skin diseases and toxic conditions. It is included in abortificient and emmenagogue compound formulations. It is also entered into anthelmintic prescriptions. Kumaaryaasava (Elwa) is also available over the counter and is indicated in the treatment of enlargement of liver and spleen, anaemia and chronic constipation. In this compound the principal ingredient is Aloe leaf juice (Khare, 2004).

According to legend, Socotrine aloes (Sibr Saqootari) was known to the Greeks as early as the 4th century B.C. The drug was apparently known in England in the 10th century, and from the 17th century records of East India Company. Socotrine and Zinzibar Aloes were for many years the only official Aloes but they have now been replaced by the Cape and Curacao (Barbados) varieties. Barbados aloe was started by the Dutch in the Islands of Curacao, Aruba, and Bonaire about 1827 A.C. Barbadose aloe is in considerable demand because of its medicinal and other virtues. It can be easily cultivated in almost all parts of India, even under constant drought conditions. Now it is planted in Indian gardens and has become completely naturalized in most of the part of the country (Evans, 1989).

VERNACULAR NAMES

Arabic	Musabbar, Sibr
Bengali	Ghrit-kumari, Musabbar
Cannad	Kathaligida, Loli-sara
Chinese	Lu-Hui
Duke	Musanbar
English	Barbados Aloe, Curacao Aloe, Jafarabad Aloe, Aloe, Common Indian Aloe

Gujrati	Kadvikunvar, Kunvar, Kuvara, Kumarpathu
Hindi	Ghiguvara, Ghikumari, Gvarapatha, Kumari, Kuvarapatha
Kashmiri	Musabbar
Maharashtra	Pivalboel, Korphad, Koraphanta, Korkand, Kunvarpata, Koraphada
Punjabi	Elwa
Persian	Elwa, Shibyar, Darakhtesinn
Siryani	Alwa
Sanskrit	Ghrita-kumari, Kumari, Adala, Bahupatri, Grihakanya.
Turkish	Azwa
Telgu	Chinnakalabanda, Chinnarakasimatta, Ettalkalabanda, Kalabanda, Manjikattali, Musambaramu.
Tamil	Angani, Kattalai, Kodiyan, Sirukattalai, Sottukkattalai, Veligem, Chirukattali, Kumari
Urdu	Ghiqwara
Unani	Fikra, Alya

HABITAT AND DISTRIBUTION

There are about 180 species of aloe and most of them are found in South Africa and West Indies. *A. barbadensis* is a native of Northern Africa but it is planted in Indian gardens and many other tropical countries. It is cultivated throughout India in many varieties some of which run wild as on the coasts of Bombay, Gujarat and South India. *A. vera* or *A. barbadensis* have become completely naturalized in India especially in the hot dry valleys of northwestern Himalayas and throughout the central table and extending as far as Cape Comorin.

Aloe plant is a typical xerophytic with thick, fleshy, strongly cuticularized, spiny margined, leaves arranged in rsette formation. Erect unbranched flower rises after rainy season in winter. It flourishes on poorest soil and can be propagated easily by means of a sucker (Ali, 1998; Bentley, 1990; Shah & Qadri, 1996; Nadkarni, 1989; Anonymous, 1972).

BOTANICAL DESCRIPTION

Stem

It is a perennial plant with a very short, thick, cylindrical, simple, woody stem, sending out at the base numerous stolons.

Leaves

30-60 cm. long, erect, crowded in a basal rosette, full of juice, glancous-green, narrow lanceolate, long acuminate, smooth except for the spiny teeth on the margins.

Scape

Flowering stem longer than leaves, scaly, branched, racemes long, dense.

Flowers

Yellow, pendulous, imbricated in dense resemes terminating the scape.

Fruit

Loculicidal capsule.

Root

Fibrous, fleshy

(Nadkarni, 1989; Bentley, 1990; Anonymous, 1972; Warrier *et al*, 1997; Shah & Qadri, 1996; Kirtikar & Basu, 1987).

VARITIES OF ALOE

***Aloe barbadensis* (*A.vulgaris/ A. Officinalis*)**

This is known as Curacao Aloe Or Barbados Aloe. It is a native of northern Africa. At present it is cultivated in Aruba, Bonaire and Curacao Islands near West Indies. The plant of *A. barbadensis* is of herbaceous type.

***Aloe ferox* and its hybrids**

This is called as Cape Aloe and occurs wildly on the Islands of Socotra, South Africa, Kenya and neighboring mainland of East Africa. The plant of *A. ferox* is of the arborescent type.

