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## An *in-vitro* study on antibacterial activity of baptisia tinctoria 200 and 30 potencies against salmonella typhi

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### Abstract

Salmonella species are intracellular pathogens, and some of their serotypes can lead to disease. The majority of diseases are brought on by eating food that has been contaminated by human or animal feces, such as by a food service employee in a restaurant. Salmonella serotypes can be categorized into two primary categories: typhoidal and nontyphoidal. Nontyphoidal serotypes are zoonotic and can spread from human to human and from animal to human. They often exclusively affect the gastrointestinal system and induce salmonellosis, whose symptoms can be treated without the use of antibiotics. Homoeopathic medication Typhoid is successfully treated with baptisia tinctoria, an effective medication. Low dilution baptism results in the production of agglutinins, which are a type of anti-bodies to the bac typhosus (Mellon). As a result, it increases the body's natural defenses against the bacillary intoxication's invasion.

**Keywords:** Salmonella typhi, typhoid fever, homoeopathy, baptisia

### Introduction

A genus of rod-shaped (bacillus) Gram-negative bacteria belonging to the enterobacteriaceae family is called Salmonella. Salmonella enterica and Salmonella bongori are the two recognized species of Salmonella. The type species is S. enterica, which is further subdivided into six subspecies and more than 2,600 serotypes. Daniel Elmer Salmon (1850–1914), an American veterinarian, received the name Salmonella.

With cell diameters ranging from 0.7 to 1.5  $\mu$ m, lengths of 2 to 5  $\mu$ m, and peritrichous flagella (located all around the cell body, allowing them to move), Salmonella species are non-spore-forming, primarily motile enterobacteria. They are chemotrophs, drawing energy from organic sources through oxidation and reduction processes. Additionally, they are facultative anaerobes that may produce ATP when oxygen is present ("aerobically"), as well as using alternative electron acceptors or fermentation.

Intracellular infections, such as the Salmonella species, are what sicken people. The majority of infections are caused by eating food that has been contaminated by either human or animal excrement, such as by a food service employee in a restaurant. Both typhoidal and nontyphoidal Salmonella serotypes fall into these two categories. Serotypes that are not typhoidal are zoonotic and can spread from person to person as well as from animal to animal. Salmonellosis, whose symptoms can be treated without antibiotics, is typically the only organ they infect except the gastrointestinal tract. In contrast, nontyphoidal Salmonella can be invasive in sub-Saharan Africa and result in paratyphoid fever, which necessitates prompt antibiotic therapy. Food-borne infection, typhoid fever, and paratyphoid fever are all diseases that are only spread from person to person by typhoidal serotypes.

### Materials and Methods

#### Collection of sample

The study's medications are obtained from any reputable homoeopathic pharmaceuticals

**Method of Collection of Data (Including Sampling Procedures if any):** Conducting the study or obtaining data by disc diffusion method or Kirby-bauer testing method. The drug for conducting the study are Baptisia tinctoria 30 and 200ch.

These are divided into 4 groups A<sub>1</sub>- Baptisia tinctoria 200 A<sub>2</sub>- Baptisia tinctoria 30 ethanol.A<sub>3</sub>- Ethano (negative control).A<sub>4</sub>- Ciprofloxacin 500 mg.

## Methodology

### Antibacterial activity (Kirby-Bauer method)

The Antibacterial Activity Was Performed following Kirby-Bauer method. The muller hinton agar plate was prepared and solidified. After solidification of the plates the salmonella typhi inoculum was uniformly swabbed over the smolted solidified muller hinton Plate. The plate were undisturbed for 5 minutes, after 5 minutes the plates were taken and the sterile disc 6 mm were placed on the appropriate position using sterile forceps. The antibiotic disc (ciprofloxacin 500 mg) were also placed ethanol was used as negative control. After few minutes the different Potencies (200&30) Of Homoeopathic Medicines Was Loaded in the sterile disc under sterile condition. 10 µl of the Medicine Was Loaded in Each Sterile Disc. The Plate were Undisturbed, Later the plates were incubated 37 °C for 24 hours. After 24hrs the result will Observed by measuring the zone of incubation in millimetres.

