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Vitro Antiplasmodial Activity of Ethanol Extract of Begonia trichocarpaDalz

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ABSTRACT: The efforts to find alternative antimalarial medicine have not essentially solved the problem of malaria control because of the presence of medication resistance. The Plasmodium resistance to antimalarial medicine is resulted from malaria treatment failure. Therefore, the availability of new antimalarial medicine is urgently needed to overcome the resistance problems. Taxonomical evaluations of Begonia trichocarpaDalz was carried out by the observation of habit, description of plant, nature and type of leaf, study of flowers including character of the androecium and gynoecium, nature stem, type of roots and fruits. Coarse powder of Begonia trichocarpaDalz was extracted using ethanol 96% by maceration method. An in vitro antiplasmodial activity test was carried out by using Candle Jar method. The doses of administration of ethanolic extract of Begonia trichocarpaDalz were at 1000; 500; 250; 100 and 50 µg/mL concentration. The results of the study included parasitemia percentage, P. falciparum growth inhibition percentage and IC50 value. The IC50 value of the ethanol extract of Begonia trichocarpaDalz was 2.46 µg/mL. The in vitroantiplasmodial activities of ethanol extracts of Begonia trichocarpaDalzwere categorized to be very active.

Key word: Begonia trichocarpa Dalz, Antiplasmodial,

I. INTRODUCTION

The resistance of Plasmodium to antimalarial drugs resulted in treatment failure. It posed a threat in the absence of alternative effective drug for the resistance (1, 2, 3). Therefore, the availability of new antimalarial drug was highly required to overcome this problem (4, 5, 6). Exploration of new antimalarial drugs was conducted using various methods, including exploration and development of natural substance (7, 8,9). MALARIA is the most prevalent among the insect-borne diseases. Every year it kills between one and two million people, with as many as 300–500 million people being infected. It is estimated that nearly half the world population is at risk, with fatal rates being extremely high among young children below 5 years of age. Malaria is a classic example of a disease that affects the productivity of individuals, families and the whole society. It is common in the poorer and less-developed countries of the world. Africa faces its greatest impact (10, 11,12). The plant family Meliaceae has been the subject of study as one of the most promising source of compounds with antiplasmodial properties. Some species belonging to this family (Azadirachtaindica, Entandrophragmaangolense, Entandrophragmacandollei, Entandrophragma utile, Khayagrandifoliola) are widely used as antimalarials or antipyretics in traditional medicine (13, 14).

II. MATERIALS AND METHODS

Plant Materials: The parts of the plants used in the study were the Begonia trichocarpaDalz that were collected from Kottayam district, Kerala, India..

Experimental animals: The used parasites were P. falciparum strain FCR3 obtained from the Pharmacology Laboratory.

Chemical Material: The materials used for the fractionation were n-hexane, ethyl acetate, ethanol, methanol. RPMI, HEPES, NaHCO3, gentamicin, RBC (Red Blood Cell) of blood group O, sodium chloride 0.9%; 1.6%; 12%, sheep blood serum with blood group O, wax, 10% glycerol, 5% sorbitol, methanol, DMSO, chloroquine, distilled water, alcohol, 0.2% dextrose, glycerol, freezing medium, giemsa, and oil immersion were used to test in vitro antiplasmodial activity (15,16).

Methods:

The collected parts of the plants were washed using tap water, chopped into small pieces and dried in oven at 50°c. Dried powder of the

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Begonia trichocarpaDalz, were macerated using ethanol 96% for 24 hours. The resulting filtrate was evaporated to obtain thick ethanol extract. In Vitro antiplasmodial activity test was carried out to the ethanol extract of Begonia trichocarpaDalz. It was carried out using candle jar method. The culture was maintained by replacing the media every 24 hours. If the parasitemia was too high (i.e., more than 10%), subculture was prepared by adding red blood cells so that it become lower. If the Plasmodium culture has grown and reached more than 2%, the test might be carried out by doing synchronization. The material was weighted, added 100 µL DMSO and 900 µL RPMI solutions and sterilized by filtering it using 0.20 µm membrane filter. Concentration ranks of the materials were then made, viz. 1000,500, 250,100 and 50 µg/mL.Chloroquine was used as positive control and its concentration ranks were made, viz. 0.05, 0.04, 0.02, 0.01and 0.001 µg/mL. The testing material, negative control (i.e., RPMI media) and 100 µL chloroquine were put into microplate (with 96 wells) and added 100 µL of Plasmodium resulting from the synchronization. The microplate was put into the candle jar, incubated at 37 oC for 72 hours.

III. RESULTS AND DISCUSSION

In Vitro Antiplasmodial Activity The results of the in vitro antiplasmodial activity test of ethanol extracts of Begonia trichocarpaDalz in triplet were mean parasitemia percentage, inhibition, and IC50 value (Table 2). The parasitemia percentage resulted from the percentage of the infected erythrocyte number per thousand erythrocytes. The parasitemia percentage was increasingly smaller with the increase in the concentration of the fractions in the test. The calculation of the parasitemia percentage and negative control gave the percentage of Plasmodium growth inhibition.

Table 2. The Percentages of Plasmodia inhibitory, and IC50Value

Sample	Concentration (µg/mL)	%Paracitemia	%Plasmodial Inhibition	IC50 Value (µg/mL)
Ethanol Extract	1000	0.98	90.23	2.463 ±0.54
	500	1.45	83.54	
	250	3.52	74.65	
	100	4.76	63.76	
	50	6.01	51.99	
Chloroquine	0.05	0	100	0.0056±0.54
	0.04	0.053	99.45	
	0.02	0.201	98.02	
	0.01	0.245	97.48	
	0.001	6.12	27.81	

The in vitro antiplasmodial activities of ethanol extracts of Begonia trichocarpaDalz were categorized on the basis of the resulting IC50 values was 2.46 µg/mL. The in vitro antiplasmodial activity was considered to be inactive if IC50 was more than 100 µg/mL. In addition to the quassionoid, it was also caused by the presence of alkaloid indol chantin-6-on, though its activity was weaker than that of the quassinoidthe resulting IC50 values was 0.0054 µg/mL. .

IV. CONCLUSIONS

The in vitro antiplasmodial activities of ethanol extracts of Begonia trichocarpaDalz was categorized to be very active based on the IC50 value 2.467 µg/mL. These findings may provide a lead for further investigations of the overall pharmacological actions of Begonia trichocarpa Dalz in more appropriate model.

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