Aloe perry

This aloe is known as Socotrine and Zangibar aloes. This is cultivated in Socotra and Zangibar Islands. The plant is suitable to grow in the limestone-tract and can be cultivated in the driest situation and poorest soil. This aloe is also called as Monkey Skin Aloe.

(Ali, 1998; Anonymous, 1972; Shah & Qadri, 1996).

PROPERTIES OF DRIED JUICE OF ELWA

Barbados Aloe is opaque and is yellow to chocolate brown in colour. Over heated inferior quality aloe is nearly black in colour. The fracture is waxy.

Cape Aloe is glassy, dark chocolate or green-chocolate in colour. Small pieces are reddish brown or yellow coloured or amber. Odour is characteristic sour and taste unpleasant and bitter.

Socotrine Aloe occurs in masses of different shapes and sizes and is yellow brown to dark brown and opaque. Fracture is irregular and porous and taste is bitter.

Zinzibar Aloe is opaque, more firm than Socotrine and livery brown in colour.fracture is smooth as wax. Odour is considered pleasant but taste is bitter.

(Shah & Qadri, 1996; Ali, 1998; Wallis, 1985).

THERAPEUTIC USES (MAWAQE-ISTAMAAL)

Uses	Unani References	Ethnomedical References
Qurooh (Wounds)	Ibn-e-Sina, 1927; Ibn-e-Baitar, 1999; Ghani, 1920; Karim, 1520;Ibn-e-Rushd, 1987; Hakeem, 1311; Ali, 1294H; Khan, 2037; Ayyub, 1927.	Ali, 1998; Kirtikar & Basu, 1987
Asbi Amraz (Nervine disorders)		Khare, 2004; Warrier *et al*, 1997
Malikhoolia (Malencholia)	Ibn-e-Sina, 1927; Ibn-e-Baitar, 1999; Karim, 1520; Hakeem, 1311; Ali 1301; Hussain, 1223H; Khan, 1305; Khan, 1883	
Amraz-e-Chashm (Diseases of Eye)	Ibn-e-Sina, 1927; Ibn-e-Baitar, 1999; Karim, 1520; Ibn-e-Rushd, 1987; Hakeem, 1311; Ali, 1294H; Ali 1301; Khan, 2037; Khan, 1305; Khan, 1883; Ayyub, 1927.	Anonymous, 1972; Singh, 2005; Anonymous, 1992; Kirtikar & Basu, 1987
Basoor (Pustule)	Ibn-e-Sina, 1927; Hussain, N.A	
Humma (Fever)		Kirtikar & Basu, 1987;
Waja-ul-mafasil (Arthritis)	Ibn-e-Sina, 1927; Ibn-e-Baitar, 1999; Karim, 1520; Hakeem, 1311; Ali 1301; Khan, 1883	Khare, 2004
Niqras (Gout)	Khan, 1883	Khare, 2004
Suda (Headache)	Ibn-e-Sina, 1927; Ibn-e-Baitar, 1999; Karim, 1520; Ali, 1294H; Khan, 1305; Khan, 1883	
Qurooh-e-Meda (Gastric Ulcer)		Singh, 2005; Shah & Qadri, 1996; Warrier *et al*, 1997; Asolkar *et al*, 1992; Nadkarni, 1989
Iltihab-e-Meda (Gastritis)	Ibn-e-Sina, 1927; Ibn-e-Rushd, 1987; Hakeem, 1311; Khan, 1305	
Sudad-e-Jigar (Liver obstruction)	Ibn-e-Sina, 1927; Ibn-e-Baitar, 1999; Karim, 1520; Hakeem, 1311; Ali, 1294H; Hussain, 1223H; Khan, 1883	Anonymous, 1972
Yarqan (Jaundice)	Ibn-e-Sina, 1927; Ibn-e-Baitar, 1999; Karim, 1520; Hakeem, 1311; Khan, 1323; Hussain, 1223H; Khan, 1305; Khan, 1883	
Qoolanj (Colic)		Warrier *et al*, 1997; Agarwal 1990
Qula (Stomatitis)	Ibn-e-Baitar, 1999; Ibn-e-Sina, 1927; Ibn-e-Rushd, 1987	
Zaat-ur-Riya (Pneumonia		Singh, 2005
Nafs-ud-dam (Haemoptysis)	Ibn-e-Baitar, 1999; Karim, 1520; Khan, 1323; Hussain, 1223H; Khan, 1305	
Shighaf-e-Miqad (Fissure in Ano)	Ibn-e-Baitar, 1999	Agarwal 1990; Chopra *et al*, 1958
Inteshaar-e-Shaar (Falling of Hairs)	Ibn-e-Baitar, 1999; Ghani, 1920; Khan, 1883	Singh, 2005; Ali, 1998
Warm-e-Lissan (Glossitis)	Ibn-e-Baitar, 1999	
Nazla wa Zukam (Cold and Corryza)	Ibn-e-Baitar, 1999	Singh, 2005
Kasr (Fracture)	Ibn-e-Baitar, 1999	
Ehtebaas-e-Haiz (Amenorrhoea)	Kabiruddin, 1951; Prashad, 1994; Multani, N.A.	Ali, 1998; Bentley, 1990; Khare, 2004; Kirtikar & Basu, 1987; Warrier *et al*, 1997; Agarwal 1990; Asolkar *et al*, 1992
Surkh bada (Erysepalus)	Ibn-e-Baitar, 1999; Ghani, 1920	
Shara (Urticaria)	Ibn-e-Baitar, 1999; Ghani, 1920	
Musawwad-e-Shaar (Premature graying of hairs)	Ghani, 1920	Ali, 1998
Amraz-e-Gurda (Kidney Diseases)	Karim, 1520; Khan, 1323; Hussain, 1223H.	Khare, 2004
Amraz-e-Tihal (Diseases of Spleen)	Karim, 1520; Khan, 2037; Hussain, 1223H; Ayyub, 1927; Anonymous, 1993	Anonymous, 1972; Ali, 1998; Anonymous, 1992; Kirtikar & Basu, 1987; Warrier *et al*, 1997
Amraz-e-Jigar (Liver Diseases)		Anonymous, 1992; Kirtikar & Basu, 1987; Warrier *et al*, 1997
Zauf-e-Dimagh (Weakness of Brain)	Ali, 1294H	
Kirm-e-Shikam wa Meda	Karim, 1520; Hakeem, 1311; Ali 1301; Khan,	Singh, 2005; Kirtikar & Basu, 1987

