International Journal of Current Pharmaceutical Research

ISSN- 0975-7066 Vol 12, Issue 1, 2020

Original Article

ANTIOXIDANT ACTIVITY AND TOTAL PHENOL AND FLAVONOIDS ANALYSIS OF SIBERIAN GINSENG ROOT

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Received: 17 Sep 2019, Revised and Accepted: 28 Nov 2019

ABSTRACT

Objective: This study was examined to *in vitro* antioxidant activity and Total Phenol and Flavonoids content analysis of methanolic root extract of *Eleutherococcus senticosus* (Siberian ginseng).

Methods: 1,1-dephenyl-2-picryl-hydrazyl free radical scavenging and FRAP assay propose that antioxidant activity of methanol root extract because of reducing capacity of the antioxidant against oxidative effects of reactive oxygen species.

Results: Scavenging activity of Siberian ginseng root RC50 value was shown 713.42±11.55 µg/ml and reducing power 0.13±0.01 mmol/g was investigated. In addition, total phenol 12.6±1.13 mg GAE/g DW and total flavonoids 9.8±0.20 mg QE/g DW were recorded.

Conclusion: Although all tests were performed *in vitro* assay, these results recommend that Siberian ginseng root may be a good source of antioxidant ingrediant.

Keywords: Eleutherococcus senticosus, Scavenging activity, Phenol, Flavonoids, Siberian ginseng

DOI: http://dx.doi.org/10.22159/ijcpr.2020v12i1.36830. Journal homepage: https://innovareacademics.in/journals/index.php/ijcpr

INTRODUCTION

Eleutherococcussenticosus also called Siberian ginseng, is a medicinal plant. Siberian ginseng, from the family Araliaceaecirculated in Northeast China, Southeast Russia, Japan and Korea [1]. The root of Siberian ginseng are extensively used as a traditional Chinese medicine used to strengthen the spleen and nourish the kidney. In the extract of Siberian ginseng, saponins, lignans, triterpenoid, coumarins, and flavones. Phenolic compounds such as eleutheroside E and syringin have been reported to have a variety of medicinal anti-leishmania, anti-gout, antihyperglycemic, anti-hepatitis, immunostimulatory, effects concerning antibacterial, anticancer, anti-inflammatory, haemostatic, hypocholesterolemic effects and antioxidant activity [2-4].

The pharmacological activity of natural products is very regularly believed to be the result of the combined of constituents. The major compounds of *E. senticosus* are polyphenols. These compounds comprise-eleuthero sides, flavonoids and phenolic acids. The roots of *E. senticosus*are good resource of phenols, called as eleutherosides and flavonoids, triterpenic acids, phenolic acids and anthocyaninsmainlyeleutherosides B, E, E1.

Currently, in China root ethanol extract of Siberian ginseng is a prevalent health supplement for impotence, weakness and diseases connected with inflammation. Several other properties of eleutherosides from E. senticosuscontainand increased glucose uptake in C2C12 myotublesand alleviation of insulin resistance in db/db(obese type 2 diabetic) mice [5], increased endurance capacity and cardiovascular function in athletic training over an 8-week, neuroprotectiveeffects during neural ischemia in rats [6], further growth inhibition and apoptosis in stomach cancer cells (KATO III cells) [7], anti-inflammatory effects [8] and interestingly also cancer [9], with glycoproteins from Acanthopanaxsenticosus (glycoproteins (EN-SP) showed anti-tumor effects [10].

This study to evaluate the primary analysis of bioactive compounds and Total Phenol and Flavonoid content anlaysis of siberian ginseng root. We also investigated antioxidant capacity. Siberian ginseng root showing good antioxidant capacity, it may be use for health supplemt in pharma industry.

MATERIALS AND METHODS

Materials

The Siberian ginseng root was procured from traditional plant suppliers. Butylated hydroxytoluene (BHT), 1,1-diphenyl-2-picrylhydrazyl (DPPH), Folin-Ciocalteu reagent, potassium ferricyanide, ferric chloride, gallic acid, quercetin and ursolic acid were obtained from Sigma-Aldrich.

Preparation of extract

The dried root of Siberian ginseng (20 gms) were soaked in methanol for 24 h. Extract was filtered and evaporated using a rotary vacuum evaporator at 40 °C. Obtained residues was suspended in methanol for further analysis.

