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A review paper on medicinal plants for Typhoid

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Abstract
Typhoid fever is caused by a most harmful organism Salmonella Typhi. It is the major widespread disease which affects both young and adult in their productive ages. More than 60 lakh per year cases of typhoid are noted in the Indian subcontinent. The main reservoir of salmonella typhi is Human beings. Through faecal and oral routes this disease transferred to a human. In India, some cases of Multidrug-resistant typhoid are noted while in Pakistan extremely drug-resistant cases of typhoid are reported from many years. In India recent report shows that ceftriaxone is the first line of drug which is 100% vulnerable to Salmonella typhi. Better hygiene, adequate water management, proper use of antibiotics and appropriate use of vaccination of typhoid will decrease the burden of disease. The primary source of antibiotics is natural products which were obtained from microorganisms. Medicinal plants exhibit significant bioactivities and with the increasing demand of these herbal medicines, the screening of medicinal herbs for the formation of chemical compounds has become a very efficient way of forming antibiotics. From centuries alternative herbal medicine has been used to cure various infections. Natural plants contain phytoconstituents which have similar chemical properties as of synthetic antibiotics. The increasing number of antibiotic-resistant strains has encouraged researchers to discover new methods of treatment for these diseases. Patients who suffer resistance to antibiotics need longer time for hospitalization to recover from that disease. Some studies focus on traditional therapy using plants, not only for typhoid fever but also other infectious and metabolic diseases. Plants contain chemical compounds which may become the active source of antibiotics and they contain an active ingredient which may help to overcome the problem of resistance against many microorganisms. Moreover, these medicinal plants role is promising which act as a potential agent for curing typhoid fever of natural plant sources. In future plants may be the source of effective treatments against typhoid and many more diseases.

Introduction

Typhoid is an infection which is caused by the bacterium Salmonella typhimurium (S.typhi). In human, this bacterium lives in the intestine and bloodstream. It spreads from the faeces of an infected person by direct contact. From the bloodstream, it spreads into other tissues and organs. In developing countries, Typhoid becomes a major public health threat. In 2010 annually cases of typhoid are approximately 13.5 million and 190 000 death cases of this disease were recorded (Yousif, 2018).

In many countries like Europe and North America, the occurrence of typhoid fever is very less, while this disease is endemic in developing countries, such as Africa, Latin America and South or Southeast Asia, the disease is endemic. Annually, the cases of typhoid are around 5,700 in the United States and Indonesia, there are 573 cases per lakh people living in the country. Typhoid is a bacterial infection that causes high fever, diarrhoea and vomiting. This disease is caused by Salmonella typhi or S. paratyphi (Whitaker, Franco-Paredes, Del Rio, & Edupuganti, 2009).

Through infected foods or drinking water, S.typhi or S. paratyphi gets an entry in human's bloodstream and intestinal tracts. Salmonella is the genus belongs to Enterobacteriaceae family. Salmonella Typhi and S.paratyphi appears from the same source and occurred in many developing countries where sewage and water treatment system are very poor. Among the Salmonella typhi, Salmonella paratyphi A, Salmonella paratyphi B and C bacteria which cause similar illness related to Typhoid fever (Jajere, 2019).

In developing countries, Enteric fever becomes a major public health issue nowadays. Many of the cases occurred in Asia particularly in India where proper sanitation is very poor and the cases of Typhoid are approximately 21 million and about 2,16,509 mortality cases appeared per year (Bassey & Izah, 2017). Salmonella Typhi and Paratyphi A cause the undesirable infection. In many developing countries Enteric fever is endemic, In the Indian subcontinent, the death rate is increasing day by day if proper treatment not occurred. including India and, if not treated appropriately, has a mortality rate of 30%. Effectual medical care decreases the death rate as low as 0.5% (FEVER & FEVER, 2015).

The antibiotic treatment was required for S. Typhi infections. cefixime, ciprofloxacin and ceftriaxone are the antibiotics which were used for the treatment of enteric fever. Salmonella Typhi (S. Typhi) and S.paratyphi particularly gained resistance to chloramphenicol, trimethoprim-sulfamethoxazole or ampicillin which were the common drugs used to cure enteric fever (Lakshmi, Ashok, Susmita, & Shailaja, 2006).

Fluoroquinolones, such as ciprofloxacin, has become the choice drug for curing of enteric fever and these drugs are presently used against S.Typhi. More effective drugs are needed to be considered in this situation. Typhoid and paratyphoid disorders were caused by microorganisms. These diseases are being treated by the traditional medical practitioners through herbal preparations and the researcher claim that the advantage of using of herbal medicines is that they are mainly less cost and less harmful than most of the artificial medicines. The herbal medicines are beneficial in many ways. They are intense curative and inexpensive and they are very cost-efficient (Crump & Mintz, 2010).

