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Research Article

ASSESSMENT OF PHYTOCHEMICALS AND ANTIOXIDANT POTENTIAL OF SIDDHA IRAMICHAM POWDER, KANYAKUMARI DISTRICT – INDIA

R. Mary Suja[1], B. Christudhas Williams[2]

[1]PhD Scholar, Department of Botany and Research Centre, Scott Christian College (Autonomous) Nagercoil, India

[2]Assistant Professor Department of Botany and Research Centre, Scott Christian College (Autonomous) Nagercoil, India

*Correspondence author Email: **rmsuja.83@gmail.com**

ABSTRACT

The main objective of the present investigation is to evaluate the phytochemical constituents and antioxidant potential of Siddha Cancer medicine prescribed by the Traditional Siddha Practitioner of Kanyakumari District, India. Iramicham Powder is an external form of Breast Cancer medicine prescribed above 18 years was prepared with 5 different plant ingredients. Phytochemical analysis of the Iramicham Powder, aqueous, silver nitrate and ethanol extract revealed the presence of alkaloid, flavanoid, phenol, terpenoid, reducing sugar, tannin, steroid glycosides and saponin constituents. The unexplored area of hydroxyl radical assay of Iramicham Powder and extracts varied from the minimum scavenging 63.76 ± 0.011 % (25µl) of aqueous extract to the maximum scavenging 95.97 ± 0.015 % (100µl) of Iramicham Powder. DPPH radical scavenging assay varied from the minimum inhibition 57.27 ± 0.011 % (25µl) of ethanol extract to the maximum inhibition 84.27 ± 0.030 % (100µl) of Iramicham Powder. Reducing

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power activity of the Iramicham Powder and extracts varied from the minimum scavenging 56.23 ± 0.025 % (25µl) of Vitamin-C to the maximum scavenging 87.63 ± 0.011 % (100µl) of Iramicham Powder. The antioxidant assay of reducing power activity of the Iramicham Powder and extracts varied from the minimum scavenging 56.23 ± 0.025 % (25µl) of Vitamin-C to the maximum scavenging 87.63 ± 0.011 % (100µl) of Iramicham Powder and extracts indicated promising antioxidant activities in concentration dependent manner. Siddha Cancer medicines highlight the effect of reducing power activity of the Iramicham Powder and extracts varied from the minimum scavenging 56.23 ± 0.025 % (25µl) of Vitamin-C to the maximum scavenging 87.63 ± 0.011 % (100µl) of Iramicham Powder as a great potential source to rid Breast Cancer.

KEYWORDS: Iramicham Powder, phytochemical, antioxidant, Kalanchi, Cancer

INTRODUCTION

Siddha system is one of the pioneer systems of medicine among traditional medicine practices in India. Traditional Siddha medicine upholds balancing, uprighting and eliminating the pathogens as the main principles of treating diseases and maintaining health. Siddha Medicine stresses "prevention before diseases rather than treating diseases". The drugs prescribed by the Siddhars could be classified into three groups: *thavaram* (herbal product), *thadhu* (inorganic substances) and *jangamam* (animal products) [1]. Breast cancer develops from breast tissue signs of breast cancer may include a lump in the breast, a change in breast shape, dimpling of the skin and fluid coming from the nipple or a red scaly patch of skin [2]. The therapeutic value of medicinal plants depends upon the presence of one or more constituents possessing certain physiological and pharmacological activity. When two or more herbs are used in formulations, they are known as polyherb. The main herbs are selected according to the disease and other herbs are used to enhance the effects of chief herb [3]. Low levels of antioxidants or inhibition of the antioxidant enzymes, cause oxidative stress and may damage or kill cells. As oxidative stress might be an important part of many human diseases, the use of antioxidants in pharmacology is intensively studied, particularly as treatments for stroke and neurodegenerative diseases [4].

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MATERIALS AND METHODS

Collection of Plant Materials

The plant materials were collected from unpolluted rural areas of India and other ingredients were procured from commercial Siddha raw drug store was authenticated and prepared by my Uncle (Siddha Traditional Practitioner). All the ingredients were shade dried, powdered and stored in porcelain pots. The Siddha formulation were prepared as prescribed in the written scripts, books and palm leaf parchments of my Grandpa and Forefathers - Traditional Vadiyars (Table -1).

