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ANTIOXIDANT AND ANTIFUNGAL ACTIVITY OF SOME MEDICINAL PLANT EXTRACTS

Sachin Kumar Jain, Praveen Sharma, Neelam Balekar, Dinesh Kumar Jain

IPS Academy College of Pharmacy, Rajendra Nagar, AB Road, Indore (M.P.) India 452012

E-mail address: Sachin225819@rediffmail.com

ABSTRACT

In this study, the antioxidant and antifungal activities of extracts of *Tabernaemontana alternifolia, Thuja occidantalis* and *Cajanus cajan* were recognized. Total yields, radical scavenging activity and the antioxidant property of the extracts were investigated. The free radical scavenging activities of extract was documented as 41.3 ± 2.1 to 76.9 ± 6.1%, likewise. The antioxidant capacity of extracts was recognized between 153.4 ± 10.1 to 336.7 ± 24.2 mg/g extract. This extract was explored for antifungal activity by paper disc method against 2 fungi by using flucanazole as a standard drug. The 0.5 % level of *Tabernaemontana alternifolia* extract exhibited 100% inhibition till the 7th day of incubation when compare to control (Ascorbic acid). Statistical variances within fungi were significant at $p<0.05$. The extract was to some extent effective against all the fungi used in experiment.

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INTRODUCTION:

Recently, the use of spices and herbs as antioxidants and antimicrobial agents in foods is becoming of growing importance. Antioxidants have been extensively used as food additives to offer protection against oxidative degradation of foods [1, 2]. Newly in different parts of the world, awareness has been paid to exploiting plant products as tale chemotherapeutant and preservatives in plant protection and food storage[3]. Fumigation is a handling measure which is intended to eradicate pests and microorganisms in fasting grains and other possessions as well with toxic chemicals or fumigants[4]. The antimicrobial property of spice and essential oils have been known for a long time, and a number of study of the antimicrobial effect of spices, essential oil and their components have been reported. Even though, most of the reports on natural products in agricultural areas are about insects, there are important reports enlightening that plant extracts and essential oil exhibit antimicrobial action against food and several storage fungi, leaf pathogens and soil borne.

MATERIAL AND METHODS:

Plant materials

Nag Kuda (*Tabernaemontana alternifolia*), Red cedar (*Thuja occidantalis*) and pigeon pea (*Cajanus cajan*) were obtained from a garden. Plants are stored in a dry, dark and cool room, and were grounded before use.

Extraction The spices were dried grounded and extracted in 90% methanol + 9% water + 1% acetic acid mix. The extraction period was 24 h. After filtration; the filtrate was evaporated under vacuum, less than 45 C^0.

Figure 1: *Tabernaemontana alternifolia*

Figure 2: *Thuja occidantalis*

Figure 3: *Cajanus cajan*

Antioxidant activity

Antioxidant activities in the latter samples were resolute *in vitro* via scavenging of the ABTS (2,2%-azino-bis-3-ethyl-benzthiazoine-6-sulphuric acid) radical, generated by a metmyoglobin: hydrogenperoxide system, as described earlier[5]. Samples were diluted 1/6 with the extraction solvent. Free radical scavenging activity were resolute by DPPH method and the results were articulated as IC_{50} (mg/ml), minimum extract required to inhibit the 50% of 1, 1-diphenyl-2-picrylhydrazyl[6].

Fungal strains

The fungi used in the assay *Aspergillus niger* and *Aspergillus parasiticus* were collected from the local market of Indore.

Antifungal assay

Filter paper of in diameter of 5 mm was soaked with 0.1, 0.3 and 0.5% of *Tabernaemontana alternifolia, Thuja occidantalis* and *Cajanus cajan* extract. Paper discs were placed on the cover of petri dishes. The consequence of extracts was tested alongside the mycelial growth of *A. niger* and *A. parasiticus* using Potato Dextrose Agar (PDA) *in vitro*. Medium (20 ml) was dispensed into each Petri plate and 5 mm diameter plugs of each species were excise from the margin of a 14-day-old culture grown on PDA. The colony diameter was calculated at several points and the percentage mycelia inhibition calculated.

$$I= [(C-T)/C] \times 100$$

Where I is inhibition (%), C is the colony diameter of control (mm), and T is the colony diameter of test (mm).

Statistical analyses

Outcome of the research were analyzed for statistical implication by analysis of discrepancy. This research was performed by three duplicates with a replicate.

RESULTS AND DISCUSSION:

Total yield (%), antiradical activities (%) and antioxidant capacity (mg/g) of plant extracts are given

in Table 1. The yield of extract was established between 9.7 ± 0.7 % to16.3 ± 0.9. The antiradical activity of plant extracts was ranged between 36.5 ± 2.3 to 78.9 ± 7.1% (Table 2).

