International Journal of Pharmacy and Biological Sciences-IJPBS™ (2020) 10 (4): 155-157
Online ISSN: 2230-7605, Print ISSN: 2321-3272
Research Article | Biological Sciences | OA Journal | MCI Approved | Index Copernicus

Antioxidant and Antidiabetic Activities of *Ruellia tuberosa Linn.*

R.P.Pandey[+] and B. K. Singh*
[+]Department of Chemistry, Buddha PG College, Kushinagar-274403(UP), India
***Department of Chemistry, S D P G College, Mathlar, Deoria-274502(UP), India**

Received: 02 Jul 2020/ Accepted: 9 Aug 2020 / Published online: 1 Oct 2020
***Corresponding Author Email:** rppandeybpgc@outlook.com

Abstract
Ruellia tuberosa L. *(Acanthaceae)* is a tropical perennial plant widely distributed in southeast Asia including Thailand and Laos. *R. tuberosa* has been used as diuretic, anti-diabetic, antipyretic, analgesic, antihypertensive, thirst quenching and antidotal agent in folk medicines. The present paper describes its antioxidant and anti-diabetic activities.

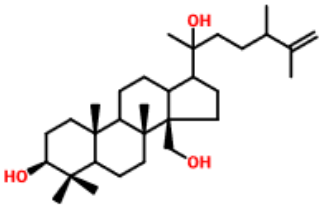
Keywords
Ruellia tuberosa,anti-diabetic and anti-oxidant activities

*****

Ruellia tuberosa L. (Acanthaceae) is a tropical perennial plant. It is widely distributed in southeast Asia including Thailand and Laos. In folk medicines, R. tuberosa has been used as diuretic, anti-diabetic, antipyretic, analgesic, antihypertensive, thirst quenching and antidotal agent. Recently, it has been introduced as a component of herbal drink in Taiwan [1, 2]. Traditional use of R. tuberosa in herbal drink is attributed to its antioxidant activity. The antioxidant activity of Ruellia tuberosa L. (Acanthaceae) was investigated by the 2,2-diphenyl-1-picrylhydrazyl (DPPH) free radical-scavenging assay and the hydrogen peroxide-induced luminol chemiluminescence assay. The methanolic extract (ME) and its four fractions of water (WtF), ethyl acetate (EaF), chloroform (CfF), and n-hexane (HxF) were prepared and then subjected to antioxidant evaluation. The results of both methods revealed that R. tuberosa possesses potent antioxidant activity and provide useful information on the pharmacological activities associated with free radicals of this traditional folk remedy.[1] Flavonoids constitute one of the well-known and widespread groups of phenolics in higher plants. Several flavonoids; apigenin, luteolin, 3, 5-diglucoside, apigenin 7-O-glucuronoide, apigenin glucoside, apigenin rutinoside, luteolin glucoside, pedalitin, flavone glycoside, cirsimaritin, cirsimarin, cirsiliol 4'-glucoside, sorbifolin and pedalitin are reported in R. tuberosa [2, 3, 4]. The study was carried out to evaluate the total phenolic constituents, antioxidant and anti-proliferative activities of Ruellia tuberosa. The total phenolic and flavonoid contents of the plant extracts were determined by using Folin-Ciocalteau and aluminium chloride colorimetric assays, respectively. The antioxidant activity of the plant extracts was evaluated using DPPH free radical scavenging assay. The methanol leaf extract was found to possess the highest total phenolic content (82.67 ± 2.09 mg GAE/g) while the ethyl acetate leaf extract was found to possess the highest total flavonoid content (152.77 ± 4.68 mg Cat/g). The ethyl acetate leaf possessed the highest radical scavenging activity, with IC50 of 720 µg/ml. Significant correlation was found between the total phenolic/flavonoid contents with the total antioxidant activity. These findings indicate that Ruellia tuberosa could be a potential source for natural antioxidant .Thus, further isolation and characterization of the respective bioactive compounds from the plants are necessary.[5]