Table: 1 Composition of Iramicham Powder

S.No	Siddha Name	Scientific Name	Quantity
1	Vettiver	*Andropogon muricatus*	5 Kalanchi
2	Kasthurimanjal	*Curcuma aromatic*	3 Kalanchi
3	Pasipairu	*Vigna radiata*	5 Kalanchi
4	Nannari	*Hemidesmus indicus*	5 Kalanchi
5	Pachaikarpooram	*Cinnamomum camphora*	5 Kalanchi

Preparation of Extract

All the dried herbs were finely powdered and fresh leaves were triturated in household mortar and pestle without adding water. The powdered herbs were weighed (Kalanchi). The sampling powder was subjected to maceration using different solvents aqueous, silver nitrate and ethanol for 48 hrs. The extracts were filtered and steam boiled for further studies.

Phytochemical Analysis and antioxidation assay of Iramicham Powder

The phytochemical analysis of Iramicham Powder, aqueous, silver nitrate and chloroform extract of siddha medicine were carried out to analyse the presence of alkaloid, flavanoid, phenol, terpenoid, saponin, reducing sugar, tannin, steroid and glycosides [5 & 6]. Antioxidation assay of the Iramicham Powder and extracts were done for hydroxyl, DPPH and reducing power activity [7, 8 & 9].

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RESULT

Qualitative Analysis

The qualitative analysis of Siddha Iramicham Powder revealed the presence of alkaloid, flavanoid, saponin, terpenoid and tannin whereas, the absence of phenol, reducing sugar, steroid and glycosides. On the other hand, aqueous extract revealed the presence of alkaloid, saponin, phenol, terpenoid, reducing sugar and steroid whereas, the absence of flavanoid, tannin and glycosides. Meanwhile, ethanol extract revealed the presence of alkaloid, saponin and glycoside whereas, the absence flavanoid, phenol, terpenoid, reducing sugar, tannin and steroid. However, silver nitrate extract revealed the presence of alkaloid, terpenoid and steroid whereas, the absence of flavanoid, saponin, phenol, reducing sugar, tannin and glycoside (Table: 2).

Table: 2 Qualitative Analysis of Iramicham Powder and extracts

S.No	Phytochemicals	Iramicham Powder	Aqueous	Ethanol	Silver nitrate
1	Alkaloid	+	+	+	+
2	Flavanoid	+	-	-	-
3	Saponin	+	+	+	-
4	Phenol	-	+	-	-
5	Terpenoid	+	+	-	+
6	Reducing Sugar	-	+	-	-
7	Tannin	+	-	-	-
8	Steroid	-	+	-	+
9	Glycoside	-	-	+	-

+ Presence - Absence

Quantitative Analysis

The quantitative analysis of Iramicham Powder showed the phytochemical constituents of alkaloid 2.914 ± 0.001 mg/g; flavanoid 0.068 ± 0.001 mg/g; terpenoid 1.479 ± 0.000 mg/g; saponin 2.516 ±

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0.001 mg/g and tannin 0.585 ± 0.000 mg/g. On the other hand, aqueous extracts of the powder showed the phytochemical constituents of alkaloid 0.070 ± 0.001 mg/g; saponin 0.465 ± 0.001 mg/g; phenol 0.415 ± 0.001 mg/g; terpenoid 0.567 ± 0.000 mg/g; reducing sugar 0.415 ± 0.000 mg/g and steroid 0.422 ± 0.001 mg/g. The ethanolic extract of alkaloid 2.500 ± 0.000 mg/g; saponin 1.984 ± 0.001 mg/g and glycosides 2.311 ± 0.002 mg/g and silver nitrate extract of alkaloid 0.426 ± 0.000 mg/g; terpenoid 1.211 ± 0.001 mg/g and steroid 1.499 ± 0.001 mg/g.