(Anthelminthic)	1323; Chiraghuddin, 1201; Hussain, 1223H; Kabiruddin, 1951; Anonymous, 1993; Qasim, N.A.	
Zauf-e-Ishteha (Anorexia)	Karim, 1520; Ali, 1294H; Hussain, 1223H; Khan, 1883	
Harq wa Salaq (Burns and Scalds)		Anonymous, 1972;Ali, 1998; Shah & Qadri, 1996; Khare, 2004; Anonymous, 1992; Warrier *et al*, 1997; Asolkar *et al*, 1992
Juzam (Leprosy)	Chiraghuddin, 1201; Qasim, N.A.	
Iltehab-e-Jild (Dermatitis)		Anonymous, 1972; Ali, 1998; Bentley, 1990; Shah & Qadri, 1996; Khare, 2004; Anonymous, 1992; Warrier *et al*, 1997; Asolkar *et al*, 1992
Jarb (Scabies)	Chiraghuddin, 1201; Khan, 1305	
Sual (Cough)		Singh, 2005
Amraz-e-Sadr (Respiratory disorders)	Chiraghuddin, 1201	
Amraz-e-Masana (Bladder diseases)	Chiraghuddin, 1201	
Kasrat-e-Atash (Dyspepsia)	Chiraghuddin, 1201	Bentley, 1990; Kirtikar & Basu, 1987; Warrier *et al*, 1997
Hikka (pruritis)	Khan, 1305	
Qabz (Constipation)	Kabiruddin, 1951; Multani, N.A.	Ali, 1998; Bentley, 1990; Wallis, 1985 Kirtikar & Basu, 1987; Warrier *et al*, 1997; Chopra *et al*, 1958
Asrul-Baul (Dysurea)	Qasim, N.A.	

PHARMACOLOGICAL STUDIES

Antioxidant activity

- Antioxidant components in *Aloe vera* were examined for lipid peroxidation using rat liver microsomal and mitochondrial enzymes. Among the aloesin derivatives examined, isorabaichromone showed a potent antioxidative activity. The DPPH radical and superoxide anion scavenging activities were determined. As one of the most potent components, isorabaichromone together with feruloylaloesin and p-coumaroylaloesin showed potent DPPH radical and superoxide anion scavenging activities (Yagi *et al*, 2002).