Presently there is a vast variety of antibiotics available to treat microbial infections, however, there is a noticeable factor that many infectious agents have attained resistance to several of these antibiotics. Many countries in the areas like Malaysia, Indonesia, Brunei, and Thailand they use the medicinal herbs for many years and these plants offer considerable curative aspects (Laxminarayan et al., 2013). Over thousands of year ago, the Indian natural medicine system has made Ayurvedic formulation. Ayurvedic formulations are mostly made from medicinal plants. The plant parts which were used for the preparation of Ayurveda are fruits, root, flower, stem and leaves. By using this herbal/Ayurvedic preparation various

infectious, as well as non-infectious diseases which are caused by virus, bacteria and fungi, are efficiently cured (Abbas & Sifat).

The commonly used medicinal plant Paullinia pinnata Linn which belongs to the family (Sapindaceae). This medicinal herb is mostly used for the treatment of enteric fever in the West Region of Cameroon. Cefixime is being used against typhoid causing bacteria i.e. Salmonella and it was found that the Propolis acts synergistically with cefixime and enhanced the efficiency of antibiotic and in combined therapy reduce its effective dose (Kalia, Kumar, & Harjai, 2016).

Harungana madagascariensis L is mostly used medicinal plant which is important for the treatment of malaria and typhoid fever. The anti- salmonellae study showed that H. madagascariensis has a promising anti-salmonellae effect and capability to show an effectual treatment against salmonella, including typhoid fever.

Medicinal plants and vegetables which are used commonly which not only contain essential nutrients but also include secondary metabolites such as; alkaloids, flavonoids, glycosides, terpenoids and phenolics (Abbas & Baig; Abbas & Nisar). The Glycyrrhiza glabra and Azadirachta indica are essential locally used medicinal herbs around the world. For the treatment of typhoid fever, Many chemical components of plant were extracted for antimicrobial activity against Salmonella typhi, and S. paratyphi (Kumari, Khan, & Gupta, 2020).

In recent past, many studies have been directed towards medicinal plant and some parts of the plant are efficient for the treatment of many diseases, thus the root of Vitex doniana, the leaf of Cassia tora, the bark of Alstonia boonei, leaf of Stachytarpheta jamaicensis, and also leaf of Caricapapaya are beneficial for effective treatment against fever, particularly typhoid fever which have been described by traditional medical practitioners (Zaki & Karande, 2011).

For typhoid management, several studies are trying to bring their study to medicinal herbs or medicinal plants. Particularly in destroying Salmonella typhi bacteria, many plants in Indonesia can be extracted and then used as an antibacterial agent. The previous study evaluated that Thalassia hemprichii possess many effective compounds which have the potential to be antibacterial and antioxidant. Researches on medicinal plants also describe that the antibiotics have an antibacterial activity which was used for medicinal therapy to cures typhoid (Abbas & Bano; Zaman et al., 2018).

As compared to other medicinal herbs, in Azadirachta indica the inhibition zone of acetone and ethanolic stem bark extracts showed more advantageous results, when compared with the many antibiotic such as amoxicillin, cotrimoxazole, cefotaxime, ceftriaxone, ciprofloxacin, and chloramphenicol and their diameter zone range from 18-35 mm and 15-31mm (Bairy & Abhinav, 2011; R. T. Khan, Riaz, Abbas, Batool, & Abbas).

Roger et al. (2015) describe many effective plants which have antimicrobial activity against Salmonella, one of these effective plants is Bidens pilosa. Against Salmonella bacteria, Bidens pilosa has antibacterial activity. Bidens pilosa contain many chemical components which are flavonoids, phenylacetylene, alkaloids, steroids, triterpenoids and tannins, saturated carbohydrate, aliphatic carboxylic acid, acetylenic 38 hydrocarbons, phenols, chalcons, flavonols, porphyrines (Abbas & Sultana; Whitney, Roger, Teyssier, Rey, & Respaut, 2015).

After using chloroform the leaf extract of Carica papaya has the strongest antibacterial activity potential against Salmonella. The chemicals constituent of Carica papaya with ethanol extracts are alkaloids, saponins, flavonoids and glycosides which contains magnesium, potassium, calcium and iron (Dabanka, 2013; S. Sabir et al., 2020).

To find the stronger antimicrobial activity against Salmonella typhi shows that Mamordica chantia has the therapeutic potential as a typhoid fever treatment in In vitro investment of efficacy of some antibiotics and Mamordica chantia extract. When compared with Ampicillin, Chloramphenicol, gentamycin, tetracycline and other types of antibiotics.

