

Original Research Article

Comparative Anti biofilm activity studies on the leaves of *Wrightia tinctoria* and *Dodonaea viscosa*

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ABSTRACT

Keywords

Wrightia tinctoria,
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Comparative anti biofilm activity of leaves of *Wrightia tinctoria* & *Dodonaea viscosa* were investigated. . The anti biofilm activities of leaves of *Wrightia tinctoria* and *Dodonaea viscosa* in successive different concentration were tested against E.coli. The leaves extracts of *D.viscosa*. showed the broader spectrum of antibiofilm activity when compared with *W.tinctoria*. However, *Wrightia tinctoria* is a widely used medicinal plant.

Introduction

In the traditional system of ayurvedic medicines, plant product either single drug or in combination with other which are considered to be less toxic and free from side effects compared to synthetic drugs plant extracts have been used for a wide variety of purpose for many thousands year. In particular anti-biofilm activity of plant extracts has formed the basis of many applications.

Biofilms are defined as microbial communities of cells that are irreversibly attached to a substratum or to an interface or to each other and are embedded into a matrix of extracellular polymeric substances that they have product.

It is now considered that most (if not all) bacteria are capable of forming biofilms and that this is their predominant bacterial life style. Biofilm formation is a complex biological phenomenon and was generally described as a temporal process involving a succession of distinct stage.

Biofilms are therefore a major concern in medicine and medical environment but also in all domains where their growth constitutes a source of contamination for humans or animals (food industry, cooling towards, water pipes,...) or lead to economic loses (biofouling at boats and immersed structure, material bio corrosion).The development of anti biofilm strategic is

therefore of major interest and currently constitutes an important field of investigation, in which environmentally friendly anti-biofilm molecules or organisms are highly valuable.

Wrightia tinctoria and *Dodonaea viscosa* are belongs to the families Apocynaceae and Sapindaceae respectively. They are distributed in all districts of deciduous forest of India. *W.tinctoria* commonly called as veppalai while *D.viscosa* is known as virali (in Tamil). These species have been important in the traditional healing. However, the former one is widely recognized medicinal plant. The leaves of *W.tinctoria* is considered for antidiarrhoeal, antitumor, analgesic, anti-inflammatory. It is also used in treatment for jaundice, toothache and skin diseases whereas, preparation of the leaf made from *Dodonaea viscosa* is found useful in anti-diabetic, anti-ulcer, menstrual and renal complaints. This work however, is designed to evaluate the comparative study of anti-biofilm activity of leaves of both species on selected microorganism.

Materials and Methods

Collection of Plant Materials

The fresh leaves of *W.tinctoria* and *D.viscosa* was collected in the month of January (2014) from TORANMAL region of pudukkottai (district) and the plants material was taxonomically identified at Department of Herbarium, St.Joseph College of Art and Science, Trichirappalli.

Preparation of Extract

The leaves was shade dried at room temperature for 15 days and then the plant material was pulverized into fine powder using a grinder (mixer). About 20 gm of powdered materials was extracted by cold

percolation method at 24 hrs using ethanol sequentially. The extracts were filtered using whatman 40 filter paper and concentrated. The extracts were put in airtight contains and stored in refrigerator which was subjected to following analysis. The extracts of leaves of both species were used for the study of antibiofilm activity

Screening for Anti-Biofilm Properties

The sample was dissolved in water at different concentrations (20, 50 & 100 mg/ml) in sterile screw cap vial shaken well to obtain complete homogeneous mixture and were used for biofilm inhibition assay. Biofilm inhibition was carried out in modified spectrophotometric assay. 100 ml of *E.Coli* cell suspension was prepared and added into tube and different concentration of sample (20, 50, & 100 mg/ml) was added and the plates were at incubated 37⁰C for 3 days. After the incubation, the liquid suspension removed and 100 ml of 1% w/v aqueous solution of crystal violet was added following staining at room temperature for 30 minutes, the dye was removed and the tubes was washed thoroughly and 95% ethanol was added incubated for 15 minutes. The reaction mixture was read spectrophotometrically at 570 nm of biofilm formation was calculated by using the following formulae.

$$\% \text{ inhibition} = (\text{OD control} - \text{OD treated}) / \text{OD control} \times 100$$

Results and Discussion

The leaves extract of *W.tinctoria* and *D.viscosa* was conducted for the antibiofilm activity of *E.coli* (Table). The control with biomass 100 μ g/ml of *E.Coli*, the leaves extract of *Dodonaea viscosa* assayed showed 76.6 the leaves extract of *Wrightia tinctoria* showed 62.1.

Table.1 Antibiofilm Activity of Leaves of *Wrightia tinctoria* and *Dodonaea viscosa*

Microorganism	Plants name	% of inhibition		
		20µg/ml	50µg/ml	100µg/ml
<i>E. coli</i>	<i>D.viscosa</i>	41.3	61.1	76.6
<i>E. coli</i>	<i>W.tinctoria</i>	18.0	48.4	62.1

On the above results, it can be concluded that the leaves extracts of *D.viscosa* showed the broader spectrum Pharmacognosy University of Kerala. Trivendrum: 59-60, (1960), of antibiofilm activity when compared with *W.tinctoria*. However, *Wrightia tinctoria* is a widely used medicinal plant.

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