Anti-Inflammatory activity

- In a study, the effects of aqueous, chloroform, and ethanolic extracts of *Aloe vera* gel on carrageenan-induced edema in the rat paw were studied, and neutrophil migration into the peritoneal cavity stimulated by carrageenan. The capacity of the aqueous extract to inhibit cyclooxygenase activity was also studied. The aqueous and chloroform extracts decreased the edema induced in the hind-paw and the number of neutrophils migrating into the peritoneal cavity, whereas the ethanol extract only decreased the number of neutrophils. The aqueous extract inhibited prostaglandin E2 production from arachidonic acid. The results demonstrated that the extracts of *Aloe vera* gel have antiinflammatory activity and suggested its inhibitory action on the arachidonic acid pathway via cyclooxygenase (Vazquez *et al*, 1996).

Anti-hyperthyroidism activity

- Relative importance of *Bacopa monnieri* (200 mg/kg), *Aegle marmelos* (1.00 g/kg) and *Aloe vera* (125 mg/kg) leaf extracts in the regulation of thyroid hormone concentrations in male mice were investigated by Kar *et al*. The serum levels of both T_3 and T_4 were inhibited by *A. vera*, *A. marmelos* extract could decrease only T_3 concentration. On the other hand, T_4 concentration was increased by *B. monnieri* extract suggesting its thyroid-stimulating role. When the relative potency of each plant extract was calculated in terms of percent increase or decrease in thyroid hormones, as compared to the control value, the decrease in T_3 concentration by *A. marmelos* was about 62% indicating its possible use in the regulation of hyperthyroidism. It was suggested that *A. marmelos* and *A. vera* may be used in the regulation of hyperthyroidism, while *B. monnieri* in hypothyroidism (Kar *et al*, 2002).

Anticancer activity

- *Shamaan et al* studied the effects of vitamin C and *Aloe vera* gel extract supplementation on induced hepatocarcinogenesis in male Sprague-Dawley rats by diethylnitrosamine (DEN) and 2-acetylaminofluorene (AAF). The severity of the carcinogenesis process was determined by measuring gamma-glutamyl transpeptidase (GGT) and the placental form of glutathione S-transferase (GSTP) histochemically in situ and in plasma and liver fractions. In addition, plasma alkaline phosphatase (ALP) and liver microsomal uridine

diphosphate glucuronyl transferase (UDPGT) activity were also determined. Administration of DEN/AAF caused an increase in the surface area and number of enzyme-positive foci (both GGT and GSTP) compared with control. Supplementation of vitamin C or *Aloe vera* gel extract to the cancer-induced rats suppressed this increase significantly ($P < 0.05$; $P < 0.001$). Increased in liver UDPGT, GGT, and GSTP activities were also observed with cancer induction that were again suppressed with either vitamin C or *Aloe vera* gel supplementation. In conclusion, vitamin C and *Aloe vera* gel extract supplementation were found to be able to reduce the severity of chemical hepatocarcinogenesis (Shamaan *et al*, 1998).

Antiprotozoal activity

- The antiprotozoal action of aqueous extract of *Aloe barbadensis* against and *in vitro* culture of *Trichomonas vaginalis* was studied. The inhibition of growth was greater than 50% against three strains of the parasite (Rojas *et al*, 1995).

Antidiabetic activity

- The anti-hyperglycemic effect of *Aloe vera* gel was evaluated by *Tanaka et al*. The five phytosterols, lophenol, 24-methyl-lophenol, 24-ethyl-lophenol, cycloartanol and 24-methylene-cycloartanol were evaluated for their anti-hyperglycemic effects in type 2 diabetic mice. In comparison with the hemoglobin A1c (HbA1c) levels of vehicle-treated mice, statistically significant decreases of 15 to 18% in HbA1c levels were observed in mice treated with 1 mug of the five phytosterols. After administration of the five phytosterols for 28 d, fasting blood glucose levels decreased to approximately 64%, 28%, 47%, 51%, and 55% of control levels, respectively. Severe diabetic mice treated with phytosterols derived from *Aloe vera* gel did not suffer weight reduction due to glucose loss in the urine. The findings suggested that *Aloe vera* gel and phytosterols derived from *Aloe vera* gel have a long-term blood glucose level control effect and would be useful for the treatment of type 2 diabetes mellitus (Tanaka *et, al*, 2006).