Through screening and evaluation of medicinal plants, the formation of newly discovered medicine become possible and these medicinal herbs are used for curing of many diseases. Various microbial infections are main causes of disease day by day and medicinal herbs are usually used as traditional healers in treatment. which have stronger antimicrobial properties (Tadeg, Mohammed, Asres, & Gebre-Mariam, 2005).

Glycyrrhiza glabra and Azadirachta indica are also traditionally used medicinal plants which are effective against salmonella typhi and consist of effective antibacterial activity (Abbas & Rani). Glycyrrhiza glabra which was commonly known as Licorice and another name is sweet wood which is related to family Papilionaceae.G.glabra consist of chemical compound included glycyrrhizin, Flavonoids and many other chemical compounds (Abbas & Fatima).

Another medicinal herbs Azadirachta indica, belonging to family Meliaceae (mehogani family) which is also known as Neem. The chemical constituents like azadirachtin, flavonoids, terpenoids and ketones are mostly present in Neem seed (Roy & Saraf, 2006).

Many pharmacological action, phytochemical components and medicinal use through millions of years of licorice which was managed in 2012. The researcher also noted that Licorice is also used as a medicinal plant. From the root of licorice glycyrrhizin, terpenoid and other chemical component were extracted.

For major body diseases at any age group, Glycyrrhiza glabra become more preventive and more curative medicine. The Neem plant and Licorice are medicinal plants helps in the treatment of many diseases. Many treatments and applications of Traditional medicine which vary from country to country and region to region. It is also known as alternative or complementary medicine (CAM).

In Africa, more than 80% of peoples depend on medicinal plants for their earliest health care. About 59 to 60% of the children in Africa infected from malaria which has high fever were used to be cured with the help of medicinal plants at home. (WHO, 2003). Plants are the main source of chemical compounds which include different types of chemical components like alkaloid, flavonoids, tannins, terpenoids which contain certain antibacterial functions. Due to the formation of resistance of drug in human beings by commonly used antibiotics has required the discovery of new antibacterial substances with the help of plants material. (45). Nowadays, it has been calculated that plant components provided the models relatively for 50% Western drugs.

The number of antibiotic resistance for the treatment of typhoid is relatively noted to be very less Since 2001, particularly in South Sulawesi (tetracycline 1.34%, ampicillin 1.87%, Chloramphenicol 1.04%, Ciprofloxacin 0.11%, MDR 1.21%) respectively. The antibiotic resistance of typhoid increases in 2007 to 8.13%, 7.96%, 7.84%, 3.90%, 6.83%. Despite this increase, Chien Shun (2014)noted that as compared to Bangladesh, Taiwan, and Vietnam the level of antibiotic resistance for Salmonella typhi in Indonesia is still relatively low.

Medicinal plants have been selected for many years in our country as a traditional system. These medicinal plants play a vital role in the initial health care. According to the World Health Organization (WHO) that approximately 80% of the inhabitant depend mainly on medicinal plants for their initial health care. Plant compound has an effective role in the health care systems. Many researchers found that from 90 plant species more than 119 chemical substances are derived which are included as effective medicine nowadays and uses in many countries. From these 119 drugs, 74 % drugs were produced with the help of isolation of chemical constituent from medicinal plants which were used in traditional herbs as a result of chemical studies (R. T. Khan, Gerdezi, Habib, & Abbas, 2019; Qayytum et al., 2020; S. M. Sabir et al., 2019).

In developing world medicinal plants has continued its popularity in all areas and its use is fastly spreading in industrialized countries day by day (A. Khan et al., 2014).

Furthermore, the advantage of herbal medicine is that it contains chemical components which inactivate another substance when added with it. Furthermore, these complementary compounds make the plant safe and efficient and make the plant higher rank from other components (Abbas & Rehmat). The present studies describe the efficiency of many medicinal plants as the formation of medicine against Typhoid fever.

Conclusion:

Typhoid is a common disease caused by Salmonella Typhi, become the main problem in many developed countries. The antibiotics are the main option used to cure of this disease. Ceftriaxone, ciprofloxacin, cefixime are commonly used antibiotics for the treatment of typhoid. Vaccination is also the treatment option for typhoid fever. Considering the side effects of the allopathic drugs on human health, it's necessary to develop the alternate route to develop the drugs from plants. This study showed that the medicinal plants play important role in the treatment of typhoid fever. Medicinal plants have broad-spectrum antibacterial activity against bacteria. Recent work suggests that medicinal plant play an efficient role for treatment of typhoid fever. By applying these herbal extract typhoid and anti-typhoid activities become controlled or prevented.

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