Primary phytochemical anaysis

The phytochemical Screening of Alkaloids, Flavonoid, phenolics, terpenoids, flavonoids, tannins, carbohydrates, glycosides and saponins in methanol root extract of Siberian ginseng were determined using previously described method of A. Sofowora [11].

Total phenolic content (TPC)

The total phenolic content of siberian ginseng root extract was determined using of Singleton and Rossi method [12]. Total Phenol Content was expressed as gallic acid equivalents (GAE/g dry sample). Each tests was done in triplicate.

Total flavonoid content (TFC)

The Total Flavonoids Content of root extract of siberian ginseng was investigated using the colorimetric method [12]. Total Flavonoids Content was expressed as mg of quercetin equivalent (QEs/g/dry sample). All tests were done triplicate.

DPPH radical scavenging activity

The free radical scavenging activity of root extract of siberian ginseng was determined DPPH assay [13]. 0.8 ml of DPPH solution was plated in 96-well plates, and 0.2 ml of the sample was or a control added to each well. The reaction mixture was incubated for

30 min in dark condition at room temperature. Then absorbance was recorded at 520 nm.

The RC_{50} (50% reduction of DPPH radicals) was observed from a graph. Butylatedhydroxytoluene was used as the standard.

FRAP assay

The total reducing power of siberian ginseng root extract was evaluated by described [14]. Sample was mixed with 0.5 ml of phosphate buffer (0.2 M, pH 6.6) and 0.5 ml of potassium ferricyanide (1%, w/v). Then incubation at 50 °C for 20 min. The reaction was stopped by addition of 10% of 0.5 ml trichloroacetic acid solution and centrifuged the mixture at 2,500 rpm for 10 min. 0.5 ml supernatant was mixed with 0.5 ml distilled water and 0.1 ml of ferric chloride solution (0.1%, w/v). The absorbance was recorded at 750 nm.

RESULTS

Phytochemical analysis

The primary phytochemical analysis of Siberian ginseng root was shown in table 1. Root methanol extract was determined Phenol, Flavonoid, Tannins, Saponins and Glycoside.

Table 1: Phytochemical analysis of siberian ginseng root

Phytochemical name	Methanol extract
Alkaloids	-ve
Carbohydrates	-ve
Glycosides	+ve
Saponins	+ve
Flavonoids	+ve
Phenol	+ve
Tannins	+ve

Table 2: Total phenol and flavonoid content of root methanol extract of siberian ginseng

	Total phenol content (mg GAE/g DW)	Total flavonoid content (mg QE/g DW)
Root Methanol Extract	12.6±1.13	9.8±0.20

Table 3: DPPh and FRAP assay for root of siberian ginseng

	DPPH (RC_{50} µg/ml)	FRAP (mmol/g)
Root Methanol Extract	713.42±11.55	0.13±0.01

Total phenolic and total flavonoids content

The Total Phenol and Flavonoids content of root methanolic extracts of siberian ginseng were presented in table 1. Total Phenol content was determined 12.6±1.13 mg GAE/g or total flavonoids content was determined 9.8±0.20 mg QEs/g dry sample.

DPPH and FRAP analysis

The examination of antioxidant properties of siberian ginseng root is measured an important work in developing new antioxidant agents with low toxicity and less side effects. Therefore, we investigated the antioxidant properties of Siberian ginseng root MeOH extract was analyzed for antioxidant activities based on DPPH free radical scavenging activity and FRAP. Table 2 were presented DPPH free radical scavenging activity and reducing the power of methanol root extract of siberian ginseng.

CONCLUSION

We analyzed the Total Phenol and Flavonoids content and antioxidant properties suggested that Siberian ginseng root is an abundant source of natural antioxidant activities. In addition, the presence of ursolic acid and sesquiterpene hydrocarbons in the root extract of Siberian ginseng shown the potential source as a crude drug and dietary health supplement. Further studies on the isolation and characterization of the root extract and toxicity should be tested to confirm the safety use.

FUNDING

Nil

AUTHORS CONTRIBUTIONS

All the authors have contributed equally.

CONFLICTS OF INTERESTS

Declared none

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