EXCELLENT PUBLISHERS

International Journal of Current Research and Academic Review

ISSN: 2347-3215 Volume 1 Number 1 (2013) pp. 45-56

www.journals.excellentpublishers.com

Ayurveda: from traditional use to scientific research

Vikrant Arya*

Department of Pharmacognosy, College of Ayurvedic Pharmaceutical Sciences, Joginder Nagar Mandi, Himachal Pradesh, India
Under Society for Ayurvedic Pharmacy Education and Training, Department of Ayurveda, Govt. of Himachal Pradesh, India

**Corresponding author e-mail: arya.vikrant30@gmail.com*

KEYWORDS

Ayurveda;
Pharma-cology;
Scientific study.

ABSTRACT

It is well known that the oldest of all the sciences in the world is the science of life, Ayurveda. It is based entirely on herbs and herbal compounds. The scientific method of Modern Science is based on the principle of Observation, Hypothesis / anti-thesis, Experimentation and Proof. Present form of Ayurveda is the outcome of continued scientific inputs that has gone in to the evolution of its principles, theories and protocol of healthy living and disease management. In this paper an attempt has been done to highlight various plants of Ayurveda and their exploration in the scientific research. The evidences of effect of different Ayurvedic plant extracts, formulations (herbal product, bhasmas etc) by in vitro, in vivo studies and clinical trials is extremely helpful in enhancing the wisdom of Ayurveda as evidence-based Indian system of medicine.

Introduction

Ayurveda is the mother of all forms of modern medicine, from body work to surgery. Ayurveda is an ancient time tested method of holistic medicine that supports the individual in finding balance throughout their physiology leading to great levels of health's and happiness. Ayurveda's origin is crucial to the development of its medical theory. India has a rich scientific history, Ayurveda in particular dates back 3500 to 5000 years ago. It is the most ancient form of medicine in India and traces back to Lord Brahma (the Hindu God of Creation), according to Hindu mythology.

Ayurveda literally means, the science of life, and was discovered thousands of years ago. Ayurveda recognizes the interaction between humans and nature; ultimately the same elements that compose our body also make up the Earth; humans are microcosms of the macrocosmic universe. Ayurvedic remedies do not operate the body's

Table.1 Detail of some Ayurvedic plants explored in scientific research

AYURVEDIC APPROACH						SCIENTIFIC RESEARCH		
Botanical name/family	**Ayurvedic name**	**Part involved**	**Traditional use**		**Dose as indicated in API**	**Scientific research published**	**Dose**	**Place of research**
			Use (Sanskrit meaning)	Use (English meaning)				
Cleome gynandra Capparidaceae	Ajagandha	Seed	Gulma	Tumor	1-3 g of the drug in powder form	Evaluation of anticancer activity of *Cleome gynandra* on Ehrlich's ascites carcinoma treated mice (Akhtar *et al*., 2011)	200 and 400 mg/kg	India
Emblica officinalis Euphorbiaceae	Amalaki	Fruit pulp	Prameha	Diabetes Mellitus	10-20 g of the drug	Effect of amla fruit (*Emblica officinalis* Gaertn.) on blood glucose and lipid profile of normal subjects and type 2 diabetic patients	100, 200, 300 and 400 mg/kg	Pakistan
Calotropis procera Asclepiadaceae	Arka	Root	Gulma	Tumor	1-3 g of the drug for decoction	Evaluation of antitumour activity of *Calotropis gigantea*. root bark against Ehrlich ascites carcinoma in swiss albino mice (Habib and Karim , 2011)	Methanol extract (10 and 20 mg/kg), Petroleum ether fraction (40 and 80 mg/kg) and chloroform fraction (20 and 40 mg/kg)	Bangladesh
Saraca asoca Leguminosae	Ashoka	Stem bark	Sotha	Inflammatory disorders	20-30 g of the drug for decoction	Therapeutic effect of *Saraca asoca* (roxb.) Wilde on lysosomal enzymes and collagen metabolism in adjuvant induced arthritis (Saravanan *et al.*, 2011)	50, 100 and 200 mg/kg	India

