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A Review on Phytochemical Medicinal Plants Against Pathogenic Bacteria in South East Ethiopia

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Abstract
This review stated that plants are valuable sources for new compounds and should receive special attention in research strategies to develop new antimicrobials urgently required in the near future. The importance of medicinal plants and traditional health systems in solving the health care problems of the world is gaining increasing attention. Because of this resurgence of interest, the research on plants of medicinal importance is growing phenomenally at the international level, often to the detriment of natural habitats and protects populations in the countries of origin. In Ethiopia since many years the peoples are using plants as the medicine. The plant contains various phytochemical, which would act on the pathogenic microorganism and hinder their growth. The scanty of review are available on antibacterial activity of medicinal plants in Ethiopia, but still we need to explore many antimicrobial compounds from plants. These kinds of the review are baseline information for the development of new drugs, which is bench mark in science. Commercially many synthetic drugs are available in market, but microorganisms are resistant to many antibiotics. So research should need to develop new synthetic compound from the plant source.
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INTRODUCTION

1.1. Traditional medicinal plants

The use of medicinal plants to get relief from illness can be traced back over five millennia to written documents of the early civilization in China, India, and the Near east, but it is doubtless on an art as old as mankind (Mohsenzadeh, 2007). Natural products perform various functions and many of them have interesting and useful biological activities. More than 35,000 plant species are being used in various human cultures around the world for medicinal purpose (Philip *et al*., 2009). The potential of higher plants as source for new drugs is still largely unexplored. Among the estimated 250,000 - 500,000 plant species only small percentages have been investigated (Abebe Demissie, 2001). Phytochemicals and the fractionation submitted to biological and pharmacological screening is even small (Ramor and Ponnampulam, 2008). Historically pharmacological screening of natural compounds or synthetic origin has been the source of enumerable therapeutic agents (Semere, 2006). Random screening as tool in discovering new biological active molecules has been most productive in the area of antibiotics (Penna *et al*., 2001). Even now, contrary to common believes drugs from higher plants continue to occupy an important niche in modern medicine (Kokoska *et al*., 2002).

Even today, it is common for people living in rural and urban areas to treat some common ailments using plants available around them (Adams and Moss, 2008). The continued dependency on herbal medicine along with the side effect of modern medicine is largely conditioned by economic and cultural factors (Akch et *al*., 2007). In addition to these factors, the fact that modern medical services are in accessible to the vast majority of the populations due to their costs made herbal medicines more acceptable. The problem of ensuring equitable distribution of modern health care has become more serious, as the gap between supply and demand has continued widen. Medicinal plants represent a rich source of antimicrobial agents on a global basis; at least 130 drugs, all single chemical entities extracted from higher plants are modified further synthetically and currently in use, but some of them are not being made synthetically for economic reasons (Ramor and Ponnampulam, 2008). Bacterialand fungal infections were some of the most serious global health issue. Numerous biologically active plants have been discovered by evaluation of ethno pharmacological data and these plants may offer the local population immediate and accessible therapeutic products (Bruck *et al*., 2004). Medicinal plants are important sources of traditional medicine for millions of people and additional inputs to modern medicine in terms of exploring and producing new drugs to meet the need for the over grown populations of the planet (Celikel and Kavas, 2008).

Several herbs were known to possess medicinal value including anti-microbial properties (Jaturapronchai, 2003). The extensive use of synthetic drugs, excessive unwanted medication was cause increasing side effects that produced by the administration of drugs is much more serious problem than that of the disease itself (Babu *et al*., 2010). Herbs, shrubs, higher plants and climbers remain as an important and reliable source of potentially useful chemical compounds for direct use as drugs and to synthesize prototypes for synthetic analogous in terms

of drug efficacy (Dewanjee *et al*., 2007). The use of plant extract (phytochemicals) believed to constitute the major parts of therapy apart from their use in the traditional systems of medical care at the local level (Desta, 2003). Medical plants currently used in the production of modern drug as source of direct therapeutics agents, as raw material for the manufacturing of complex semi synthetic compounds and as taxonomic markers in the search of new compounds (Suppakul *et al*., 2003). In Ethiopia, different plant parts have used as a source of traditional medicine from antiquity to solve different health problems and human sufferings. Due to its long period of practice and existence, traditional medicine has become an integral part of the culture of Ethiopian people (Haile, 2005).

The majority of Ethiopian rural areas were depends on the traditional medicinal plants as their only source of health care due to the lack of adequate clinics, hospitals, volunteers health care professionals, absence of vehicular roads and expensiveness of modern medicines and also due to relatively few veterinarians and shortage of other facilities, traditional medicinal plants are the only choice to treat many ailments in developing countries like Ethiopia (Suppakul *et al*., 2003).

