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Antibacterial Evaluation of the Extracts of Edible Parts of Few Plants used by Tribal People of Tripura, India

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Methanolic extract of edible parts of few plants (12 Nos.), growing in state Tripura, India, which are used by tribal people of Tripura, India, were able to show antibacterial activities against certain bacteria. The zone of inhibition and MIC of each extract was reported.

Keywords: Antibacterials, Edible parts, Tribal of Tripura.

The three of nutrients that provide energy to the body are carbohydrate, fat and protein. As long as these nutrients are digested and absorbed, they can provide fuel for physical activity and a multiple of less obvious body functions. Each of these nutrients serves functions in the body in addition of providing energy. Vegetables have a major roll to provide the fuel in regulation of body function and this vegetables are marked and identified as different type of foods to the people in individual sector.

Our North-East India including Tripura is very rich in plant and herbs because of plenty of rainfall and availability of deep forest. More than 800 thousands tribals of Tripura belonging to 19 communities once in successive wages settled down on the hill tracks that were generally covered with vegetations cluster together so thick, that day light is obscured for many miles along. The commercial status of wild food resources in the state has come to the notice that a few items of forest are brought by the tribal in the village markets of tribal dominated areas and the same is mostly purchased in a lot by the vegetable vendors of the urban areas or by middlemen. It has been observed that non-traditional forest resources which are used by the hills people of Tripura have not yet attained the significance of economic use and botanical value despite their immense potentialities to serve as useful vegetables resources of the state with "Nutritive Value".[1]

In continuation of our interest[1-3] to tribal life and culture, the present investigation is designed to highlight the medicinal importance of few edible plants of tribal people of Tripura. In this regard, antibacterial screening of the methanolic extract of the edible parts of few plants used by Tribal people of Tripura as described in Table -1 were carried out against certain bacteria and the zone of inhibition in mm and MIC in µg/ml are reported.

EXPERIMENTAL

The edible parts of few plants used by tribal people of Tripura were collected from the local market of Agartala, Tripura, India and was authenticated

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Edible parts were cleared from extraneous matters and were shade dried with occasional shifting of material to avoid any growth of fungi. Completely dried edible parts were powdered and passed through sieve 40.Extraction was done by using soxhlet apparatus in methanol. Liquid extract was collected, filtered, air dried followed by keeping at desicator, for further works.

The Chemicals used for all purposes were of analytical grade. The micro organisms were standardized before application and sub-cultured in nutrient agar broth for further application.

Antibacterial Investigation (Method)

Antibacterial studies were carried out by paper disc method[4,5] for the extracts of edible parts of few plants used by Tribal people of Tripura against *Bacillus pumilus* ATCC 6363, *Staphylococcus aureus* ML -185, *Bacillus subtilis* ATCC 39816 (Gram +ve) and *Shigella dysenteriae* ATCC 26591, *Escherichia coli* ATCC 10536 and *Vibrio cholerae* ATCC 3241 (Gram -ve) – bacterias. The zone of inhibition in mm, were recorded and compared with the standard drug tetracycline of 0.1% w/v concentration. From the stock, the sub culture was prepared for each organism. The test solution was prepared by dissolving the methanolic extract of stem and seeds in dimethyl formamide to obtain 5% w/v solution. In petry dishes the nutrient agar media were spreaded along with the organisms (pour plate technique) followed by placing the paper discs (6mm dia) soaked with test and standard solutions aseptically and then allowed for 24 hours incubation at 37 $\pm$ 0.5^0c to note down the zone of inhibition. The agar media composition was as beef extract – 10 gm, peptone – 10 gm, sodium chloride – 5mg, agar – 20 gm and distilled water upto volume – 1000 ml. Each petry dish was containing three discs, one of standard, another of control and 3rd one of test solutions. Optimum concentration of tetracycline was used due to the restricted size of petry dishes available. The average results of triplicate are presented in Table 1.

The MIC (minimal inhibitory concentration)[6] of all extracts were also determined by observing optical density at 600nm by following serial dilution technique and the results of triplicate are depicted in Table 1.

