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ارزیابی فعالیت زیستی گیاهان دارای ویژگی ضدسرطانی با استفاده از روش سنجش میزان کشندگی میگوی آب شور

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چکیده

سابقه و هدف: یکی از اهداف پژوهش‌های جدید شناسایی گیاهان دارای ویژگی‌های درمانی است. هدف از این پژوهش، ارزیابی ویژگی ضدسرطانی گروهی از گیاهان با روش غربال‌گری سریع میزان کشندگی میگوی آب شور است.

مواد و روش‌ها: این پژوهش به صورت تجربی بر روی ۱۹ نمونه گیاه تهیه شده از کمپ دانشگاه بنگلور، دارای فعالیت ضدسرطانی ناشناخته و ۳ نمونه گیاه شناخته شده دارای ویژگی ضدسرطانی به عنوان کنترل انجام شد. پس از عصاره‌گیری گیاهان یاد شده با روش کشندگی میگوی آب شور فعالیت زیستی آن‌ها مورد ارزیابی قرار گرفت.

یافته‌ها: نتایج نشان داد که ۴۸/۹۹٪از گیاهان مورد پژوهش دارای فعالیت بازدارندگی بین ۴۴ تا ۴۴/۰۰۲٪ می‌باشند. همچنین ۴۷/۷۰٪ از گیاهان مورد بررسی فعالیت بازدارندگی اندک داشتند. همچنین ۳ نمونه کنترل، دارای فعالیت بازدارندگی بین ۶۴/۴۶ تا ۱۰۰ را داشتند.

نتیجه‌گیری: نتایج این پژوهش نشان داد که استفاده از روش کشندگی میگوی آب شور می‌تواند یکی از روش‌های سریع غربال‌گری گیاهان دارویی باشد.

واژگان کلیدی: فعالیت بیولوژیکی، میگوی آب‌شور، گیاهان ضدسرطانی

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Biological activity of prominent anti-cancer plants using Brine Shrimp Lethality Test

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Abstract

Background and Objectives: Identifying plants with therapeutic properties is a great purpose of novel researches. This study aimed to evaluate anticancer properties of a group of plants with a fast screening method brine shrimp lethality test.
Material and Methods: This experimentally study were performed on 19 samples plants, taken from Campus of Bangalore University, with known anti-cancer activity, and three plant samples with known anticancer properties as controls. After extraction of mentioned plants, biological activity of them was assessed using brine shrimp lethality test.
Results: The results showed that 48.99% of the studied plants had inhibitory activity between 44 to 44.002%. Also, 47.70% of the investigated plants had little inhibitory activity. Also, three control samples have inhibition between 64.46 to 100.
Conclusion: The results showed that brine Shrimp Lethality Test can be rapidly screening plants with anti-cancer activity.

Key words: Biological activity, Brine shrimp lethality, Plant anti-cancer

Introduction

Plant medicines are the most widely used medicines in the world today. The World Health Organization (WHO) estimated that 80% of the population of developing countries still relies on traditional medicines, mostly plant drugs for their primary health care needs. Research on plants has great importance in drug discovery as there is high scope for exhaustive studies to identify new medicinal plants and to identify medicinal valued plants for threatening diseases like HIV and cancer.8

The plant such as Vinca rosea has prominent secondary metabolites like vinblastine and vincristine, which are found to have potent cytotoxic properties.3 These agents have even contributed significantly to the successful treatment of many cancers. Similarly, compound withaferin-a from Withania somnifera, camtothecin from Camptotheca acuminata are having prominent anti-cancer activity .In our study we use Brine shrimp lethality assay that is considered as a useful tool in preliminary assessment of biological activities of plant extracts. The drugs from these plants have many anti-cancer properties like topoisomerase-I and topoisomerase-II inhibition, thymidylate synthase inhibition, general cytotoxic effect, apoptosis effect , effects over cyclin dependent kinases, anti-mitotic properties showing effects

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over tubulin, fibrin proteins ,etc.at cellular and organism level leading to lethality with time and concentration effect of plant drugs.8 The aim of this study is use traditional plant drugs for primary threatening diseases like cancer by using rapid screening bioassay.

Materials and methods

Sample preparation: Fresh leaves were collected from 20 random plants and 3 anti-cancer plants.