ANTIOXIDATION ASSAY

Hydroxyl radical scavenging

Hydroxyl radical scavenging activity of the Iramicham Powder varied from the minimum inhibition of 79.96 ± 0.015 % (25µl) to the maximum inhibition of 95.97 ± 0.015 % (100µl). On the other hand, aqueous extract of the powder varied from the minimum inhibition of 67.38 ± 0.000 % (25µl) to the maximum inhibition of 77.48 ± 0.015 % (100µl). Meanwhile, ethanolic extract of the powder varied from the minimum inhibition of 63.76 ± 0.011 % (25µl) to the maximum inhibition of 69.17 ± 0.011 % (100µl). The silver nitrate extract of the powder varied from the minimum inhibition of 71.35 ± 0.015 % (25µl) to the maximum inhibition of 77.00 ± 0.000 % (100µl). The antioxidant potential of standard antioxidant L-ascorbic acid varied from the minimum inhibition of 76.39 ± 0.011 % (25µl) to the maximum inhibition of 93.21 ± 0.005 % (100µl). In general, hydroxyl radical scavenging of the Iramicham Powder and extracts varied from the minimum inhibition 63.76 ± 0.011 % (25µl) of aqueous extract to the maximum inhibition 95.97 ± 0.015 % (100µl) of Iramicham Powder (Table: 3 & Fig: 1).

Table: 3 Hydroxyl Radical Scavenging of Iramicham Powder and Extracts

Concentration of medicine and extracts	Iramicham Powder	Aqueous Extract	Ethanol Extract	Silver nitrate (Nanoparticle)	L-Ascorbic acid (Standard)
25µl	79.96 ± 0.015	67.38 ±0.000	63.76 ±0.011	71.35 ±0.015	76.39 ±0.011
50µl	81.36 ±0.010	72.15 ±0.011	64.97 ±0.010	73.27 ±0.015	81.27 ±0.011
75µl	85.25 ±0.015	74.32 ±0.015	66.72 ±0.020	75.92 ±0.011	85.29 ±0.025
100µl	95.97 ±0.015	77.48 ±0.015	69.17 ±0.011	77.00 ±0.000	93.21 ±0.005

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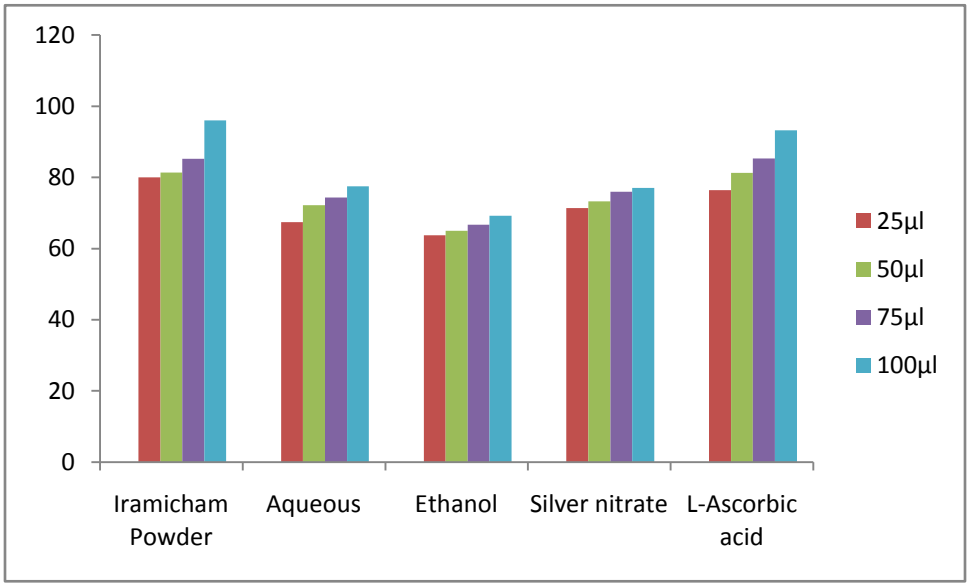
Fig: 1 Hydroxyl Radical Scavenging of Iramicham Powder and Extracts



