



Research Article

ANTIFUNGAL ACTIVITY OF THE CRUDE EXTRACTS OF *COLOCASIA ESCULENTA* LEAVES *IN VITRO* ON PLANT PATHOGENIC FUNGI

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ABSTRACT

Colocasia esculenta belonging to family Araceae popularly known as “taro” is very useful medicinal plant described by Charaka as an anti-inflammatory plant. An experiment was carried out to study the antifungal activity of alcoholic and aqueous extract of *Colocasia esculenta* by food poisoning technique against *Alternaria* blight of chili caused by *Alternaria solani* and *Alternaria* blight of castor caused by *Alternaria ricini*. In anti-fungal study alcoholic extract showed good anti fungal activity than aqueous extract.

Key Words: *Colocasia esculenta*, Antifungal Activity, food poisoning technique.

INTRODUCTION

The plant kingdom is a treasure house of potential drugs and there has been an increasing awareness about their importance of medicinal plants. They are used locally in the treatment of infections caused by fungi, bacteria, viruses and parasites. Different plants have been used as a source of inspiration in the development of novel drug.

‘Taro’ corm is an excellent source of carbohydrate, the majority being starch of which 17-28% is amylase, and the remainder is amylopectin (Oke, 1990). Taro is especially useful to people allergic to cereals and can be consumed by children who are sensitive to milk, and as such taro flour is used in infant food formulae and canned baby foods (Lee, 1999). It contains greater amounts of vitamin B-complex than whole milk (Lee, 1999). Taro corm is low in fat and protein; however, the protein content of taro corm is slightly higher than that of yam, cassava or sweet potato. The protein is rich in some essential amino acids, but is low in isoleucine, tryptophan and methionine (Onwueme, 1998). Proximate composition of the taro corm on a fresh weight basis include; Moisture 63-85%, Carbohydrate (mostly starch) 13-29%, Protein 1.4-3.0%, Fat 0.16-0.36%, Crude Fibre 0.60-1.18%, Ash 0.60-1.3%, Vitamin C 7-9 mg/100 g, Thiamine 0.18 mg/100 g, Riboflavin 0.04 mg/100 g, Niacin 0.9 mg/100g (Onwueme, 1998). In Pacific Island countries such as Fiji and parts of Africa, taro is a staple food crop (Lebot and Aradhya, 1991; Opara, 2001). Taro is one of the few major staple foods where both the leaf and underground parts are important in the human diet (Lee, 1999). Opara (2001) reported that taro leaf is an excellent source of carotene, potassium, calcium, phosphorous, iron, riboflavin, thiamine, niacin, vitamin A, vitamin C and dietary fibre.

Alternaria blight of chili caused by *Alternaria solani* and *Alternaria* blight of castor caused by *Alternaria ricini* are serious diseases of chili and castor respectively. As castor is medicinally important crop and chili is important ingredient of spice so in the present investigation these fungal diseases were managed by using alcoholic and aqueous extract of *Colocasia esculenta* by food poisoning technique.

MATERIALS AND METHODS

The disease samples of chili and castor showing blight symptom were collected from different locations of Gaganbawada taluka. The disease samples were inoculated on Czapek’s Dox agar medium, after getting pure culture pathogenesis test was carried out on chili and castor plant, the identification of *Alternaria solani* and *Alternaria ricini* was carried out by using standard techniques.

Fresh leaves of *Colocasia esculenta* (Herbarium Vaucher Number: 118) were collected in the month of November to December from Gaganbawada region. The fresh leaves of *Colocasia esculenta* were dried under shade & powder in a mixture grinder. The powder leaves packed in a paper bags and stored in air tight container until use. The Soxhlet process was used for the extraction of the plant material. Anti-fungal study was carried out through food poisoning technique at 100% 25%, 50% and 75 % concentration of extract. The toxicity of stock extracts was determined against *Alternaria solani* and *Alternaria ricini* by food poisoning technique. Petri plates (80 mm diameter) containing Czapek Dox agar (medium supplemented with different plant extracts at four concentrations i.e. 100, 50, 75 and 25%) inoculated with an 8 mm culture disc of *Alternaria solani* and *Alternaria ricini* from 7 day old colony by placing upside down in the centre of petriplate separately. Three replications were maintained for each treatment. The plates were incubated at room temperature (26±3°C). Medium without any plant extract was served as control. The radial growth of the mycelium was measured. Above procedure was also repeated for aqueous extracts of same plants instead of alcoholic extracts.

RESULT AND DISCUSSION

In anti-fungal study alcoholic extract showed good anti fungal activity than aqueous extract of *Colocasia esculenta*. Alcoholic leaf extract of *Colocasia esculenta* against *Alternaria solani* and *Alternaria ricini* showed 100% percentage control efficacy (PCE) at 25% concentration. Aqueous leaf extract reduced the growth of pathogen as concentration of extract increased (Table 1 and Table 2).

Table 1: Effect of *Colocasia esculenta* leaf extracts on linear growth (mm) on *Alternaria solani* causing *Alternaria* blight of chili.

Sr.No.	Concentration in percentage	Mycelial growth in mm	
		Alcoholic leaf extract	Aqueous leaf extract
1	25%	00.00	51.33
2	50%	00.00	44.66
3	75%	00.00	34.66
4	100%	00.00	31.33
5	Control	80.00	80.00

Table 2: Effect of *Colocasia esculenta* leaf extracts on linear growth (mm) on *Alternaria ricini* causing *Alternaria* blight of castor.

Sr.No.	Concentration in percentage	Mycelial growth in mm	
		Alcoholic leaf extract	Aqueous leaf extract
1	25%	00.00	48.36
2	50%	00.00	38.34
3	75%	00.00	27.33
4	100%	00.00	21.44
5	Control	80.00	80.00

Similar observations were also reported by the report by Banos et al. (2002), Richa et al. (2012) who tested the plant extract against the radial growth of *Colletotrichum gloeosporioides* and found that Citrus Limon, *Persea americana* and *Carica papaya* totally inhibited growth of *Colletotrichum gloeosporioides*. Plant extract showing antimicrobial effect have been proved against several diseases (Anamika & Simon, 2011). Similarly Lucy et al. (2010) reported that the leaf crude extracts of *Alpinia galanga* exhibited effectiveness against *C. gloeosporioides* and should be considered for further evaluation.

CONCLUSION

Effect of plant extract on *Alternaria solani* and *Alternaria ricini* showed promising prospect for the utilization of plant extract in blight disease control and *Colocasia esculenta* can be used as an ecofriendly control method against the blight disease of chili and castor. Further studies on the isolation and characterization of the active (Antifungal) compounds are needed for field experiment in order to gain information about the effectiveness of the extract tested against fungal disease. The results will be important since the field studies will reveal the efficacy of the leaf extract in controlling the fungi as they interact with environmental factors.

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