Table 2: Total yield, antiradical and antioxidant capacity of with several plants extracts (%)

Extract	Total yield	Antiradical activity (%)	Antioxidant capacity (m mol/100ppm extract)
Ascorbic acid (Standard)	-	39.4 ± 1.1	149.8 ± 12.4
Tabernaemontana alternifolia	13.4[a] ± 1.5[b]	41.3 ± 2.1	153.4 ± 10.1
Thuja occidantalis	11.3 ± 0.8	68.4 ± 4.5	278.2 ± 16.6
Cajanus cajan	10.7 ± 0.4	76.9 ± 6.1	336.7 ± 24.2

a Results are mean values of triplicate determinations; b Standard deviation

The activity of the extracts is qualified to their hydrogen donating capability. Comparison with BHT, these data obtained expose that the extracts are free radical inhibitors and primary antioxidants that react with the radicals. The antioxidant capacity 167.4 ± 12.3 to358.7 ± 17.6 mg/g extract (equivalent to ascorbic acid), correspondingly. Inhibition rates of all the extracts against *A. niger* decrease and even stimulated the mycelial growth of *A. parasiticus* during the end of incubation. *Tabernaemontana alternifolia* and *Thuja occidantalis* slightly inhibitory effect than *Cajanus cajan* extracts against *A. niger* (Table 1 & Fig. 4). Higher levels of *Cajanus cajan* extract showed greater fungi toxic action against *A. niger*. The 0.5% levels of *Cajanus cajan* showed inhibition with a steadily decreasing rate at the end of incubation.

Table 1: Percentage inhibition of some fungi mycelial growth with several plants extracts (%)

Fungi	Days	*Flucanazole* (Standard)			*Tabernaemontana alternifolia* (%)			*Thuja occidantalis* (%)			*Cajanus cajan* (%)		
		0.1	**0.2**	**0.3**	**0.1**	**0.3**	**0.5**	**0.1**	**0.3**	**0.5**	**0.1**	**0.3**	**0.5**
A. parasitius	3	8.2	8.5	8.9	10.3	12.4	14.4	13.2	17.3	19.3	14.2	20.3	23.7
	4	8.4	8.8	9.0	10.1	12.1	14.1	12.4	16.8	18.8	13.9	19.3	22.4
	5	8.8	9.2	9.4	9.9	10.2	13.5	12.1	15.9	17.2	12.6	17.3	21.5
	6	8.1	9.0	8.9	9.2	9.5	12.9	11.3	14.2	16.1	11.5	16.8	20.5
	7	9.1	8.7	9.5	8.5	8.9	11.3	9.3	8.9	15.3	10.5	15.2	19.4
A. niger	3	7.8	8.1	9.4	18.3	22.4	25.4	28.2	30.3	31.3	34.4	36.4	38.9
	4	7.5	8.4	9.0	17.1	21.3	24.1	27.4	26.9	30.8	33.5	29.6	37.8
	5	8.0	9.4	7.2	16.9	20.2	23.5	26.1	25.8	27.4	32.6	27.1	36.7
	6	8.2	9.2	8.4	15.2	19.5	22.9	25.3	24.1	26.4	31.5	26.6	35.2
	7	7.2	8.7	8.4	12.5	18.9	21.3	19.3	18.8	25.6	30.3	25.7	30.3

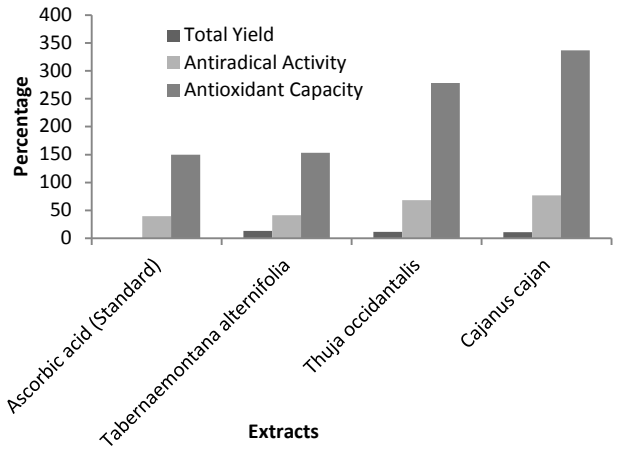

Figure 4: Total yield, antiradical and Antioxidant capacity of with several plants extracts (%)

CONCLUSION:

Fruits, vegetables and herbs are recommended at present as optimal sources of chemical constituents with antioxidant activity and supplementation of human diet with plants containing high amounts of compounds accomplished of deactivating free radicals may have valuable effects. Usually, the extent of the antioxidant and antibacterial property of the extracts could be accredited to their phenolic compositions.

It can be accomplished that extract obtained from these extracts can provide a good chance as an antioxidant and antifungal agent in food industry, if any Organoleptic effects are satisfactory. After these screening experiments, additional work will be performed to describe the anti-oxidative and antifungal activities in more detail. Supplementary research is needed on the determination of the association between the antioxidant capacity and the chemical composition of the plants.

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