Extraction: Leaves were dried in hot air oven at 52 for 48 hours. The finely powdered 1.0gm material is took in vials containing 10 ml of 75% methanol and subjected to extraction in a water bath for 3 hours and 3 repeated extraction is carried till the solvent in extract turned colorless. The sediment in every extract is discarded and supernatant is centrifuged at 10000 rpm for 10 minutes at 4 . The supernatant is again allowed for filtration using 0.45 micron filters. The final filtrate in vials are tightly capped and stored under refrigerated condition to have constant volume, concentration and to prevent volatilization of few metabolites.

Brine Shrimp Lethality test: The extract is then utilized at low concentrations (200 of extract/10mL of brine) to screen new plants against known plants for anti-cancer activity using rapid screening assay.

Artemia salina cysts were incubated in artificial sea water at 28. About 200 of extract were used for lethality assay of all plants used in screening. Lethality observation was critically examined after 24 hours using hand lens.

Results

For all the plants species used in screening process brine shrimp lethality was recorded after 24 hours. Also, statistical tool was used to calculate percent shrimp survival and standard deviation for all replications. To compare the performance of new plants against the standard anti-cancer plants, rank list was established considering percent shrimp survival and standard deviation value. The performance of plants used in screening against anti-cancer plants is listed in the order of their ranking in Table 1.

Discussion

Many flowering plants, herbs and shrubs are higher scope to identify medicinal value of plants especially for the disease like cancer and HIV. So screening process is having great important, drugs like vincristine, vinblastin and many more were identified to have anti-cancer property. From the results of already known plants for anti-cancer activity vinca rosea remained as dominant plant compared to Withania somnifera and Nothapodytes nimmoniana over concentrations and replications. The results provide new promising plants for novel biological activity in comparison to anti-cancer plants thereby substantiating one or the other kind of anti-cancer properties would be responsi-

Vinca rosa Withania somnifera Nothapodytes nimmoniana

Figure 1: Indicates species known for anti-cancer properties and treatment control.

Tabel 1. List of the plant species effective in brine shrimp lethality assay compared to the known anti-cancer plants used as standard checks in evaluation.

SI No	name of the species	Family	%shrimps Survival	STDV
1	*Schettlera venulosum*	Ranunculaceae	0	0
2	*Ficus religiosa*	Acanthaceae	0	0
3	*Dicapetalum balanoides*	Dichaperalaceae	13.33	0.57
4	*Leea indiaca*	leeaceae	20	1.73
5	*Eugenia uniflora*	Myrtaceae	26.66	1.52
6	*Caryota urens*	Arecaceae	33.33	2.08
7	*Pongamia pinnata*	Fabaceae	40	1.73
8	*Callicarpa tomentosa*	Verbenaceae	40	2.64
9	*Vinca rosea**	Apocynaceae	0	0
10	*Withania somnifera**	Solanaceae	40	1.41
11	*Nothapodytes nimmoniana**	lcacinaceae	66.66	0.57
12	*Gymnocranthera canavice*	lcacinaceae	46.66	1.15
13	*Coleus forskohlii*	Lamiaceae	46.66	2.08
14	*Araucaria cunninghamii*	Araucariaceae	53.33	0.57
15	*Mallotus phillipenesis*	Euphorbiaceae	60	0
16	*Aleurites moluccana*	Euphorbiaceae	66.66	0.57
17	*Sapium insigne*	Euphorbiaceae	66.66	0.57
18	*Syzigium operculatum*	Myrtaceae	80	0
19	*Fern sp*	Polypodiaceae	86.66	0.57
20	*Holigarna grahmii*	Anacardiacrae	93.33	0.57
21	*Simaruba glaca*	Simarubaceae	93.33	0.57
22	*Keonathus malabarica*	Esrildidae	100	0
23	artificial sea water*	–	100	0

ble in enlisting the plants for more or near biological activity compared to standard checks and useful in cancer therapy.

Conclusion

Plants which were identified from the rich diversity and screening to novel anti-cancer property of plants are having scope in drug discovery, drug designing and plant drug metabolomics. It is necessary to find out alternative species for high or near biological activity. Screening plant species against the known plants containing secondary metabolites for anti-cancer property can up lead the prospects of drug discovery in new promised plants and to attribute drugs in current pharmaceuticals.

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