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IN-VITRO ANTIOXIDANT POTENTIAL OF TUBEROUS ROOT OF METHANOLIC EXTRACT OF *Ipomoea digitata (Linn.)*

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ABSTRACT

In vitro antioxidant activities of methanol extract of tuberous root of *Ipomoea digitata* (Linn.) was investigated. The free radical scavenging activity to evaluate by Hydroxyl radical scavenging activity**,** FRAP method and Estimation of total phenol. Hydroxyl radical scavenging activity of methanolic extract and reference standard Ascorbate IC_{50} values was found to be 230 µg/ml and 410 µg/ml. FRAP method of methanolic extract and reference standard Ascorbate IC_{50} values was found to be 800 µg/ml and 50 µg/ml.The total phenol content of methanolic extract was found to be 7.51mg/g respectively. The above result possess significant antioxidant activity when compare to the above all standard.

KEYWORDS

Antioxidant, *Ipomoea digitata*, Hydroxyl radical scavenging activity, FRAP method, Estimation of total phenol.

INTRODUCTION

Oxidant stress, a result of imbalance between the antioxidant defense system and the formation of reactive Oxygen species (ROS), may damage life important membrane lipids, proteins, DNA and carbohydrates[1]. It is well known that reactive oxygen species (ROS) are involved in many Pathological disorders such as atherosclerosis and related cardiovascular disease[2][3][4]. Oxidative stress can result either from low levels of anti oxidants and from an increased production of reactive species [5]. Elevated serum lipid levels, particularly of cholesterol along with generation of reactive oxygen species (ROS), play a key role in the development of coronary artery disease (CAD) and atherosclerosis [6].

Many studies have suggested that these naturally occurring flavonoid compounds exhibit biological activities and show a remarkably with scavenging activity toward chemically generated radicals, thus making them effective in inhibiting oxidation of human low density lipoproteins and preventing various human diseases.[7][8][9][10].

The tuberous root of ipomoea digitata (linn) is a belong to the convolvolaceae family. The root large ovoid or elongated tuberous roots. The root is regarded as a diuretic, leprosy, burning sensation, vomiting, disease of blood, anthelmintic, syphilis and spleen disease [11]. The plant used as Aphrodisiac activity [12] Anticancer and anti microbial activity [13]. Resin glycoside was isolated from leaves and stems of Ipomoea Digitata [14], Anti-microbial

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activity and anti-complement [15], Flowering plants used against snakebite [16] plant used as treatment of oral diseases [17], Therefore, the present investigation focused to evaluate the invitro antioxidant potential of methanolic extract of tuberous root of Ipomoea digitata in different screening methods.

MATERIALS AND METHODS

1. Collection and Identification of Plant materials

The tuberous root of *Ipomoea digitata (linn)*, were collected form Kilikulam, Tirunelveli District of Tamilnadu, India. Taxonomic identification was made from Botanical Survey of Medical Plants Unit Siddha, Government of India. Palayamkottai. The tuberous root of *Ipomoea digitata (Linn)*, were dried under shade, segregated, pulverized by a mechanical grinder and passed through a 40 mesh sieve.

2. Preparation of Extracts

The above powdered materials were successively extracted with Methanol by hot continuous percolation method in Soxhlet apparatus [18] for 24 hrs. The extract was concentrated by using rotary evaporator.

EVALUATION OF ANTIOXIDANT ACTIVITY OF IN VITRO STUDYS:

Hydroxyl radical scavenging activity [19]

Hydroxyl radical scavenging capacity of an extract is directly related to its antioxidant activity. This method involves *in-vitro* generation of hydroxyl radicals using Fe^{3+}/ascorbate/EDTA/H_2O_2 system using Fenton reaction. Scavenging of this hydroxyl radical in presence of antioxidant is measured. In one of the methods the hydroxyl radicals formed by the oxidation is made to react with DMSO (dimethyl sulphoxide) to yield formaldehyde. Formaldehyde formed produces intense yellow colour with Nash reagent (2M ammonium acetate with 0.05m acetic acid and 0.02m acetyl acetone in distilled water). The intensity of yellow colour formed is measured at 412 nm spectrophotometrically against reagent blank. The activity is expressed as % hydroxyl radical scavenging

FRAP Method [20]

FRAP (Ferric Reducing Antioxidant Power) is one of the most rapid test and very useful for routine analysis. The antioxidative activity is estimated by measuring the increase in absorbance caused by the formation of ferrous ions from FRAP reagent containing TPTZ (2,4,6 – tri) (2-pridyl)–S-triazine) and $FeCl_3 6H_2O$. The absorbance was measured spectrophotometrically at 595nm. Antioxidant activity of plant extracts is reported by this method.

