# Antioxidant Activity of *Vanda tessellata*(Roxb.) HookEx. G. Don.

**R. Mary Subin[1]* and B. Christudhas Williams[2]**

[1, 2]Department of Botany and Research Centre, Scott Christian College (Autonomous) (Affiliated to Manonmaniam Sundaranar University, Tirunelveli),Nagercoil – 629 003, Tamilnadu, India.

## ABSTRACT

*Vanda tessellata*(Orchidaceae) has been utilized in Ayurveda system of medicine for treating several ailments. In this study,the antioxidant activity of the ethanolic extract of *V.tessellata*collected from Keeripari Hills, Southern Western Ghats was analysed. Free radical-scavenging activity of DPPH radical-scavenging,hydroxyl radical-scavengingand total antioxidant assays were conducted. The highest percentage of scavenging of DPPH (72.75%) and hydroxyl radical (74.89%) and total antioxidant activity (74.78%) were observed at the highest concentration (250µg/ml) compared with standard ascorbic acid. The present investigation proves that *V. tessellata* extract has strong antioxidant property that might help protect against diseases due to oxidative stress.

## KEY WORDS

*Vanda tessellata*, DPPH, hydroxy radical, total antioxidant.

## INTRODUCTION

Antioxidants play a very important role in neutralizing against harmful reactive oxygen species (ROS) generated duringaerobic respiration in the cell[1].ROS includes hydroxyl radical, nitric oxide, hydrogen peroxide, ferric ion, etc. Free radicals cause various diseases such as inflammation, cancer, diabetes, cardiovascular disease, liver cirrhosis, etc.[2,3,4,5]. Ayurveda is a holistic system of medicine[6]. *Vandatessellata* (Roxb.) Hook. Ex. G. Don.(Orchidaceae) has been utilized for treating various diseases. Since ancient days, and it has been mentioned extensively inayurveda and traditional folk medicinal systems[7].The leafextractsis used for treating fever,inflammation and also otitis[8]. The root of this plant is also used for treating rheumatism,

dyspepsia, nervous problems,fever and snake bite[9]. The antioxidant potential of this plant is unknown and hence the present study we analysed the antioxidant activity in*V. tessellata.*

## MATERIALS AND METHODS

### *Sample collection and processing*

The plant material of *V. tessellata* was collected from KeeriparaiReserve Forest of Kanyakumari Wildlife Sanctuary, Southern Western Ghats. The leaves were shed dried and crushed to obtain powder.

### *Extraction*

100 g of the dried powder of *V. tessellata* extracted with 95% ethanol using soxhlet apparatus and then make a concentration of 1mg/ml diluted to prepare the different concentrations for antioxidant assays.

### *DPPH radical scavenging activity assay*

The free radical scavenging activity of the fractions was measured *in vitro* by 2,2′- diphenyl-1-picrylhydrazyl (DPPH) assay according to the method described earlier[10]. The stock solution was prepared by dissolving 24 mg DPPH with 100 ml of ethanol. A 3 ml aliquot of stock solution was mixed with 100 µl of ethanol extract of *Vanda tessellata*at various concentrations (50, 100, 150, 200 and 250µg/ml). Ascorbic acid was used as a standard.The absorbance was taken at 517 nm. The scavenging activity was estimated based on the percentage of DPPH radical scavenged as the following equation:

$$\text{Scavenging effect}(\%)=[(\text{control OD}-\text{sample OD})/(\text{control OD})]\times 100$$

### *Hydroxyl radical scavenging activity*

The activity of ethanol extracts of *Vanda tessellata*in the scavenging of hydroxyl free radical was determined by the method described by[11]. The ethanol extract with different concentrations (50, 100, 150, 200 and 250µg/ml)was mixed with a reaction mixture contained, in a final volume of 1 ml: 2-deoxy-2-ribose (2.8 mM); $KH_2PO_4$-KOH buffer (20 mM, pH 7.4); $FeCl_3$ (100 µM); EDTA (100 µM); $H_2O_2$ (1.0mM) and ascorbic acid (100 µM). The absorbance was measured at 532 nm against an appropriate blank solution. Ascorbic acid was used as a standard. Hydroxyl radical scavenging ability (%) was calculated by using the formula:

Hydroxyl radical scavenged (%) = (OD of control–OD of sample/OD of control)×100

### *Total Antioxidant activity*

About 7.4 sulpuric acid (0.6M solution), 0.9942g of sodium sulphate (28mM solution) and 1.2359g of ammonium molybdate (4mM) were mixed together in 250ml distilled water and labelled as Total Antioxidant

Capacity (TAC) reagent.Different concentrations((50, 100, 150, 200 and 250µg/ml)of ethanol extract of *Vanda tessellata*was prepared for total antioxidant assay. Absorbance was measured at 695nm in a spectrophotometer. Ascorbic acid was used as a standard[12].

