Recent Research in Science and Technology 2013, 5(2): 73-74
ISSN: 2076-5061
Available Online: http://recent-science.com/

Search for *in vitro* antibacterial efficacy of phytoconstituents of *Acacia arabica* leaf extracts against various serogroups of *E. coli* associated with diarrheal infections in ruminants

Deboshree Biswas and M.G Roymon

Department of Microbiology & Biotechnology, St. Thomas College, Ruabanda, Bhilai, India.

Abstract
The investigation was carried out in order to detect antibacterial activity of crude methanolic, acetone, chloroform and aqueous leaf extracts of *Acacia arabica* against four different *E. coli* strains *E. coli* O22, O11, O89 and O61 associated with diarrheal infections in ruminants. MIC of methanolic extract was observed to be ranged from 0.09 to 0.17 mg/ml where as acetone leaf extract ranged from 0.5 to 5 mg/ml whereas chloroform and aqueous leaf extract showed no inhibitory results against any tested organism.

Keywords: Phytoconstituents, *Acacia arabica, E.coli*

INTRODUCTION

E. coli is one of the most important cause of diarrheal infections in young ruminants are generally very limited work is carried out in field of Ethanoveterinary medicines (EVM) to cure such type of infections. EVM is the term used to treat animals using medicinal plants. Hussain *et al.* (2011) strongly advocated the use of medicinal plants to cure domesticated animals due to its easy and cheap availability with out any side effects over western medicines. The present study deals with *in vitro* antibacterial efficacy of *Acacia arabica,* against four different diarrheagenic stool isolated *E. coli* stains.

MATERIALS AND METHODS

Bacterial Cultures

Cultures were obtained from stool samples and drinking water sources from veterinary hospitals and also from animal husbandry. All cultures were sent for identification and serotyping at CRI, Kasauli (H.P). Further 16 s-IRS-23 s ribotyping of the same tested strains were dune at DBRI, Hyderabad (A.P).

Plant material

Leaves of *Acacia arabica* were collected in specimen voucher during November season and thoroughly washed under tap water and shade dried.

Extract preparation

Both cold and hot extracts were prepared as per methods recommended by Nair *et al.* (2005) and Johnson *et al.* (2008) respectively.

Bioassay

Crude (cold and hot) methanolic, acetone, chloroform and aqueous extracts of *Acacia arabica* were tested against four different stains by broth microdilution technique (Kashikar and George, 2006) with some modifications.

Preliminary phytochemical analysis of bioactive compounds

Preliminary estimation of bioactive compounds (alkaloids, flavonoids, saponin, tannin and glycosides) were done by methods described by Aderotimi & Samuel (2006).

RESULTS

Of the 8 different solvent (Table-1) extracts the observed MIC was recorded in 5 different solvent extracts where as cold and hot aqueous leaf extract as well as hot chloroform leaf extracts showed no inhibitory response against any tested strains. MIC of cold methanolic leaf extract was 0.6 mg/ml for *E. coli* O22, O11 and O89 strains and it is of 0.09 mg/ml for *E. coli* O61. MIC of cold acetone leaf extract ranged from 0.6-4.16 mg/ml where as MIC of cold chloroform leaf extract was of 0.3 mg/ml. MIC of hot methanolic leaf extract ranged from 0.09-0.17 mg/ml whereas MIC of hot acetone leaf extract ranged from 0.5-4.16 mg/ml. Preliminary analysis of phytochemical constituents (Table-2) showed presence of tannins, saponins and glycosides in both cold and hot methanolic and acetone extracts whereas flavonoids were present in very limited amount. Cold and hot chloroform extracts showed presence of moderate amount of saponins and traces of glycosides whereas flavonoids, saponins, tannins and glycosides were present in very limited amount in cold and hot aqueous extracts.

*Corresponding Author

Deboshree Biswas
Department of Microbiology & Biotechnology, St. Thomas College, Ruabanda, Bhilai, India.

