

# Free Radical Scavenging Potential of N, N Di-p-Hydroxybenzylidene Ethylenediamine: Structure-Activity relationship

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## Abstract:

## Introduction:

Reactive oxygen species (ROS) such as superoxides, peroxides and hydroxyl radicals, have implications in many degenerative and non-degenerative diseases such as cancer, diabetes mellitus, alzheimer's and many more *in vivo*. Although living beings have inherent mechanism to neutralize corresponding adverse effects, their excessive generation can be harmful. Hence under diseased conditions there is need for external supplement of potential free radical scavengers. In view of this, search is always on for the molecules with potential free radical scavenging abilities. Schiff bases (SBs) and their metal complexes are known to exhibit excellent antidiabetic, antibacterial and antifungal activities, however potential of SBs to scavenge free radicals needs to be explored. In view of this, present work explores the synthesis, characterization and radical scavenging potential of We have synthesized of series of Schiff bases using various substituted benzaldehydes and ethylene diamines. The present paper focuses on the synthesis, characterization of N,N-Di-p-hydroxybenzylidene ethylenediamine (NNDPHE) and its potential to scavenge 2,2-diphenyl-1-picrylhydrazyl (DPPH).

## Experimental:

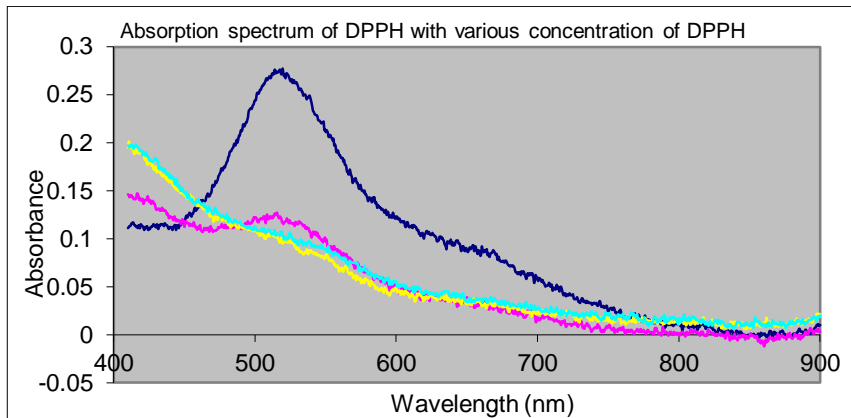
**Synthesis:** Chemicals and solvents used in the present work, such as 4-hydroxy benzaldehyde, ethylene diamine, DPPH, ethanol, methanol, acetone etc were of analytical grade and employed without further purification. Synthesis of NNDPHE consisted of stirring calculated amounts of 4-hydroxy benzaldehyde and ethylene diamine for 30 minutes at room temperature (25<sup>o</sup>C). The product formed was washed repeatedly with ethanol and recrystallized using absolute ethanol. The yield of the product was 70% and melting point determined using open capillary method was found to be 192<sup>o</sup>C. The reaction was monitored by TLC. The structure of the final product was confirmed using IR and NMR spectra.

## DPPH Scavenging Ability:

A stock solution of 0.15 mM of DPPH in methanol ( $\lambda_{\max}$ =515 nm) after suitable dilutions was allowed to react with 1 mM solution of NNDPHE prepared in ethanol. The reaction mixture was kept in dark for 20 minutes so as to complete the reaction. The total volume of the solutions ranged from 2.5 to 3.0 mL. The

reaction was monitored spectrophotometrically. Absorbances were recorded using Elico SL-159 spectrophotometer (Elico, India).

## Results and Discussion:



Sr. No	Parameter	Value
1	[DPPH]*	0.15
2	[SB]*	1.00
3	EC50	0.166±0.007
4	ARP	6.024±0.542
5	ARE	0.402±0.056

Concentrations of DPPH and SB are mM L<sup>-1</sup>.

**Table 1: Evaluation of SB**

The absorption spectra of DPPH when it is allowed to react with NNDPHE are shown in figure 1. It can be seen from the figure that as the concentration of SB increases, the extent of scavenging also increases. From the absorbance values, a graph of ratio of concentration of SB to concentration of DPPH against percentage of DPPH scavenged was plotted which was used to determine the EC50 values for DPPH scavenging activity of SB. The NNDPHE, the obtained value was 0.166±0.007 mM L<sup>-1</sup>. Antiradical potential (ARP) was calculated as the reciprocal of EC50. However, it is known that EC50 values and ARP doesn't indicate the time required for scavenging, a new parameter antiradical efficiency (ARE) was introduced. In the present study, AER was found to be 0.402±0.056.

It is known that, DPPH accepts electrons from other reactant and gets reduced so that its absorbance at 515 nm decreases. It can be seen that the synthesized SB has many electron donating centres which can reduce DPPH. The reducing power of SB is found to be more than many known antioxidants.

**Key References:** (1) Brand-Williams, W., Cuvelier, M.E. and Berset, C. (1997). *Lebensm.-Wiss.- u Technology*, 30, 609-615. (2) Blois, M., S. (1958). *Nature*, 181, 1199-1200.