Total antioxidant activity=[(control OD−sample OD)/(control OD)]×100

## RESULTS AND DISCUSSION

DPPH radical-scavenging, Hydroxyl radical-scavenging and total antioxidant activities measured in dried *V. tessellata* leaf extracts.In DPPH radical-scavenging activity showed thehighest percentage of inhibition. The maximum scavenging activity (72.75%) wasobserved in highest concentration (250 µg/ml) with an IC50=149.054 µg/ml and compared with standard ascorbic acid was (78.04%)and IC50=28.67µg/ml at the concentration (250 µg/ml)(Fig.1).

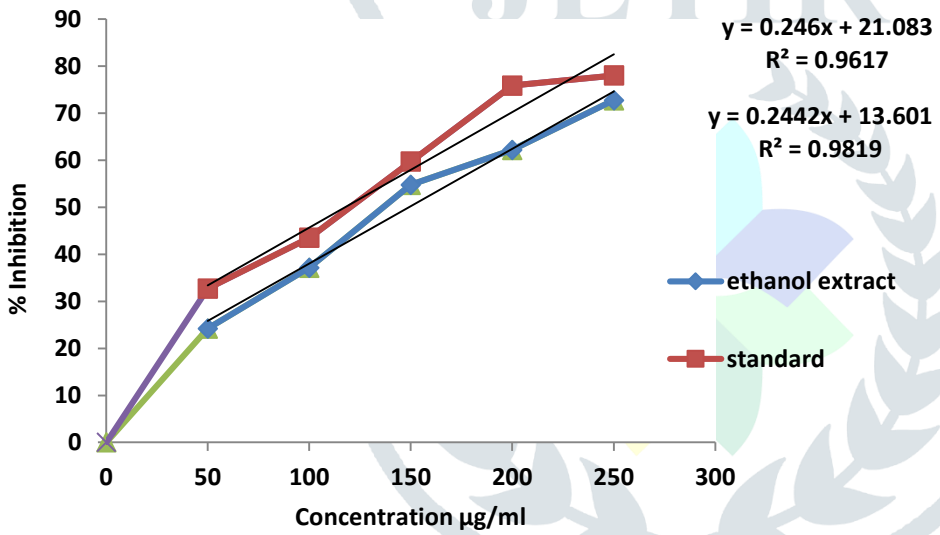


Fig.1 DPPH scavenging activity of *V. tessellata*

Hydroxyl radical scavenging is an extremely reactive free radical formed in biological systems. Highest percentage of inhibition in Hydroxyl radical-scavenging activity was found to be 74.89% and standard ascorbic acid was 80.01% at250 µg/mlconcentration. The IC50 values of standard ascorbic acid and ethanol extract of *V.tessellata* were 98.65µg/ml and 116.71µg/ml respectively (Fig.2).