Email: biswasdeboshree19@gmail.com

Table 1. MIC (in mg/ml) of leaf extracts (Mean ±SEM of triplicates)

E. coli	CMLE	CALE	CCLE	CAQLE	HMLE	HALE	HCLE	HAQLE
O22	0.6± 0	4.16± 1.01	0.3± 0	0	0.17± 0.06	4.16± 1.01	0	0
O11	0.6± 0	0.6± 0	0.3± 0	0	0.12± 0.02	0.5±0.09	0	0
O89	0.6± 0	2.5±1.2	0.3± 0	0	0.09± 0.02	0.81±0.17	0	0
O61	0.09±0.02	1.25± 0	0.3± 0	0	0.15± 0	5± 0	0	0

CMLE: Cold Methanolic Leaf Extract, CALE: Cold Acetone Leaf Extract, CCLE: Cold Chloroform Leaf Extract, CAQLE: Cold Aqueous Leaf Extract, HMLE: Hot Methanolic Leaf Extract, HALE: Hot Acetone Leaf Extract, HCLE: Hot Chloroform Leaf Extract, HAQLE: Hot Aqueous Leaf Extract

Table 2. Preliminary Phytochemical Screening of Leaf Extracts

Leaf extracts	Alkaloids	Flavonoids	Saponins	Tannin	Glycosides
Cold Methanol	-	+	+++	++++	+++
Hot Methanol	-	+	+++	++++	+++
Cold Acetone	-	+	+++	++++	+++
Hot Acetone	-	+	+++	++++	+++
Cold Chloroform	-	-	+++	-	+
Hot Chloroform	-	-	+++	-	+
Cold aqueous	-	+	+	+	+
Hot aqueous	-	+	+	+	+

++++ = abundantly present, +++ = moderately present, + = present in limited amount, - = absent

DISCUSSION

Plants are one of the most powerful alternative chemotherapeutic agents to control diarrheal infections in animals. Plants and plant products has gained much importance for treatment of various infections (Anibijuwon and Udeze, 2009). However, very limited work has been carried out in field of animal health. Chukwuka *et al.* (2011) reported that a very limited work has been carried out in field of medicinal plants for curing diseases allied to animal health. Bakari *et al*. (2012) reported antibacterial usefulness of plant extract of *Commiphora swynnertonii* against *E. coli* and other organisms associated with infections in animals. In the present study most of the extracts of *Acacia arabica* showed effective inhibitory response against four different diarrheagenic serogroups of *E. coli* associated with diarrheal infections in ruminants. The antibacterial effectiveness of extracts was due to presence of large amount of tannins, saponins and glycosides. Hot methanolic extract was found to be more effective detected on the basis of minimum inhibitory concentration. Antibacterial effectiveness of extracts is always due to presence of bioactive compounds. Acharyya *et al*. (2009) reported that presence of polyphenols and flavonoids in extracts are related to bactericidal activity.

REFERENCES

[1] Acharyya, S.; Patra, A. and Bag, P.K. 2009. Evaluation of the antimicrobial activity of some medicinal plants against enteric bacteria with particular reference to multi-drug resistant *Vibrio cholera. Tropical Journal of Pharmaceutical Research*, 8: 231-237

[2] Aderotimi, B. and Samuel, A. 2006. Phytochemical screening and antimicrobial assessment of *Abutilon mauritianum*, *Bacopa monnifera* and *Dhatura stramonium. Biokemistri,* 18: 39-44.

[3] Anibijuwon, I.I. and Udeze, A.O. 2009. Antimicrobial activity of *Carica Papaya* (Pawpaw leaf) on some pathogenic organisms of clinical origin from South-Western Nigeria. *Ethnobotanical Leaflets,* 13: 850-864.

[4] Bakari, G.G.; Max, R.A.; Mdegela, H.R.; Phiri, E.C. and Mtambo, M.M. 2012. Effect of crude extracts from *Commiphora swynnertonii* (Burtt) against selected microbes of animal health importance. *Journal of Medicinal Plants Research,* 6: 1795-1799.

[5] Chukwuka, K.S.; Ikheloa, J.O.; Okonko, I.O.; Moody, J.O. and Mankinde, T.A. 2011. The antimicrobial activities of some medicinal plants on *Escherichia coli* as an agent of diarrhea in livestock. *Advances in Applied Science Research*, 2: 37-48.

[6] Hussain, T.; Arshar, M.; Khan, S.; Sattar, H. and Qureshi, M.S. 2011. *In vitro* screening of methanolic plant extracts for their antibacterial activity. *Pakistan Journal of Botany,* 43: 531-538.

[7] Johnson, M.; Maridass, M. and Irudayaraj, V. 2008. Preliminary phytochemical and antibacterial studies on *Passiflora edulis*. *Ethnobotanical Leaflets*, 12: 425-432.

[8] Kashikar, N.D. and George, I. 2006. Antibacterial activity of *Cissus quadrangularis* Linn. *Indian Journal of Pharmaceutical Sciences,* 68: 245-247.

[9] Nair, R.; Kalariya, T. and Sumitra, C. 2005. Antibacterial activity of some selected Indian medicinal flora. *Turkish Journal of Biology,* 29: 41-47.