Anti-hyperlipidaemic activity

- The study was designed to examine the potential anti-hyperlipidaemic efficacy of the ethanolic extract from *Aloe vera* leaf gel in streptozotocin (STZ)-induced diabetic rats. Oral administration of Aloe vera gel extract at a dose of 300 mg/kg bodyweight per day to STZ-induced diabetic rats for a period of 21 days resulted in a significant reduction in fasting blood glucose, hepatic transaminases (aspartate aminotransferase and alanine aminotransferase), plasma and tissue (liver and kidney) cholesterol, triglycerides, free fatty acids and phospholipids and a significant improvement in plasma insulin. In addition, the decreased plasma levels of high-density lipoprotein-cholesterol and increased plasma levels of low-density lipoprotein-and very low-density lipoprotein-cholesterol in diabetic rats were restored to near normal levels following treatment with the extract. The altered fatty acid composition in the liver and kidney of diabetic rats was restored following treatment with the extract (Rajasekaran *et al*, 2006).

Antiviral activity

- The antiviral activity of partially purified extracts prepared from the gel portion of leaves of *Aloe barbadensis* against human cytomegalovirus (CMV) by plaque inhibition tests, flow cytometry and morphometry assays was assessed. Mechanism of inhibition of CMV infection by aloe extracts through interference with DNA synthesis had been suggested (Saoo *et al*, 1996).

Antitoxic activity

- Concomitant oral supplementation of *Aloe vera* during arsenic exposure was investigated in rats for its protective value. Animal exposed to arsenic showed a significant inhibition of gamma-aminolevulinic acid dehydratase activity, a marginal decrease in glutathione (GSH) and an increase in zinc protoporphyrin level in blood. White blood corpuscles level decreased while most of the other clinical blood parameters remained unaltered on arsenic exposure. Thiobarbituric acid reactive substance level increased significantly while the activity of alkaline phosphatase, asparatate aminotransferase, alanine aminotransferase and catalase decreased on arsenic exposure. Renal GSH contents decreased while superoxide dismutase activity decreased significantly on arsenic exposure. Concomitant administration of *Aloe vera* had remarkable protective action on inhibited blood biochemical parameters (Gupta *et al*, 2005).

Antifungal activity

- Ethanolic extract of *Aloe vera* (aerial parts) was tested for antifungal activity against *Aspergillus flavus*, *A. terreus* and *Mucor* species. The extract showed good fungicidal activity (Perumal *et al*, 2004).

Antiulcer activity

- The aqueous extract of *Aloe vera* leaf gel was administered orally to rats with ethanol-induced ulcer. Total number of lesions in the gastric area, total volume, acidity, levels of protein and glycoprotein components were determined in the gastric juice. The observed decreased in the number of gastric lesions in the treated rats suggested the cytoprotective and acid regulating properties of the leaf gel (Sivagnanam *et al*, 2003).

Anti-acne activity

- The Aloe gel and some essential oils compound formulation were found to repair damage and promote supple skin. After the survey, the cream had been found useful for various ailments like acne, dryness, dark patches on face (Farooqi, 2003).

Angiogenic activity

- Angiogenic activity of *Aloe vera* gel was investigated by *in vitro* assay. The most active fraction (F3) obtained from dichloromethane extract of *Aloe vera* gel increased the proliferation of calf pulmonary artery endothelial (CPAE) cells. F3 fraction also induced CPAE cells to invade type I collagen gel and form capillary-like tube through *in vitro* angiogenesis assay and increased the invasion of CPAE cells into matrigel through *in vitro* invasion assay. F3 fraction enhanced mRNA expression of urokinase-type plasminogen activator, matrix metalloproteinase-2, and membrane-type MMP in CPAE (Lee *et al*, 1998).

Cardioprotective activity

- Five thousand patients of atheromatous heart disease, presented as angina pectoris, were studied over a period of five years. After adding the husk of Isabgol and *Aloe vera* to the diet, a marked reduction in total serum cholesterol, serum triglycerides, fasting and postprandial blood sugar level in diabetic patients, total lipids and also increase in HDL were noted. Simultaneously the clinical profile of these patients showed reduction in the frequency of anginal attacks and gradually, the drugs, like verapamil, nifedipine, beta-blockers and nitrates, were tapered. The patients, most benefitted, were diabetics (without adding any antidiabetic drug) (Agarwal, 1985).

Enzyme inhibitory activity

- Twenty-two crude ethanolic extracts from 14 indigenous medicinal plants were subjected to enzyme inhibition screening against acetylcholinesterase (AChE), butyryl cholinesterase (BChE) and lipoxygenase enzymes (LO). Three extracts showed activity against AChE, nine extracts were found to be active against BChE and four extracts inhibited the enzyme LO. The most significant inhibition activities (> or =50%) were found in extracts derived from *Aloe vera* (leaves), *Alpinia galanga* (rhizome), *Curcuma longa* (rhizome), *Cymbopogon citratus* (leaves), *Ocimum americanum* (leaves and stem), and *Withania somnifera* (roots) (Khattak *et al*, 2005).