Withania somnifera Solanaceae	Asvagandha	Root	Daurbalya	Impotency	3-6 g of the drug in powder form	Efficacy of Ashwagandha (*Withania somnifera* Dunal. Linn.) in the management of psychogenic erectile dysfunction (Mamidi and Thakar , 2011)	4 tablets (500 mg each) thrice a day	India
Ficus religiosa Moraceae	Asvattha	Bark	Prameha	Diabetes Mellitus	20-30 g of the drug for decoction	Antidiabetic effect of *Ficus religiosa* extract in streptozotocin-induced diabetic rats (Pandit *et al.*, 2010)	25, 50 and 100mg/kg	India
Linum usitatissimum Linaceae	Atasi	Seed	Kushtha	Skin disorder	3-6 g of the drug in powder form	Antimicrobial investigation of *Linum usitatissimum* for the treatment of acne (Nand *et al.*, 2011)	A MIC of 2.5 mg/mL was observed against *S.epidermidis*	India
Abutilon indicum Malvaceae	Atibala	Root	Meha	Diabetes Mellitus	3-6 g of the drug in powder form	Antidiabetic activities of *Abutilon indicum* (l.) Sweet are mediated by enhancement of adipocyte differentiation and activation of the Glut1 promoter (Krisanapun *et al*., 2011)	0.25 or $0.5\,g\,kg^{-1}$ body weight	USA
Acacia nilotica Leguminosae	Babbula	Stem bark	Atisara	Diarrhoea	20-30 g of the drug for decoction	Antidiarrhoeal activity of *Acacia nilotica* willd. bark methanol extract (Misar *et al*., 2007).	50, 100 and 200 mg/kg	India
Psoralea corylifolia Leguminosae	Bakuchi	Fruit	Krimiroga	Worm infection	3-6 g of the drug in powder form	In vitro antimicrobial activities of Bakuchiol against oral microorganisms (Harumi Katsura *et al.*, 2001).	10 µg/ml	India

Glycyrrhiza glabra Leguminosae	Yashti	Stem and root	Vrana	Ulcerative	2-4 g of the drug in powder form	Anti-ulcer and antioxidant activity of Gutgard (Mukherjee *et al*., 2010).	12.5, 25, and 50 mg/kg	India
Cannabis sativa Cannabinaceae	Vijayaa	Leaf	Klaibya	Erectile dysfunction	125-250 mg of the drug in powder form	Early endothelial dysfunction as a marker of vasculogenic erectile dysfunction in young habitual cannabis users(Aversa *et al.*, 2008)	Habitual cannabis users (varied dose)	Rome
Adhatoda vasica Acanthaceae	Vasa	Leaf	Kasa	Cough	10-20 ml of the juice of fresh leaves	Antitussive effect of *Adhatoda vasica* extract on mechanical or chemical stimulation-induced coughing in animals (Dhuley,1999).	10 mg/kg	India
Crataeva nurvala Capparidaceae	Varuna	Stem bark	Asmari	Kidney stones	20-30 g of the drug for decoction	Effect of *Crataeva nurvala* in experimental urolithiasis	50, 100 and 200 mg/kg	India
Zingiber officinale Zingiberaceae	Shunthi	Rhizome	Svasa	Respiratory disease	1-2 g of the drug in powder form	Fresh ginger (*Zingiber officinale*) has anti-viral activity against human respiratory syncytial virus in human respiratory tract cell lines (Chang *et al*., 2013)	300 μg/ml	Taiwan
Achyranthes aspera Amaranthaceae	Apamarga	Whole plant	Medoroga	Obesity	20-50 g. of the drug for decoction	Assessment of antiobesity potential of *Achyranthes aspera* l inn. Seed (Rani *et al*., 2012)	900 mg/kg	India

Semecarpus anacardium Anacardiaceae	Bhallataka	Fruit	Krimi	Helminth,, worms	1.2 g. of the drug in Ksirapaka form	Evaluation of anthelmintic activity of nuts of *Semecarpus anacardium* (Pal *et al*., 2008)	20 mg/ml	India
Bacopa monnieri Scrophulariaceae	Brahmi	Whole plant	Manovikara	Mental disorders	1-3 g in powder form	Effects of 12-week *Bacopa monnieri* consumption on attention, cognitive processing, working memory, and functions of both cholinergic and monoaminergic systems in healthy elderly volunteers (Peth-Nui e*t al*., 2012)	Standardized extract of *B. monnieri* (300 and 600 mg	Thailand
Solanum indicum Solanaceae	Brihati	Root	Jvara	Fever	10-20 g of the drug for decoction	Antinociceptive, anti-inflammatory and antipyretic effects of *Solanum nigrum* aqueous extract in animal models (Zakaria *et al.*, 2009)	10, 50 and 100%, was prepared by soaking (1:20; w/v) air-dried powdered leaves (20 g) in distilled water	Malaysia
Leucas cephalotes Lamiaceae	Dronapushpi	Whole plant	Kamala	Acute Hepatitis	1-3 g of the drug in powder form	Hepatoprotective activity of gumma (*Leucas cephalotes* Spreng) Against carbon tetrachloride induced hepatotoxicity in wistar rats (Sofi e*t al.*, 2011)	0.7ml/kg	India

