Asian Journal of Chemistry Vol. 21, No. 1 (2009), 805-807

NOTE

Antimicrobial Activity of Natural Dye from *Thespisia populea* Extract

S. SHANKAR*, R. ANAND† and K. RAMESH†
Postgraduate and Research Department of Chemistry
A.V.V.M. Sripushpam College, Poondi-613 503, India
E-mail: rajiphysio21@yahoo.com

The bark extract of *Thespisia populea* was selected to study the antimicrobial activity against four infectious bacteria such as *E. coli, Streptococcus* sp., *S. aureus, S. epidermis* and four fungi such as *Trichophyton mentogrophyte, T. tonsurans, T. rubrum* and *Epidermophyton floccosum*.

Key Words: *Thespisia populea* extract, Antimicrobial activity.

Thespisia means 'Divinely decreed' and was given Daniel Solander who saw it tahitti as a member of captain in cook's ship. The extract of bark of outer rind of the *Thespisia populea* tree is dark brown coloured solution with characteristic odour. The bark contains high level of tannins and has been used as a mordant. With evolution of man sickness exit and search to seek the way to cure illness also developed from the existence of man. Allopathy medicinal system offer immediate cure against diseases due to presence of active principles in it, but at the same time it has adverse reactions. Several studies on antimicrobial substances from plants have been conducted by a number of investigators[1]. Various types of organic and inorganic materials leached out from plants which inhibit growth of bacteria and fungi[2]. In the present investigation the extract of *Thespisia populea* were tested against four infectious bacteria *viz.*, *E. coli, Streptococcus* sp., *S. aureus, S. epidermis* and four fungi strains *viz.*, *Trichophyton mentogrophyte, T. tonsurans, T. rubrum* and *Epidermophyton floccosum*.

Thespisia populea samples was extracted in aqueous boiling water and the extraction was carried out for 3 h. The solution was then evaporated to half of the original volume. The bark extract of *Thespisia populea* were incorporated into a sterile disc with 200 µL of the extract using micropipette. Well scoured and bleached cotton fabric was entered into the bath contain dye extract (5 %) and water at MLR-1:50. after 5 min calculated quantity of sodium carbonate (3 %) was added and the dyeing was continued then

†Department of Chemistry, King Nandhivarman College of Arts and Science, Thellar-604 406, India.

required amount of sodium chloride (10 %) was added for 0.5 h and the dyeing was continued for 1 h at boiling conditions. Then the sample was washed with water and dried. The sample cut into pieces and used for direct cloth method.. The extract of *Thespisia populea* samples was incorporated into sterile disc with 200 µL of the extract using micropipette. Assay of the antibacterial activity of the *Thespisia populea* extract were done by disc diffusion, agar well technique and direct cloth methods using Muller Hinton agar. In this technique, bacterial and fungal strains were smeared on the surface of the agar plates[3]. Then the plates were incubated at respective temperature. The inhibition zone formation was observed and recorded.

The level of inhibitory activity varies widely on different bacterial and fungal species for *Thespisia populea* samples. In disc diffusion technique, *Thespisia populea* sample was showed better antibacterial activity against *S. aureus* (17 mm), followed by 16 mm in *S. epidermis*. The lowest inhibitory activity was recorded in *Streptococcus* sp. with represented by 7 mm (Table-1). The antibacterial activity of *Thespisia populea* samples of above results was correlated with previous findings by Darokar *et al.*[4] and Zheleva *et al.*[5].

In agar well technique, the maximum inhibition zone was observed in *S. aureus* (19 mm) followed by *S. epidermis* and *Streptococcus* sp (18 mm). The maximum inhibitory zone was showed in *S. aureus* by 16 mm and minimum of 6 mm was observed in *S. epidermis* and *Streptococcus* sp. (Table-1). This was accepted with earlier studies by Majundar[6], Thomas *et al.*[7], Zheleva *et al.*[8], Darokar *et al.*[4] and Locher *et al.*[2].

TABLE-1
ANTIBACTERIAL ACTIVITY OF *Thespisia populea* AGAINST PATHOGENIC BACTERIA (THE INHIBITION ZONE IS REPRESENTED IN mm)

Name of the bacteria	Disc diffusion technique	Agar well method	Direct Cloth method
E. coli	9	11	8
Streptococcus sp.	7	18	6
S. aureus	17	19	16
S.epidermis	16	18	6

In disc diffusion technique, *Thespisia populea* sample was showed better antifungal activity against *T. tonsurans* and *T. rubrum* (16 mm). The lowest inhibitory activity was recorded in *E. floccosum* with represented by 7 mm (Table-2). In agar well technique, the maximum inhibition zone was observed in *T. rubrum* (25 mm) followed by *E. floccosum* (20 mm) and *T. tonsurans* (18 mm). In direct cloth method, the maximum antifungal activity was showed in *T. rubrum* by 19 mm and minimum of 7 mm was observed in

T. mentographyte and *E. floccosum* (Table-2). The above results was correlated with earlier studies by Thomas *et al.*[7], Zheleva *et al.*[8] and Pulok *et al.*[9].

TABLE-2
ANTIFUNGAL ACTIVITY OF *Thespisia populea* AGAINST PATHOGENIC FUNGI (THE INHIBITION ZONE IS REPRESENTED IN mm)

Name of the fungi	Disc diffusion technique	Agar well method	Direct cloth method
T. mentagrophyte	8	15	7
T. tonsurans	16	18	9
T. rubrum	16	25	19
E. floccosum	7	20	7

When comparing the works of Thomas *et al.*[7] who suggested that the inhibitory zone showing grater than 8 mm were sensitive to that particular extract obtained results during the present investigation was greater. Among all the three methods, better antimicrobial activity was obtained by using agar well method than other methods. Thus, the results of the present study confirm the presence of antimicrobial activity in the *T. populea* sample was investigated using disc diffusion, agar well methods and direct cloth methods. The active principle (chemicals) of extract which is responsible for antibacterial activity remains to be elucidated by further studies.

REFERENCES

1. S.J. Huang, S.Y. Tsai and J.L. Man, Antioxidant Properties of Methanolic Extracts from *Agrocybe cylindracea*. Annual Meeting and Food Expo-Anaheim, California, pp. 6-17 (2002).
2. Y. Sun, I.W. Oberley and Y. Li, *Clin. Nephrol.*, **53**, 9 (1988).
3. O. Silva, A. Durate, J. Cabrita, M. Pimental, A. Diniz and J. Gomes, *J. Ethnopharmacol.*, **50**, 55 (1996).
4. M.P. Darokar, A. Mathur, S. Dwivedi, R. Bhalla, S.P.S. Khanuja and R. Sushilkumar, *Curr. Sci. (India)*, **175**, 187 (1998).
5. A. Zheleva, V. Gadjeva and S. Popava, *Trakia J. Sci.*, **2**, 28 (2004).
6. A.M. Majumdar, *Indian J. Microbiol.*, **24**, 2 (1984).
7. E.S. Thomas, J. Shanmugam and M.M. Rafi, *Biomedicine*, **16**, 15 (1996).
8. A. Zheleva, M. Zheleva and V. Gadzheva, *Amanita phalloides* Mushroom Toxins Inhibit *in vitro* Catalase Activity. Medical-Biological Sciences, Prophylactic Medicine and Social Health, Vol. 1, pp. 75-79 (2002).
9. K.M. Pulok, S.N. Kalkalisha, M. Pal and B.P. Saha, *Indian. J. Microbiol.*, **35**, 327 (1995).

(*Received*: 7 December 2007; *Accepted*: 5 September 2008) AJC-6834