Effects on blood ethanol level

- Various high molecular weight fractions from *Aloe vera* on a single oral administration in rats were found to cause a significant decrease in the blood ethanol concentration as well as enhancement of liver cytosolic ADH and ALDH activities. A strong acidic high molecular weight fraction was demonstrated to exhibit the most potent activity on ethanol metabolism (Shin *et al*, 1998).

Effect on age related diseases

- The effects of long-term *Aloe vera* ingestion on age-related diseases were investigated using male specific pathogen-free,Fischer 344 rats. Life-long *Aloe vera* ingestion produced neither harmful effects nor deleterious changes. The ingestion of *Aloe vera* exhibited significantly fewer occurrences of multiple causes of death, and slightly lowered incidence of fatal chronic nephropathy and thrombosis in the cardiac atrium (Ikeno, 2002).

Gastroprotective activity

- The effect of varying doses of ethanol extract of *Aloe vera* on acute gastric mucosal lesions induced by 0.6 M HCl and acid output was studied in the pylorus ligated and lumen perfused rats, respectively. Acid secretion was determined by titration of the collected gastric juice to pH 7.0. Intraperitoneal injection of *Aloe vera*, dose dependently inhibited gastric acid secretion. The plant was more active as a gastroprotective agent at lower concentration against mucosal injury induced by 0.6 M HCl. In conclusion, *Aloe vera* was endowed with gastric acid anti-secretory activity and could protect the gastric mucosa at low concentrations against injurious agents (Yusuf *et al*, 2004).

Hepatoprotective activity

- The effects of *Aloe vera* leaf pulp and gel extracts was investigated on the liver tissue of neonatal streptozotocin)-induced type-II diabetic rats. Liver tissues were examined histologically. The markers of oxidative stress: glutathione (GSH), non-enzymatic glycosylation (NEG) and lipid peroxidation (LPO), were determined in liver tissue. Biochemical parameters for liver functions: serum alkaline phosphatase (ALP) and alanine transaminase (ALP) activities, were evaluated. All parameters were also determined in healthy (non diabetic) rats for comparison. In the diabetic control group, the degenerative changes in liver tissue were remarkable, while in the diabetic groups given Aloe pulp and gel extracts and glibenclamide, the damage to the liver tissue was decreased. The increase of GSH and the decrease of NEG and LPO in liver tissues with the treatment of Aloe gel extract is consistent with the beneficial effect of Aloe. Serum ALP and ALT activities were also decreased in the groups given Aloe gel extract. It was concluded that Aloe gel extract has a protective effect comparable to glibenclamide against hepatotoxicity produced by diabetes if used in the treatment of type-II diabetes (Can *et al*, 2004).

Hypotensive activity

- Hypotensive effects of aloe-emodin, aloin A, elgonica dimer A and bisbenzopyran from *Aloe barbadensis* have been studied. Aloe-emodin has emerged as a potent hypotensive agent in current pharmacological investigations and caused 26 %, 52 %, and 79 % falls in mean arterial blood pressure at the corresponding doses of 0.5, 1, and 3 mg/kg in rats (Saleem *et al*, 2001).

Nephroprotective activity

- Significant degenerative changes were observed in the kidney tissue of untreated neonatal streptozotocin-induced type-II diabetic rats. These degenerative changes were diminished in the kidney tissue of diabetic animals given glibenclamide and Aloe leaf gel and pulp extracts. Kidney lipid peroxidation levels were increased in diabetic rats compared to healthy rats; these levels were higher in rats treated with glibenclamide than in those, which received Aloe extracts. Serum urea and creatinine levels were higher in diabetic rats in comparison to healthy rats. The administration of Aloe gel extract and glibenclamide decreased serum urea and creatinine levels in comparison to diabetic controls. Only *A. vera* leaf gel extract showed improvement both in histological and biochemical parameters suggesting a protective effect of *A. vera* on mild damage caused by type-II diabetes on kidney tissue (Bolkent *et al*, 2004).

Ovulatory activity

- Aloes compound (AC) was tried in infertile women as a fertile drug and in adolescent girls as a drug to regularize endocrine functions and menstrual (ovulation) cycle. AC contained the ingredients like, *Aloe indica*, myrrh, Manjista, Karia (iron) Bhasma, Hurnal, Kamboji and jeevati. Response in the both the groups was 50 and 45 %, respectively by working as a fertility and ovulation-inducing agent (Kakarla, 1999).