Acorus calamus Araceae	Vacha	Rhizomes	Svasa	Respiratory disease	60 -120 mg of the drug in powder form	Bronchodilatory effect of *Acorus calamus* (linn.) is mediated through multiple pathways (Shah and Gilani , 2010)	0.003 mg/mL	Pakistan
Convolvulus pluricaulis Convolvulaceae	Sankha pushpi	Whole plant	Apasmara	Epileptic seizure	3-8 g. of the drug in powder form	Study of *Convolvulus pluricaulis* for antioxidant and anticonvulsant activity (Verma *et al.*, 2012)	250, 500 and 1000 mg/kg	India
Trigonella foenum-graecum Fabaceae	Methi	Seed	Prameha	Diabetes Mellitus	3-6 g. of the drug in powder form	Preventive and curative effect of *Trigonella foenum-graecum* seeds in C57BL/6J models of type 2 diabetes induced by high-fat diet (Hamza *et al*., 2012)	Plant extracts 2 g/kg daily	France
Mimosa pudica Fabaceae	Lajjalu	Whole plant	Svasa	Respiratory disease	10-20 g of the drug for decoction	Suppression of ovalbumin-induced airway inflammatory responses in a mouse model of asthma by *Mimosa pudica* extract (Yang et *al.*, 2011)	50, 125,250 mg/kg	Korea
Clerodendrum phlomidis Verbenaceae	Agnimantha	Root	Sotha	Inflammatory disorders	12-24 g. of the drug in powder form for decoction	Lysosomal membrane stabilization and anti-inflammatory activity of *Clerodendrum phlomidis*, a traditional medicinal plant (Babu *et al*., 2011)	100, 200, 400 mg/kg	India
Hibiscus sabdariffa Malvaceae	Ambasthaki	Root	Pakvatisara	Acute diarrhea	5 -10 g	Antinociceptive, anti-inflammatory and antidiarrheal activities of ethanolic calyx extract of *Hibiscus sabdariffa* Linn.	250 and 500 mg/kg	Bangladesh

						(Malvaceae) in mice (Ali *et al.*, 2011)		
Mangifera indica Anacardiaceae	Amra	Stem bark	Prameha	Diabetes Mellitus	3-6 g. of powder	Antiinflammatory, analgesic and hypoglycemic effects of *Mangifera indica* linn. (Anacardiaceae) stem-bark aqueous extract (Ojewole, 2005)	50-800 mg/kg	South Africa
Ailanthus excelsa Simarubaceae	Aralu	Stem bark	Svasa	Respiratory disease	1-3 g	Bronchodilator activity of aqueous extract of stem bark of *Ailanthus excelsa* Roxb. (Kumar *et al*., 2010)	100, 200, 400 mg/kg	India
Coccinia indica Cucurbitaceae	Bimbi	Whole plant	Jvara	Fever	3-6 g of the drug in powder form, 5-10 ml Svarasa	Anti-inflammatory, analgesic and antipyretic activity of aqueous extract of fresh leaves of *Coccinia indica* (Niazi *et al.*, 2000)	25-300 mg/kg	India
Vitex negundo Verbenaceae	Nirgundi	Leaf	Gulma	Tumor	10-20 ml Swarasa	Cytotoxic flavone analogues of vitexicarpin, a constituent of the leaves of *Vitex negundo* (Díaz *et al*., 2003).	40 mg/kg	USA

metabolism. Their effect is registered gradually resulting in minimum side effects (Arya and Kaur, 2011; MHFW, 2001; Bala *et al*., 2010). Evidence based knowledge of several Ayurvedic plants have also been shown in Table 1 given below.

From this paper it is concluded that Ayurveda is an evidence-based medicine system with holistic approach to health and personalized medicine and this Indian medicine system is now practiced all over world as a complementary system.