DPPH radical scavenging

DPPH radical scavenging assay of the Iramicham Powder varied from the minimum of 71.62 ± 0.030 % (25µl) to the maximum of 84.27 ± 0.030 % (100µl). On the other hand, aqueous extract of the powder varied from the minimum scavenging of 69.63 ± 0.011 % (25µl) to the maximum scavenging of 74.26 ± 0.017 % (100µl). Meanwhile, ethanolic extract of the powder varied from the minimum scavenging of 57.27 ± 0.011 % (25µl) to the maximum scavenging of 58.71 ± 0.010 % (100µl). The silver nitrate extract of the powder varied from the minimum scavenging of 59.60 ± 0.010 % (25µl) to the maximum scavenging of 65.45 ± 0.015 % (100µl). The antioxidant potential of standard antioxidant L-ascorbic acid varied from the minimum scavenging of 67.24 ± 0.011 % (25µl) to the maximum scavenging of 81.26 ± 0.000 % (100µl). In general, DPPH scavenging of the Iramicham Powder and extracts varied from the minimum scavenging 57.27 ± 0.011 % (25µl) of ethanol extract to the maximum scavenging 84.27 ± 0.030 % (100µl) of Iramicham Powder (Table: 4 & Fig: 2).

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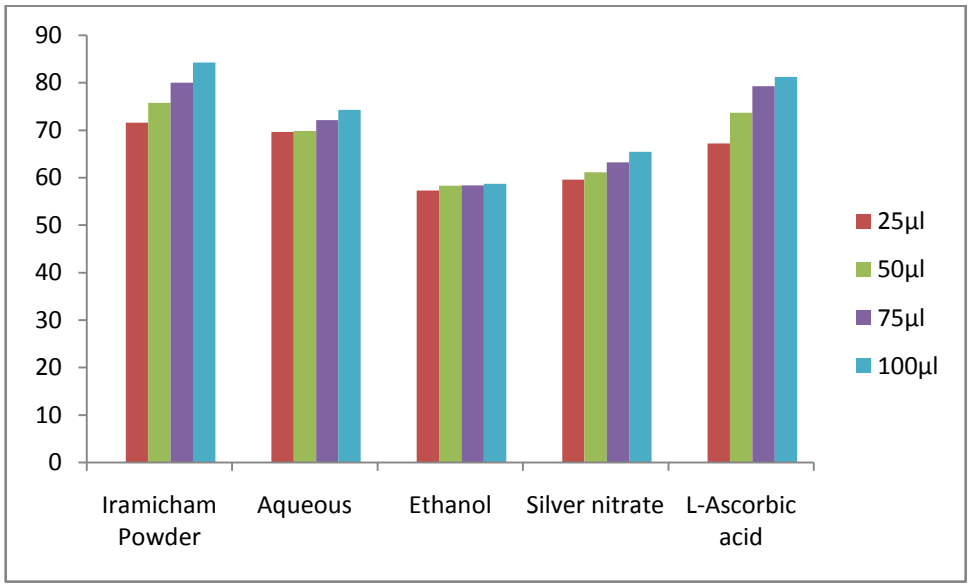
Table: 4 DPPH Radical Scavenging of Iramicham Powder and Extracts

Concentration of medicine and extracts	Iramicham Powder	Aqueous Extract	Ethanol Extract	Silver nitrate (Nanoparticle)	L-Ascorbic acid (Standard)
25µl	71.62 ± 0.030	69.63 ±0.011	57.27 ±0.011	59.60 ±0.010	67.24 ±0.011
50µl	75.76 ±0.020	69.86 ±0.010	58.30 ±0.020	61.17 ±0.011	73.71 ±0.000
75µl	79.99 ±0.000	72.11 ±0.025	58.39 ±0.011	63.25 ±0.011	79.29 ±0.000
100µl	84.27 ±0.030	74.26 ±0.017	58.71 ±0.010	65.45 ±0.015	81.26 ±0.000

Fig: 2 DPPH Radical Scavenging of Iramicham Powder and Extracts



Reducing Power Activity

Reducing Power activity of the Iramicham Powder varied from the minimum of 79.96 ± 0.010 % (25µl) to the maximum of 87.63 ± 0.011 % (100µl). On the other hand, aqueous extract of the powder varied from the minimum scavenging of 59.77 ± 0.020 % (25µl) to the maximum scavenging of 74.33 ± 0.011 % (100µl). Meanwhile, ethanolic extract of the powder varied from the minimum scavenging of 57.71 ±