Radioprotective activity

- Radio modifying effects of the leaf extract of *Aloe vera* were observed in testes of Swiss albino mice at 50 and 100 mg/kg dose levels. This extract was non-toxic when injected up to 800 mg/kg and a significant enhancement in survival time of the irradiated group was observed. The treatment also reduced radiation-induced damage to germ cells and loss in body weight (Pande *et al*, 1998).

Wound healing activity

- The use of *Aloe vera* extract in the management of burn wounds had been compared with routinely used framycetin dressing. One hundred subjects with burns of about 10-40% total burn surface area excluding electrical, chemical and radiation burns and subjects with diseases affecting wound healing area were randomly allocated to dressing with aloe extract or routine dressing done every 3rd day. The mean wound healing time was significantly lower in aloe group. Bacteriological control was also obtained in aloe group (Murtaza & Hatwar, 2002).

REFERENCES

1. Khare, C.P. (2004) *Indian Herbal Remedies*, Springer-Verlag berlin Heidelberg, New York, p. 43-45, 431-432.
2. Anonymous (1972) *The Wealth of India*, Publication & Information Directorate, CSIR, New Delhi, vol. I & IX, p. 191-193, 391-392.
3. Wallis, T. E. (1985) *Text Book of Pharmacognosy*, CBS Publishers and Distributors, Delhi, 5th edn, p. 449-457.
4. Wang, Y., (1985) Twenty-four cases of renal syndrome complicated with nitremia treated with TCM-WM combined. *Chinese Journal of Integrated Traditional and Western Medicine*, 5(9): 550-552.
5. Ali, M. (1998) *Text Book of Pharmacognosy*, CBS Publishers & Distributors, New Delhi, p. 111-115.
6. Evans, W.C. (1989) *Trease and Evans Pharmacognosy*, W. B. Saunders, Elsvier Sciense Limited, 13th edn, p. 413-416.
7. Bentley, R., Trimen, H. (1990) *Medicinal Plants*, Allied Book Centre, Dehradun, India, IV: 282-283.
8. Shah, C.S., Qadri, J.S. (1996) *A Textbook of Pharmacognosy*, B.S., Shah Prakashan, Ahmedabad, p. 93-98.
9. Warrier, P.K., Numbiar, V.P., Ramankutty, C. (1997) *Indian Medicinal Plants, a compendium of 500 species*, Orient Longman, I(V): 103-105, 160-162.
10. Kirtikar, K.R. and Basu, B.D. (1987) *Indian Medicinal Plant*, International Book Distributors, III(IV): 1748-1751, 2504-2506.
11. Singh, M.P. (2005) *Medicinal Herbs With Their Formulations*, Daya Publishing House, Delhi, I(II): 83-84, 777-779.
12. Asolkar, L.V., Kakkar, K.K. and Chakre, O.J. (1992*) Second Supplement of Glossary of Indian Medicinal Plants*, Part I (A-K), (1965-1981) Publication & Information Directorate, CSIR, New Delhi, p. 46-49.
13. Anonymous (1992) *The Useful Plants of India*, Publication & Information Directorate, CSIR, New Delhi, p. 29: 581.
14. Yagi, A., Kabash, A., Okamura, N., Haraguchi, H., Moustafa, S.M., Khalifa, T., I. (2002) Antioxidant, free radical scavenging and anti-inflammatory effects of aloesin derivatives in *Aloe vera*. *Planta Med*., 68(11): 957-60.
15. Vazquez, B., Avila, G., Segura, D., Escalante, B. (1996) Antiinflammatory activity of extracts from *Aloe vera* gel. *J. Ethnopharmacol*., 55(1): 69-75.
16. Kar, A., Panda, S., Bharti, S. (2002) Relative efficacy of three medicinal plant extracts in the alteration of thyroid hormone concentrations in male mice. *J. Ethnopharmacol*., 81(2): 281-5.