References

Akhtar, M.S., A. Ramzan , A. Ali and Ahmad, M.2011. Effect of Amla fruit (*Emblica officinalis* Gaertn.) on blood glucose and lipid profile of normal subjects and type 2 diabetic patients. Int. J .Food. Sci.Nutr. 62(6):609-16.

Ali, M.K., A. Ashraf, N.N. Biswas, U.K. Karmakar and Afroz, S.2011. Antinociceptive, anti-inflammatory and antidiarrheal activities of ethanolic calyx extract of *Hibiscus sabdariffa* Linn. (Malvaceae) in mice. Zhong. Xi Yi .Jie He. Xue. Bao.9(6):626-31.

Arya, V., and Kaur R. 2011. Kangrian Medicinal Flora, Pranav Prakashan Kangra, H.P., India, Vol. I.

Aversa, A., F. Rossi, D. Francomano, R. Bruzziches, C. Bertone, V. Santiemma and Spera, G. 2008. Early endothelial dysfunction as a marker of vasculogenicerectile dysfunction in young habitual cannabis users. Int. J. Impot. Res.20(6):566-73.

Babu, N.P., P. Pandikumar, and Ignacimuthu, S. 2011. Lysosomal membrane stabilization and anti-inflammatory activity of *Clerodendrum phlomidis* L.f., a traditional medicinal plant. J. Ethnopharmacol.135(3):779-85.

Bala, A,, B. Kar , P.K. Haldar, U.K. Mazumder and Bera, S. 2010. Evaluation of anticancer activity of *Cleome gynandra* on Ehrlich's Ascites Carcinoma treated mice. J Ethnopharmacol. 129(1):131-4.

Chang, J.S., K.C. Wang, C.F. Yeh, D.E. Shieh and Chiang, L.C. 2013. Fresh ginger (*Zingiber officinale*) has anti-viral activity against human respiratory syncytial virus in human respiratory tract cell lines. J Ethnopharmacol. 145(1):146-51.

Dhuley, J.N.1999. Antitussive effect of Adhatoda vasica extract on mechanical or chemical stimulation-induced coughing in animals. J Ethnopharmacol. 67(3):361-5.

Díaz F, Chávez D, Lee D, Mi Q, Chai HB, Tan GT, Kardono LB, Riswan S, Fairchild CR, Wild R, Farnsworth NR, Cordell GA, Pezzuto JM, Kinghorn AD. Cytotoxic flavone analogues of vitexicarpin, a constituent of the leaves of *Vitex negundo*. J. Nat Prod. 2003;66(6):865-7.

Habib, M.R., and Karim, M.R.2011. Evaluation of antitumour activity of *Calotropis gigantea* L. root bark against Ehrlich ascites carcinoma in Swiss albino mice. Asian. Pac. J .Trop. Med. 4(10):786-90.

Hamza, N., B. Berke, C. Cheze, R. Le Garrec, A. Umar, A.N. Agli, R. Lassalle , J. Jové, H. Gin , and Moore, N. 2012. Preventive and curative effect of *Trigonella foenum-graecum* L. seeds in C57BL/6J models of type 2 diabetes induced by high-fat diet. J Ethnopharmacol. 142(2):516-22.

Harumi Katsura, Ryo-IchiTsukiyama, Akiko Suzuki, and Makio Kobayashi. 2001. In Vitro Antimicrobial Activities of Bakuchiol against Oral Microorganisms Antimicrob. Agents . Chemother.45(11): 3009–3013.

Krisanapun, C., S.H. Lee, P. Peungvicha, R. Temsiririrkkul and Baek, S.J. 2011. Antidiabetic Activities of *Abutilon indicum* (L.) Sweet Are Mediated by Enhancement of Adipocyte Differentiation and Activation of the GLUT1 Promoter. Evid Based Complement Alternat Med. 2011:167684.

Kumar, D., S.S. Bhujbal, R.S. Deoda and Mudgade, S.C.2010. Bronchodilator activity of aqueous extract of stem bark of *Ailanthus excelsa* Roxb. Pharmacognosy. Res.2(2):102-6.

Mamidi, P., and Thakar, A.B. 2011. Efficacy of Ashwagandha (*Withania somnifera* Dunal.Linn.)in the management of psychogenic erectile dysfunction. Ayu. 32(3):322-8.