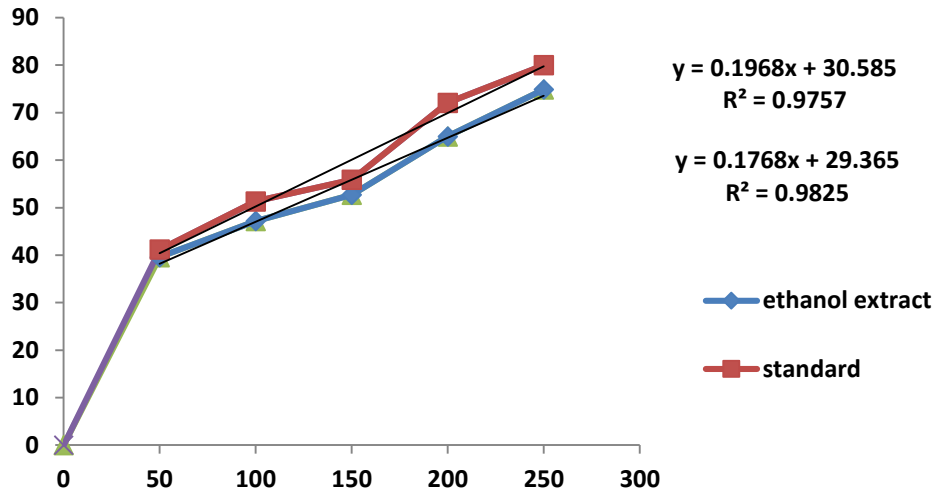


Fig.2 Hydroxyl radical-scavenging activity of *V. tessellata*

The total antioxidant activity of *V.tessellata* exhibited highest percentage inhibition(74.78%) at 250µg/ml concentration with an IC50=152.62µg/ml. The standard ascorbic acid showed highestpercentage of inhibition (81.21%) at 250µg/ml concentrationand IC50 value was 127.62µg/ml (Fig.3).

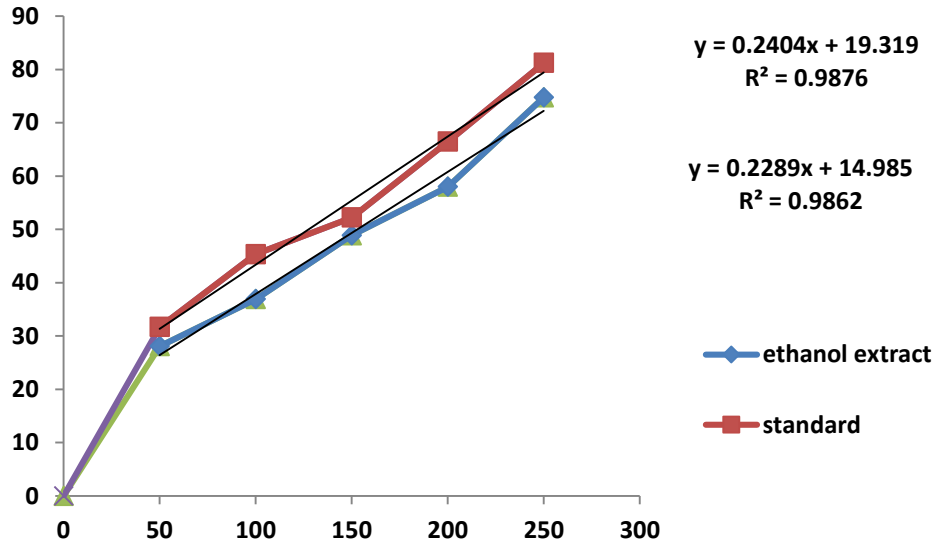


Fig.3 Nitric oxide radical-scavenging activity of *V. tessellata*

Medicinal plant contains various phytoconstituents with antioxidant properties which are responsible for various beneficial health effects[13]. Antioxidants are important defence mechanism of the various organisms against the pathological diseases[14]. The earlier findings of Bhaigyabati[15], Chutia and Basumatary[16]reported the free radical scavenging activity increased as concentration increased in the extract, because it contains one or more unpaired electron, which requires neutralization by free radical scavengers. In the present study, ethanol extract of *Vanda tessellata*showed the highest free radical scavenging activity of DPPH (72.75%),

Hydroxyl scavenging assay (74.89%) and Total antioxidant activity (74.78%). In agree with previous reportsSubin*et al*.,[17]reported the maximum percentage of inhibition of DPPH (61.91%) in ethanol extract of *Vanda roxburghii*at 100µg/ml. Uddin *et al.*,[18]studied the hydroxyl radical scavenging activity of ethanol of *Vanda roxburghii* possess the maximum scavenging activity (58.5%) at 100µg/ml and Shanmugapriya*et al.*,[19]observed the highest total antioxidant activity (62.9%) in methanol extract of *G. polycaulon* at 500µg/ml concentration. Based on findings of the present investigation, the free radical scavenging activities of the ethanol extract of *V.tessellata*shows that it has excellent antioxidant potentialwhich is used for the treatment of various ailments.

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