17. Shamaan, N.A., Kadir, K.A., Rahmat, A., Ngah, W.Z. (1998) Vitamin C and *Aloe vera* supplementation protects from chemical hepatocarcinogenesis in the rat. *Nutrition*, 14(11-12): 846-52.
18. Rojas, L., Matamoros, M., Garrido, N., Finlay, C. (1995) Action of the aqueous extract of *Aloe barbadensis* Miller in *in vitro* cultures of *Trichomonas vaginalis*. *Revista Cubana de Medicina Tropical*, 47(3): 181-84.
19. Tanaka, M., Misawa, E., Ito, Y., Habara, N., Nomaguchi, K., Yamada, M., Toida, T., Hayasawa, H., Takase, M., Inagaki, M., Higuchi, R. (2006) Identification of five phytosterols from *Aloe vera* gel as anti-diabetic compounds. *Biol. Pharm. Bull*., 29(7): 1418-22.
20. Rajasekaran, S., Ravi, K., Sivagnanam, K., Subramanian, S. (2004) Hypoglycemic effect of *Aloe vera* gel on streptozotocin-induced diabetes in experimental rats. *J. Med. Food*, 7(1): 61-6.
21. Saoo, K., Miki, H., Ohmori, M., Winters, W.D. (1996) Antiviral activity of Aloe extracts against cytomegalovirus. *Phytotherapy Research*, 10(4): 348-50.
22. Perumal, G., Subramanyam, C., Natarajan, D., Srinivasan, K., Mohanasundari, C., Prabakar, K. (2004) Antifungal activities of traditional medicinal plant extracts-A preliminary survey. *Journal of Phytological Research*, 17(1): 81-83.
23. Sivagnanam, K., Rajasekaran, S., Narayanan, V., Subramanian, S. (2003) Biochemical evaluation of the ulcer curative effect of *Aloe vera* on experimental rats. *Journal of Natural Remedies*, 3(2): 161-165.
24. Farooqi, A.H.A. (2003) A formulation useful as natural herbal cream for skin care. *2nd World Congress on "Biotechnologica Developments of Herbal Medicine*." NBRI, Lucknow, India, feb., 20-22, p. 83.
25. Lee, M.J., Lee, O.H., Yoon, S.H., Lee, S.K., Chung, M.H., Park, Y.I., Sung, C.K., Choi, J.S., Kim, K.W. (1998) *In vitro* angiogenic activity of *Aloe vera* gel on calf pulmonary artery endothelial (CPAE) cells. *Archives of pharmacol Research*, 21(3): 260-65.
26. Agarwal, O.P. (1985) Prevention of atheromatous heart disease. *Angiology*, 36(8): 485-92.
27. Khattak, S., Saeed, R., Shah, H.U., Khan, T. (2005) *In vitro* enzyme inhibition activities of crude ethanolic extracts derived from medicinal plants of Pakistan. *Nat. Prod. Res*., 19(6): 567-7.
28. Shin, K.H., Han, Y.N., Chung, H.S., Lim, S.S., Lee, S.H., Shim, C.S. (1998) Effects of high molecular weight fractions of Aloe spp. on alcohol metabolism. *Korean J. of Pharmacognosy*, 29(2): 120-24.
29. Ikeno, Y., Hubbard, G.B., Lee, S., Yu, B.P., Herlihy, J.T. (2002) The influence of long-term *Aloe vera* ingestion on age-related disease in male fischer 344 rats. *Phytotherapy Research*, 16(8): 712-18.
30. Yusuf, S., Agunu, A., Diana, M. (2004) The effect of *Aloe vera* A. Berger (Liliaceae) on gastric acid secretion and acute gastric mucosal injury in rats. *J. Ethnopharmacol*., 93(1): 33-7.
31. Can, A., Akey, N., Ozsoy, N., Bolkent, S., Arda, B.P., Yanardag, R., Okyar, A. (2004) Effect of *Aloe vera* leaf gel and pulp extracts on the liver in type-II diabetic rat models. *Biol. Pharm. Bull*., 27(5): 694-8.
32. Saleem, R., Faizi, S., Siddiqui, B.S., Ahmed, M., Hussain, S.A., Qazi, A., Dar, A., Ahmad, S.I., Qazi, M.H., Akhter, S., Hasnain, S.N. (2001) Hypotensive effect of chemical constituents from *Aloe barbadensis*. *Planta Med*., 67(8): 757-60.
33. Bolkent, S., Akey, N., Ozsoy, N., Sengezer-Inceli, M., Can, A., Alper, O., Yanardag, R. (2004) Effect of *Aloe vera* L. Burm. fil. leaf gel and pulp extracts on kidney in type-II diabetic rat models. *Indian J. Exp. Biol*., 42(1): 48-52.
34. Kakarla, R. (1999) Aloes compound-Versatility in gynaecological practice. *Indian Medical Gazette*, 133(4): 150-51.
35. Pande, S., Kumar, M., Kumar, A. (1998) Radioprotective efficacy of *Aloe vera* leaf extract. *Pharmaceutical Biology*, 36(3): 227-32.
36. Murtaza, A., Hatwar, S.K., (2002) *Aloe vera* extract in management of burn wounds. *Current Medical Trends*, 6(1): 1071-77.