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Allicin as a potent antibiotic against *Escherichia coli, Proteus vulgaris* and *Helicobacter pylori*

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ABSTRACT

The present study aims at the potential antibacterial value of Allicin against pathogenic bacteria, *Escherichia coli, Proteus vulgaris* and *Helicobacter pylori* by disc diffusion method. Bioactive compound Allicin was isolated from the garlic. The results revealed that the Allicin compound is potent in inhibiting these bacteria and this work highlights that the inhibitory effect at on par with standard antibiotics.

Key words: Allicin, Garlic, Disc Diffusion Method, Inhibitory effect.

Allicin is a sulphur-containing compound found primarily in garlic (*Allium sativum)*. Allicin isn't actually found in a whole garlic clove. Instead there is a compound called **alliin**. When the garlic is crushed or chopped, the cells break down and the alliin comes in contact with an enzyme also in the clove, called **alliinase**. The alliinase changes the alliin into allicin. This is a protective mechanism for the garlic plant. Various medicinal properties like antidiarrhoeal, antifungal, choleretic and anticancer activity have been attributed to this compound in the traditional system of Indian medicine. The bioactive compound allicin has been reported to be effective in the treatment of digestive tract infection[1].

Bioactive Compound used :

Aqueous extract of allicin (5000 µg/mL) was procured from Allicin International, tested for purity and concentration using the high performance liquid chromatography (HPLC) technique suggested by Lawson *et. al*.[3].

Test Material :

Three bacterial strains viz. *E. coli*, *P. vulgaris* and *H. pylori* were clinically isolated and collected at The Blossom Pharma and Biotech Research Institute Bhopal. These isolates were sub-cultured and preserved in agar slants at 4° C and used for antibacterial studies.

Screening for antibacterial activity :

The antibacterial activity of bioactive compound, allicin, was investigated with the help of sterile antibiotic disc (Himedia) employing disc diffusion method of Dulger and Gonuz[2]. The Allicin liquid was incorporated into sterile disc with 100, 250, 500 and 1000 µl using micropipette. Due precautions were taken to avert the flow of the solvent extract from the outer surface of the disc. Commercially available antibiotic disc - gentamycin, was used as positive control. The discs were placed on the Muller-Hinton agar plates on which the bacteria were inoculated and spread uniformly. The temperature was maintained at 37°C for 24 hrs. The diameter of inhibition zone was measured in mm.

Table-1. Effect of allicin on pathogenic bacteria by Disc Diffusion Method

Pathogens	**Control***	**100**	**200**	**500**	**1000**
Escherichia coli	17±0.5	2±0.5	5±1.0	12±0.5	10±0.5
Proteus vulgaris	18±0.5	3±0.5	4±1.0	12±0.5	7 ±0.5
Helicobacter pylori	15±0.5	4±0.5	4±1.0	13±1.0	12±1.0

**Control = Gentamycin, Value are mean with ± SD (n = 3)*

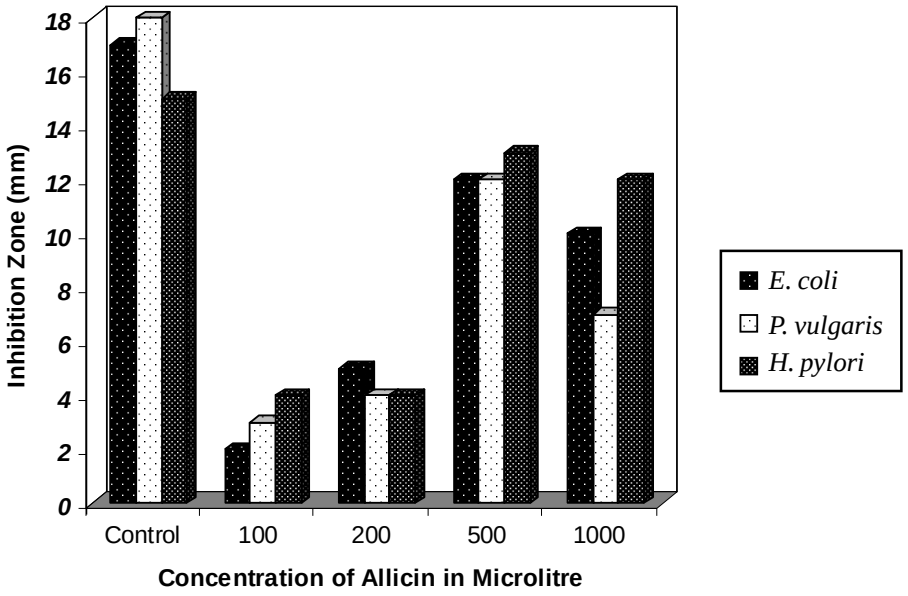

Figure-1. Effect of Allicin on Pathogenic Bacteria by Disc Diffusion Method.

Antibacterial activity of bioactive compound Allicin against *E. coli, P. vulgaris* and *H. pylori* has been presented in Table - 1. Allicin is moderately inhibitive to *E. coli, P. vulgaris* but highly effective to *H. pylori*. It showed highest inhibition (13 mm) at 500 µl concentration against *H. pylori.*

Antimicrobial agents have been used in clinical practice for over 40 years[5]. In the present study, *in vitro* antibacterial activity of Allicin against the pathogenic bacteria showed the vast inhibitory action against *E. coli P. vulgaris* and *H. pylori*. Allicin is a herbal medicine and is used for therapy of Gut infection, abdominal pain and enteritis[4].

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