RESULTS AND DISCUSSION

Significant antibacterial activities by measuring zone of inhibition in mm of methanolic extracts of edible parts of few plants were observed and almost at par activities were also found in few cases in compare to standard drug tetracycline. Activity of the edible parts of plants – *D. hamiltonin, S. indicum* and *C. gladiata* were almost at par against *E. coli* ATCC 10536, *Sh. Dysenteriae* ATCC 26591, and *E. coli* ATCC 10536 respectively. Significant activities were recorded for the edible parts of the plants – *L. spinosa* against *B. pumilus* ATCC 6363; *I. aquatica* against *B. pumilus* ATCC 6363; *S. aureus* ML – 185, *S. torvum* against *E. coli* ATCC 10536. Apart from these, in case of many plants, antibacterial activities were observed except in few cases no activity was found. The MIC in µg /ml of each extracts against all the strains were also recorded and it has been found that no extract was showing at par value in compare tetracycline. Interestingly it was found that no extract was inactive against at least one strain of bacteria. In some of the cases significant activities and in few of the cases almost at par activities were observed in compare to tetracycline.

Table 1. Antibacterial activities of the extract of edible parts of few plants used by tribal people of Tripura, India

S. No.	Name of the plants (Family)	Edible parts	Zone of inhibition in mm (MIC in mg/ml) against bacterial strains					
			B. pumilus ATCC 6363	*S. aureus* ML -185	*B. subtilis* ATCC 39816	*Sh. dysenteriae* ATCC 26591	*E. coli* ATCC 10536	*V. cholerae* ATCC 3241
1	*Lasia spinosa* L. (Araceae)	Tender stems and leaves	15 (400)	Not active (1000)	10 (800)	Not active (> 1000)	Not active (>1000)	Not active (1000)
2	*Ipomoea aquatica* L. (convolvulaceae)	Twigs and leaves	14 (500)	14 (500)	12 (700)	7 (900)	22 (200)	Not active (1000)
3	*Dioscorea hamiltonin* Hook (Dioscoreaceae)	Tubers	11 (800)	12 (700)	Not active (1100)	Not active (>1000)	19 (300)	9 (<900)
4	*Diplazium polypodioides* Bl. (Athenaceae)	Tender coiled leaves	11 (800)	7 (900)	7 (900)	7 (900)	Not active (1000)	7 (900)
5	*Monochoria hastata* L. (Pontederiaceae)	Stems and leaves	9 (<900)	7 (900)	10 (800)	8 (900)	12 (700)	10 (800)
6	*Musa paradisiaca* L. (Musaceae)	Soft immature bud	12 (700)	12 (700)	9 (<900)	7 (900)	11 (700)	Not active (1000)
7	*Alocasia odora* Roxb (Araceae)	Stems	Not active (>1000)	10 (800)	Not active (1100)	Not active (1000)	12 (700)	9 (<900)
8	*Asteracantha longifolia* Nees (Acanthaceae)	Leaves and stems	Not active (1200)	8 (900)	7 (900)	Not active (1000)	10 (800)	11 (800)
9	*Centella asiatiaca* L. (Umbelliferae)	Leaves and stems	10 (800)	Not active (>900)	10 (800)	11 (800)	9 (<900)	10 (800)
10	*Solanum torvum* Swartz (Solanaceae)	Fruits	7 (900)	8 (900)	12 (650)	Not active (1000)	13 (700)	9 (900)
11	*Solanum indicum* L. (Solanaceae)	Tender fruits	7 (>900)	Not active (>1000)	9 (<900)	20 (200)	Not active (1000)	10 (800)
12	*Canavalia gladiata* Jacq. (Papilionaceae)	Fruits	11 (750)	Not active (1000)	10 (800)	Not active (1100)	22 (200)	12 (750)
13	Tetracycline (Standard)	-	23 (30)	24 (250)	25 (28)	22 (35)	24 (27)	23 (30)

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