MHFW (Ministry of Health and Family welfare). 2001. The Ayurvedic Pharmacopoeia of India Vol. I-V, Delhi, Department of Indian system of medicine and Homeopathy, Controller of Publications.

Misar, A., R. Bhagat and Mujumdar, A.M. 2007. Antidiarrhoeal activity of *Acacia nilotica* Willd.bark methanol extract. Hindustan Antibiot Bull.49-50(1-4):14-20.

Mukherjee, M., N. Bhaskaran, R. Srinath, H.N. Shivaprasad, J.J. Allan, D. Shekhar and Agarwal A. 2010. Anti-ulcer and antioxidant activity of Gut Gard. Indian. J .Exp .Biol. 48(3):269-74.

Nand, P., S. Drabu and Gupta, R.K. 2011. Antimicrobial investigation of *Linum usitatissimum* for the treatment of acne. Nat. Prod. Commun. 6(11):1701-4.

Niazi J, Singh P, Bansal Y, Goel RK. Anti-inflammatory, analgesic and antipyretic activity of aqueous extract of fresh leaves of Coccinia indica. Inflammopharmacology. 2000;17(4):239-44.

Ojewole, J.A., 2005. Antiinflammatory, analgesic and hypoglycemic effects of *Mangifera indica* Linn. (Anacardiaceae) stem-barkaqueous extract. Methods Find Exp Clin Pharmacol. 27(8):547-54.

Pal, D., T.K. Mohapatra and Das, A. 2008. Evaluation of anthelmintic activity of nuts of *Semecarpus anacardium*. Anc Sci Life. 27(3):41-4.

Pandit, R., A. Phadke and Jagtap, A. 2010. Antidiabetic effect of Ficus religiosa extract in streptozotocin-induced diabetic rats. J Ethnopharmacol. 128(2):462-6.

Peth-Nui, T., J. Wattanathorn, S. Muchimapura, T. Tong-Un, N. Piyavhatkul, P. Rangseekajee, K. Ingkaninan and Vittaya-Areekul, S. 2012. Effects of 12-Week *Bacopa monnieri* Consumption on Attention, Cognitive Processing, Working Memory, and Functions of Both Cholinergic and Monoaminergic Systems in Healthy Elderly Volunteers. Evid .Based .Complement. Alternat. Med. 2012:606424.

Rani, N., S.K. Sharma and Vasudeva, N. 2012. Assessment of Antiobesity Potential of *Achyranthes aspera* Linn. Seed. Evid .Based. Complement. Alternat. Med. 2012:715912.

Saravanan, S., N.P.Babu, P. Pandikumar and Ignacimuthu, S.2011. Therapeutic effect of *Saraca asoca* (Roxb.) Wilde on lysosomal enzymes and collagen metabolism in adjuvant induced arthritis. Inflammopharmacol.19(6):317-25.

Shah, A.J., and Gilani, A.H.2010. Bronchodilatory effect of *Acorus calamus* (Linn.) is mediated through multiple pathways. J Ethnopharmacol. 131(2):471-7.

Sofi, G., M.Y. Khan and Jafri, M.A. 2011. Hepatoprotective activity of Gumma

(*Leucas cephalotes* Spreng.) against Carbon tetrachloride induced hepatotoxicity in wistar rats. Anc .Sci .Life. 31(2):44-8.

Varalakshmi, P., Y. Shamila and Latha, E.1990. Effect of *Crataeva nurv*ala in experimental urolithiasis. J Ethnopharmacol. 28(3):313-21.

Verma, S., R. Sinha, P. Kumar, F. Amin, J. Jain and Tanwar, S.2012. Study of *Convolvulus pluricaulis* for antioxidant and anticonvulsant activity. Cent. Nerv. Syst Agents .Med .Chem. 12(1):55-9.

Yang, E.J., J.S. Lee, C.Y. Yun, Y.S. Ryang, J.B. Kim and Kim, I.S. 2011. Suppression of ovalbumin-induced airway inflammatory responses in a mouse model of asthma by *Mimosa pudica* extract. Phytother. Res. 25(1):59-66.

Zakaria, Z.A., M.R. Sulaiman, N.A. Morsid, A. Aris, H. Zainal, N.H. Pojan and Kumar, G.H. 2009. Antinociceptive, anti-inflammatory and antipyretic effects of *Solanum nigrum* aqueous extract in animal models. Methods. Find. Exp. Clin. Pharmacol. 31(2):81-8.