

Comments on Antituberculosis Activity of Bioactive Compounds from *Acacia Nilotica*

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Description

Tuberculosis (TB) is an ancient disease that has plagued humans throughout recorded and archaeology history [1]. The infection remains the cause of a higher morbidity and mortality than any other infection in the world [2]. This is because of its great prevalence in the densely populated developing countries.

According to World health organization, 9 million people fell ill with TB and 1.5 million died from the disease [3].

TB is a treatable and curable disease. Active drug-sensitive TB disease is treated with a standard six-month course of four antimicrobial drugs that are provided with information, supervision and support to the patient by a health worker or trained volunteer. Without such supervision and support, treatment adherence can be difficult and the disease can spread. The vast majority of TB cases can be cured when medicines are provided and taken properly.

TB was almost eradicated from the surface of earth but reemerged as a result of certain factors; mis-management of Tb treatment, poverty, increase in population, man to man transmission, crowded settings such as prisons and hospitals, malnutrition, emergence of MDRTB etc. In 2013, 480,000 people developed multidrug resistant Tb (MDRTB).

Use of Herbal Medicines for the Treatment of Tb

Countries in Africa, Asia and Latin America use traditional medicine (TM) to help meet some of their primary health care needs. In Africa, up to 80% of the population uses traditional medicine for primary health care. In industrialized countries, adaptations of traditional medicine are termed "Complementary" or "Alternative" (CAM) [4].

- In China, traditional herbal preparations account for 30%-50% of the total medicinal consumption.
- In Ghana, Mali, Nigeria and Zambia, the first line of treatment for 60% of children with high fever resulting from malaria is the use of herbal medicines at home.
- WHO estimates that in several African countries traditional birth attendants assist in the majority of births.
- In Europe, North America and other industrialized regions, over 50% of the population have used complementary or alternative medicine at least once.
- In San Francisco, London and South Africa, 75% of people living with HIV/AIDS use TM/CAM.
- 70% of the populations in Canada have used complementary medicine at least once.

- In Germany, 90% of the populations have used a natural remedy at some point in their life. Between 1995 and 2000, the number of doctors who had undergone special training in natural remedy medicine had almost doubled to 10 800.
- In the United States, 158 million of the adult population use complementary medicines and according to the USA Commission for Alternative and Complementary medicines, US \$17 billion was spent on traditional remedies in 2000.
- In the United Kingdom, annual expenditure on alternative medicine is US \$ 230 million.
- The global market for herbal medicines currently stands at over US \$ 60 billion annually and is growing steadily.

In 2007, an independent survey of plants used traditionally in the treatment of Tb in some parts of Northern Nigeria was carried out. A total of 60 plants were collected through oral interview among people who had lived in these communities for at least 25 years. Respondents in the survey belong to the age of 40-75 years (males and females). Professionally they were distributed amongst herbalist, spiritualists, hunters, nomadic pastoralists and farmers.

A total of 15 plant species were identified as useful ethnomedical treatment of tuberculosis and other respiratory infections. The remedies were prepared in various ways, either in form of decoction, infusion or powder and they were also administered in various ways; drinking of decoction and infusion, inhaling/sniffing and steaming [5]. These plants were either used in singles or in combination with other plants for a period of time [5].

Selection Criteria

The 15 plant species collected; *Abrus precatorius*, *Acacia nilotica* (stem bark), *P. stemaria*, *Eucalyptus camaldulensis*, *T. globiferus*, *Boswellia dazielli*, *V. ambigua*, *Ficus thoningii*, *Xylopi aethiopica*, *T. sangiunea*, *Acacia nilotica* (fruit), *E. senegalensis*, *P. filicodes*, *L. sativum* and *Lipia multiflora* were screened for antituberculosis activity. The results of the screening showed that all the plants have varying degrees of antituberculosis activity. Criteria were developed for the purpose of prioritizing or selecting one of the extracts for further bioassay guided fractionation towards isolating the active molecules in the following order;(i) potency of the extract, that is inhibitory effect of the plant extract against test organism (ii) frequency of occurrence of use as an antituberculosis plant extract in the survey area (iii) novelty and chemical/biological components of the plant extract through literature review. The criteria used provided a traceable guide for selection of active extracts for further bioassay guided fractionation that led to the isolation of active compounds.

Acacia nilotica fruit (Linn) Willd ex Del was selected based on the above criteria for further bioassay. The extract by high thorough put fractionation yielded 6 fractions that were confirmed to contain 3 compounds by high performance liquid chromatography (HPLC) and structurally elucidated by nuclear magnetic resonance (NMR) and liquid chromatography mass spectra techniques (LCMS).

The compounds isolated were gallic acid, methyl gallate and catechin with proven antituberculosis and antibacterial effects. The extract of *A. nilotica* was also found to be pharmacologically safe in rat by oral acute toxicity study that showed the lethal mean dose to be 3708.88 mg/kg body weight [6].

Conclusively, the extract of *A. nilotica* has a very good history of use traditionally for the treatment of respiratory related diseases, possesses good antituberculosis effect and could serve as a source for leads for new antibiotics [6].

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