Estimation of total phenol [21]

The measurement of total phenol is based on Mallick and Singh (1980), To 0.25g of sample, added 2.5 ml of ethanol and centrifuged at 2ºc for 10 mins. The supernatant was Preserved. Then, the sample was re-extracted with 2.5ml of 80% ethanol and centrifuged. The pooled supernatant was evaporated to dryness. Then, added 3ml of water to the dried supernatant. To which added 0.5ml of folins phenol reagent and 2ml of sodium carbonate (20%). The reaction mixture was kept in boiling water bath for 1mins.The absorbance was measured at 650nm in a spectrophotometer.

RESULT AND DISCUSSION

1. HYDROXYL RADICAL METHOD

Free radical scavenging activity of the methanolic extract of ipomoea digitata was determined by hydroxyl radical method. The free radical scavenging potential shown maximum activity is 62.71 at 1000µg/ml for as Standard (ascorbate) was found to be 62% at 1000 µg/ml. The IC_{50} of the methanol extract of ipomoea digitata and standard (Ascorbate) was found to be 230µg/ml and 410µg/ml better antioxidant is respectively.

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Table-1.

Antioxidant activity of tuberous root of Methanolic extract of Ipomoea digitata (Linn) on Hydroxy radical method

S.No	Concentration (µg/ml)	% of activity (±SEM)	
		Sample (Methanolic extract)	Standard (Ascorbate)
1	125	42.11±0.04	27.63±0.076
2	250	53.34±0.08	49.53 ±0.054
3	500	58.52±0.05	55.12±0.022
4	1000	62.71±0.04	62.00±0.014
		IC_{50}=230 µg/ml	IC_{50}=410µg/ml

*All values are expressed as mean ± SEM for three determinations

2. FRAP METHOD

Reduced ability of the methanolic extract of ipomoea digitata was determined by FRAP method.Maximum reduced ability is 55.6% at 1000µg/ml for as Standard (Ascorbate) was found to be 98.07% at 1000 µg/ml. The IC_{50} of the methanol extract of ipomoea digitata and standard(Ascorbate) was found to be 800µg/ml and 50µg/ml in better antioxidant is respectively.

Table-2.

Reducing ability of tuberous root of Methanolic extract of Ipomoea digitata (Linn) by FRAP method.

S.No	Concentration (µg/ml)	% of activity (±SEM)	
		Sample (Methanolic extract)	Standard (Ascorbate)
1	125	25.47±0.04	72.04±0.014
2	250	32.11±0.02	82.05±0.034
3	500	40.84±0.05	86.04±0.026
4	1000	55.66±0.03	98.07±0.041
		IC_{50}= 800 µg/ml	IC_{50}=50µg/ml

*All values are expressed as mean ± SEM for three determinations

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TOTAL PHENOL

The total phenolic content of methanol extract of tuberous root of Ipomoea digitata was presented table 3. Based on the report of methanolic extract of tuberous root of Ipomoea digitata was found 7.51 mg/g of phenolic compound.

Table 3.
The total phenolic content of methanol extract of tuberous root of Ipomoea digitata (Linn)

S.NO	Extract	Total Phenolic content (mg/g Catechol)	Total Phenolic content ±SEM
1	Methanolic Extract of Ipomoea degitata (Linn)	7.52 7.64 7.38	7.51±0.03

*All values are expressed as mean ± SEM for three determinations

CONCLUSION

The results of the above investigation indicated that the methanolic extract of tuberous root of *Ipomoea digitata* (Linn) showed strong antioxidant activity. However, Phytochemical screening of methanolic extract showed presence of Triterpenoids, Phenolic compound and flavonoids. So it can be concluded that these components might be involved in the antioxidant activity of *Ipomoea digitata*.

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