

## Research Article



## Isolation, Characterization of Bioactive Compounds and Evaluation of Anti-Tubercular Activity of *Ricinus communis* Linn.

Dr. Smt. Padma Ladda\*<sup>1</sup>, Dr. Chandrakant Magdum<sup>2</sup> Dr. Smt. Nilofar Naikwade<sup>3</sup>

<sup>1,3</sup>M. Pharm., Ph. D., Department of Pharmacology, Appasaheb Birnale College of Pharmacy, South Shivaji nagar, Sangli-Miraj road, Sangli. 416416. (M.S.) India.

<sup>2</sup>Department of Chemistry, Rajarambapu College of Pharmacy, Kasegaon (M.S.) India.

\*Corresponding author's E-mail: [p\\_ladda@rediffmail.com](mailto:p_ladda@rediffmail.com)

Received: 22-06-2018; Revised: 18-07-2018; Accepted: 28-07-2018.

### ABSTRACT

Tuberculosis is among the most serious infectious cause of global morbidity and mortality. Emergence MDR-TB is posing an increased threat to TB control programs and HIV fuels the TB epidemic. This led to stimulation in the research for the development of new drugs from plant origin showing anti-tubercular activity. *Ricinus communis* Linn. Commonly called as castor (family Euphorbiaceae) reported that it is traditionally used in the treatment of tuberculosis. No scientific evaluation has been conducted to check anti-tubercular activity of *Ricinus communis* Linn. This has inspired us to evaluate the anti-tubercular activity scientifically and identify the phytoconstituents responsible for the same from the plant. In present study, *Ricinus communis* Linn. leaves were selected for the pharmacological evaluation for possible anti-tubercular activity, further isolation and characterization of bioactive compounds from ethanol extract. Total 5 compounds were isolated from ethanol extract and evaluated for In-vitro antitubercular activity against *Mycobacterium tuberculosis* H37Rv strain by NRA (Nitrate reductase assay) method. Most of the tested compounds showed considerable antitubercular activity compared to standard antitubercular drugs like rifampicin and isoniazid. HPTLC, IR, <sup>1</sup>HNMR and GC-MS study of isolated two compounds CF-1 and CF-2 gave satisfactory results for confirmation of the structure as oleic and linoleic acid with significant antitubercular activity. Oleic and linoleic acid with significant anti-TB potential and the most active compounds could be useful as a template for treatment of tuberculosis in future.

**Keywords:** *Mycobacterium tuberculosis*; Castor, NRA, oleic acid; Linolic acid.

### INTRODUCTION

Tuberculosis (TB) is a disease caused by the infection with members of *Mycobacterium tuberculosis* complex, affecting more than ten million people worldwide.<sup>1</sup> It causes ill-health for approximately 10 million people each year and is one of the top ten causes of death worldwide. For the past 5 years, it has been the leading cause of death from a single infectious agent, ranking above HIV/AIDS. There are an estimated 79,000 multi-drug resistant TB patients among the notified cases of pulmonary TB each year. India is also the country with the second highest number (after South Africa) of estimated HIV associated TB cases.<sup>2</sup> The increase in HIV infection cases was the most important factor in the growth in TB prevalence rate. Nowadays, the disease is getting more worrying status since resistant cases are rising every day. Despite this, TB resistant cases can be classified in multidrug resistant TB (MDR-TB, when the resistance to first-line agents is detected, including resistance to isoniazid or rifampin) and extensively drug-resistant TB (XDR-TB, when second-line agent resistance is detected).<sup>3</sup>

In addition to providing effective treatment and reducing mortality, a primary aim of tuberculosis (TB) control programs in countries of high TB incidence is to reduce the transmission from infectious TB cases. HIV co-infection greatly increases the chances of reactivation of latent infection of TB and increases the rapid TB

progression following primary infection or re-infection with TB.<sup>4</sup>

There is a major global health problem attributable to diseases, such as tuberculosis (TB), which are complicated due to drug resistance. This is coupled with the problem of mycobacterial persistence, thus highlighting the need to develop novel TB drugs that are not only active against drug resistant bacteria, but more importantly, kill persistent bacteria and shorten the length of treatment. With the rising prevalence of microorganisms showing resistance to antibiotics, there is an urgent need to develop new antimicrobial compounds.<sup>5</sup>

Due to an increasing demand for chemical diversity in screening programs, seeking therapeutic drugs from natural products, interest particularly in edible plants has grown throughout the world. Botanicals and herbal preparations for medicinal usage contain various types of bioactive compounds.<sup>6</sup> Traditionally the plant is used as laxative, purgative, fertilizer and fungicide etc. Plant possess beneficial effects such as anti-oxidant<sup>7</sup>, antihistaminic, antinociceptive, antiasthmatic, antiulcer, immunomodulatory, antidiabetic<sup>8</sup>, hepatoprotective<sup>9</sup>, antifertility<sup>10</sup>, antiinflammatory<sup>11-12</sup>, antimicrobial, central nervous system stimulant, lipolytic<sup>13</sup>, wound healing, insecticidal and Larvicidal and many other medicinal properties.<sup>14</sup> *Ricinus communis* Linn. seeds are widely used in African folk medicine for the treatment of malaria, fever, stomach-ache, coughs, sexually