Diabetes mellitus (DM) is a major endocrine disorder that is regarded as hyperglycemia. Asia and Africa are the most viable areas where the disease is feared to

raise 2-3 folds. DM is affecting approximately 5% of the world population. Worldwide projections suggest that more than 300 million people will have diabetes by the year 2025. According to World Ethnobotanical Information of medicinal plants, almost 800 plants are used in the control of DM. However, only few of these plants have been studied. Traditional medicines of plant origin play a vital role in the cure of DM. World Health Organization (WHO) has also recommended the evaluation of traditional plant treatments for diabetes because they are effective, non-toxic, having less or no side effects and are considered to be good medicines for oral therapy. In this regard, several scientists carried out experimental and clinical trials on medicinal plants and found significant anti-diabetic activity. Literature data indicates that some of the flavonoids and triterpenes isolated from medicinal plants have significantly reduced the blood glucose level [6-10].Durre Shahwar et al.[11] reported the hypoglycemic activity of different fractions of methanolic extract of *R. tuberosa*.They demonstrated that the methanolic extract and other solvent fractions (ethyl acetate and *n*-hexane) of *R. tuberosa* possess significant blood glucose lowering effect both in normal glycemic and in alloxan-induced diabetic rabbits. Phytochemical analysis of the *n*-hexane fraction indicated the presence of sitosterols which has been reported to have anti-diabetic effect and work like sulphonyl urea medicine [10-11]. The hypoglycemic effect of the ME extract could possibly be related to its composition. Thus, the significant anti-diabetic effect of *R. tuberosa* may be due to the presence of more than one hypoglycemic principle and their synergetic properties. Misra et al. [12] and Singh et al. [13] isolated β-sitosterol and 21-methyl-dammar-22-en-3β-18,27-triol along with some aliphatic hydroxy ketone. Therefore, a comprehensive chemical and pharmacological investigations are required to isolate and evaluate the hypoglycemic effects of the active components found in *R. tuberosa* specially 21-methyl-dammar-22-en-3β-18,27-triol.



21-methyl-dammar-22-en-3β-18,27-triol.

Ruellia tuberosa Linn

REFERENCES:

1. Fu-An C, An-Bang W, Pochuen S, Daih-Huang K, Chi-Ying H. Evaluation of the antioxidant activity of Ruellia tuberosa. Food Chem 2006; 97: 654-60.
2. Chwan-Fwu L, Yu-Ling H, Lee-Ying C, Shuenn-Jyi S, Chien-Chih C. Bioactive flavonoids from Ruellia tuberosa. J Chinese Med 2006; 17: 103-9.
3. Nair AGR, Subramanian SS. Apigenin glycosides from Thumbergia fragrans and Ruellia tuberosa. Curr Sci 1974; 43: 480.
4. Wagner H, Danninger H, Iyengar MA, Seligmann O, Farkas L, Subramanian SS, Nair AGR. Isolation of apigenin-7-β-D-glucuronide from Ruellia tuberosa and its synthesis.Chemische Berichte 1971; 104: 2681-7.
5. Bo Eng Cheong, Mohd. Zulkarnain Waslim, Fui Fui Lem, Peik Lin Teoh. Antioxidant and anti-proliferative activities of Sabah Ruellia tuberose. J App Pharm Sci, 2013; 3 (12): 020-024.
6. Anders G, Niels CH, Stig KP. The changing world demography of type 2 diabetes. Diabetes Metabol Res Rev 2002; 19: 3-7.
7. Caroline D. Invited commentary: traditional plant treatments for diabetes mellitus: pharmaceutical foods. Brit J Nutr 1998; 80: 5-6.
8. Korec R, Heinz SK, Zoukas R. Effect of neoflavonoides coutareagenin, one of the anti-diabetic substances of Hintonialatiflora on streptozotocin-induced diabetes mellitus in rats. Arzneimittel-Forsch 2000; 50: 122-8.
9. Prez RM, Cervantes H, Zavala MA, Sanchez J, Perez S, Pere C. Isolation and hypoglycemic activity of 5, 7, 3'-trihydroxy-3, 6, 4'-trimethoxy flavone from Brickellia veronicaefolia. Phytomedicine 2000; 7: 25-9.
10. Pathak D, Pathak K, Singla AK. Flavonoids as medicinal agents-recent advances. Fitoterapia 1991; 62: 371-89.
11. Durre S, Saif U, Ahmad M. Ullah S, Ahmad N, Muhammad AK,Hypoglycemic activity of Ruellia tuberosa Linn in normal and alloxan induced diabetic rabbit,Iranian Journal ofPharmaceutical Sciences 2011;7:107-115
12. Misra TN,Singh RS,Pandey HS,Pandey RP,and Singh BK,Two new aliphatic compounds from Ruellia tuberosa Linn.,Indian J. Chem.1997;36B:1194-97.
13. Singh RS,Pandey HS,Pandey RP,and Singh BK,A new triterpenoid from Ruellia tuberosa Linn.,Indian J. Chem.2002;41B:1754-56.