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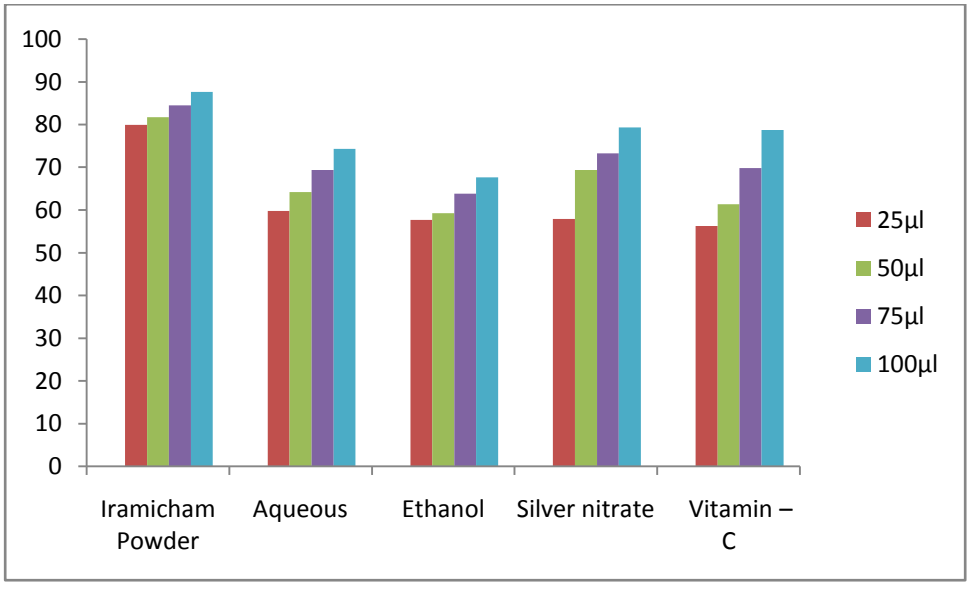
0.020 % (25µl) to the maximum scavenging of 67.63 ± 0.055 % (100µl). The silver nitrate extract of the powder varied from the minimum scavenging of 57.93 ± 0.011 % (25µl) to the maximum scavenging of 79.36 ± 0.010 % (100µl). The antioxidant potential of standard antioxidant Vitamin-C varied from the minimum scavenging of 56.23 ± 0.025 % (25µl) to the maximum scavenging of 78.72 ± 0.010 % (100µl). In general, reducing power activity of the Iramicham Powder and extracts varied from the minimum scavenging 56.23 ± 0.025 % (25µl) of Vitamin-C to the maximum scavenging 87.63 ± 0.011 % (100µl) of Iramicham Powder (Table: 5 & Fig: 3).

Table: 5 Reducing Power Activity of Iramicham Powder and Extracts

Concentration of medicine and extracts	Iramicham Powder	Aqueous Extract	Ethanol Extract	Silver nitrate (Nanoparticle)	Vitamin – C (Standard)
25µl	79.96 ± 0.010	59.77 ±0.020	57.71 ±0.020	57.93 ±0.011	56.23 ±0.025
50µl	81.69 ±0.015	64.22 ±0.011	59.27 ±0.011	69.36 ±0.005	61.37 ±0.000
75µl	84.49 ±0.011	69.36 ±0.010	63.79 ±0.011	73.26 ±0.010	69.81 ±0.015
100µl	87.63 ±0.011	74.33 ±0.011	67.63 ±0.055	79.36 ±0.010	78.72 ±0.010

Fig: 3 Reducing Power Activity of Iramicham Powder and Extracts



CONCLUSION

It is apparent that the plant kingdom offers a better prospect of providing constructive medicinal compounds for the treatment of numerous challenging diseases. The polyherbal formulation of Iramicham Powder was evaluated for the phytochemical and antioxidation activity. The presence of secondary metabolites proved that the Iramicham Powder was instigated to be an effective antioxidant, when it is compared to standard antioxidant compounds (Ascorbic acid and Vitamin C).

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