## Results

The study was done *in vitro* antibacterial study against salmonella typhi with baptisia tinctoria 200 & 30 used as intervension and ethanol and ciprofloxacin 500 mg used as control. The Antibacterial Activity Was Performed following Kirby-Bauer method. The muller hinton Agar Plate Was Prepared and Solidified. After Solidification of the Plates the Salmonella Typhi Inoculum Was Uniformly swabbed Over the Smolted Solidified muller hinton Plate. The Plate Were Undisturbed For 5 Minutes, After 5 Minutes The Plates Were Taken And The Sterile Disc 6mm Were Placed On The Appropriate Position Using Sterile Forceps. Intervension and controls are loaded over the disc.denoted as;

A<sub>1</sub>: Baptisia tinctoria 200

A<sub>2</sub>: Baptisia tinctoria 30

A<sub>3</sub>: Ethanol (negative control)

A<sub>4</sub>: Ciprofloxacin 500 mg

The Plates Were Incubated 37°C For 24 Hours.After 24hrs The Result Will Observed By Measuring The Zone Of Incubation In Millimeters.Here I got 5mm as zone of incubation in Baptisia tinctoria 200 potency.According to this we can concluded that homoeopathic medicine Baptisia tinctoria is effective for Typhoid fever in moderate potency.



**Fig 1:** Antibacterial assay of Homoeopathic potencies of Baptisia tinctoria 30C and 200C by Kirby Bauer method in salmonella typhi.

**Table 1:** Zone of inhibition of Baptisia tinctoria and control by Kirby bauer method

Sl. No	Group	Plate (mm)
1.	Baptisa tinctoria 200	5
2.	Baptisa tinctoria 30	0.1
3.	Ethanol	0

## Discussion

Salmonella species are non-spore-forming, primarily motile enterobacteria with cell diameters between 0.7 and 1.5 µm and lengths between 2 and 5 µm. They also have peritrichous flagella, which are located all around the cell body and can move [5]. They are chemotrophs, which means that they need organic substances to fuel oxidation and reduction reactions. Additionally, they are facultative anaerobes that may produce ATP either by using oxygen when it is present ("aerobically") or by using other electron acceptors or fermentation ("anaerobically") when oxygen is not. The study was done in Sarada Krishna Homoeopathic medical college research lab. *In vitro* antibacterial study against salmonella typhi with baptisia tinctoria 200 & 30 used as intervension and ethanol and ciprofloxacin 500 mg used as control. The Antibacterial Activity Was Performed following Kirby-Bauer method. The muller hinton Agar Plate Was Prepared and Solidified. After Solidification of the Plates the Salmonella Typhi Inoculum Was Uniformly swabbed Over the Smolted Solidified muller hinton Plate. The Plate Were Undisturbed For 5 Minutes, After 5 Minutes The Plates Were Taken And The Sterile Disc 6mm Were Placed On The Appropriate Position Using Sterile Forceps. The Antibiotic Disc (ciprofloxacin 500 mg) Where Also Placed ethanol was used as negative control. After Few Minutes The Different Potencies (200&30) Of Homoeopathic Medicines Was Loaded In The Sterile Disc Under Sterile Condition. 10 µl of The Medicine was Loaded in Each Sterile Disc. The Plate Were Undisturbed, Later The Plates Were Incubated 37°C For 24 Hours. After 24hrs The Result Will Observed By Measuring The Zone Of Incubation In Millimeters. Here I got 5mm as zone of incubation in baptisia tinctoria 200 potency.

## Conclusion

In conclusion, the *in vitro* study on the antibacterial activity of Homoeopathic medicine Baptisia tinctoria against salmonella typhi, demonstrated the in 200th potency shows a potential antibacterial activity. Therefore, further studies are necessary to determine the efficacy of Baptisia tinctoria as an antifungal agent in clinical purpose. So further research should be done for finding new drug that can combat other pathogenic microorganisms that possess similar mechanisms of antibacterial resistance. The development of such drugs could reduce the use of broad-spectrum antibiotics. Homoeopathy treatment is useful, cost effective and preventive mode of treatment. Homoeopathy has always been termed as placebo therapy, but the results of this experiment prove that the ultra-diluted medicines are effective *in-vitro* bacterial testing as evidence-based medicine.

## Conflict of Interest

Not available

## Financial Support

Not available

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