1.2 Ethno Botany in Ethiopia

Ethno botany is the study of the interaction between plants and people, with a particular emphasis on traditional tribal cultures. Ethno botany tries to find out how people have traditionally used plants, for various purposes, from time immemorial. The country uses plant based traditional medicine by indigenous knowledge as their major primary health care system (Suppakul *et al*., 2003). People use medicinal plant parts to treat human or livestock ailments while they are fresh, dried or both. The study of Gidey (2010) revealed that some of medicinal preparations were used while they are fresh or in dried state, as these plants are used in both forms, the chance of using the medicinal plants under different seasons of the year is increased .Medicinal plants are also on sell in domestic markets; for instance, it accounts for an average of 5000 plant species (40%) of the medicine market in China (Medhin, *et al.,* 2001) and in South Africa, between 400 to 550 plant species are currently sold for use in traditional medicine (Boadker, 2005). The country uses plant based traditional medicine by indigenous knowledge as their major primary health care system (Dawit, 2001).

Traditional knowledge of medicinal plants and their use by indigenous healers and drug development in the present are not only useful for conservation of cultural tradition and biodiversity but also for community health care and drug development in the local people. The current account of medicinal plants of Ethiopia, as documented for National Biodiversity Strategy and Action Plan by (Tesema, 2002), shows that about 887 plant species were reported to be utilized in the traditional medicine. Among these, about 26 species are endemic and they are becoming increasingly rare and are at the verge of extinction. Therefore, detailed information on the medicinal plants of Ethiopia could only be obtained when studies are undertaken in the various parts of the country where little or no botanical and ethno botanical explorations have been made in Ethiopia (Fassil Kibebew ,2001).

1.3 Need for new antimicrobial compounds

Increasing demand for new drugs, over use and miss use of antibiotics have contributed to the development and spread of the resistant microorganisms to the treatment (Elgayyar *et al*., 2001). Due to this factor researchers are increasingly turning their attention to natural products looking for new leads to develop better drugs against cancer, as well as viral and microbial infection (Philip *et al.,* 2009). This suggests that the strength of biological activities of a natural product is dependent on the diversity and quantity of a natural product. Thousands of plant products with inhibitive effect on the microorganisms have shown in vitro activity and many of they have been used for centuries by various cultures in the treatment of different diseases. However these plants are used at a very high concentration with serious side effects on the patients. So, this requires the evaluation of the concentration against the standard antibiotics that have been ready on a market (Balagojevick*et al*., 2006). In recent years, pharmaceutical companies have spent a lot of time and money in developing natural products extracted from plants, to produce more cost effective remedies that are affordable to the population.

1.4 Kalanchaoe pinatum

Kalanchoe pinnata (syn. *Bryophyllum calycinum), Bryophyllum pinnatum*, also known as the patharkuchi, Air Plant, Life Plant, Miracle Leaf, Goethe Plant, the Katakataka (Filipino) and also called "Wonder of the World" in the English speaking Caribbean.is a succulent plant native to Madagascar. It is distinctive for the profusion of miniature plantlets that form on the margins of its leaves, a trait it has in common with the other members of the *Bryophyllum* section of the *Kalanchoe* genus (Muzitano *et al*., 2008). Reportedly, the name came from the Chinese name for one of the species. This Chinese species is thought to have been either *Kalanchoe ceratophylla* or *Kalanchoe spathulata*. In these plants, new individuals develop vegetatively as plantlets, also known as bulbils or gemmae, at indents along the leaves. These young plants eventually drop off and take root. No males have been found of one species of this genus which does flower and produce seeds, and it is commonly called,

the Mother of Thousands (Baker, 2008). The main plant chemicals found in *kalanchoe* alkaloids, triterpenes, glycosides, flavonoids, cardienolides, steroids, bufadienolides and lipids. The leaves and bark is bitter tonic, astringent to bowels, analgesics, carminative and useful in diarrhoea and vomiting. Antiulcerinclude: arachidic acid, astragalin, behenic acid beta (Nayan *et al.,* 2011).

1.4.1. Botanical description

Most members of the family are remarkable for their xeromorphic structure, particularly the occurrence of water storage tissue in the leaf and stem. Some are believed to be capable of absorbing water directly from the air by special hairs, epidermal cells or adventitious roots. Members of this family are not considered as important crop plants, but they are used for horticulture; many members have an unusual attractive appearance, and are quite hardy, typically needing only minimal care.Succulent glasshouse herbs or subshrubs, with interesting foliage and flowers (Taye *et al*., 2011).

Usually robust erect plants; leaves opposite, fleshy, sessile or stalked, varying from entire to crenate and pinnatifid; flowers yellow, purple or scarlet. The leaf usually centric or intermediate between dorsi-ventral and centric; typical palisade tissue rare, opposite, or alternate, estipulate. Hairs are usually infrequent, but several kinds recorded; bladder-like hairs sometimes described as epidermal cells; glandular hairs with short or long stalks and which sometimes secrete mucilage; three armed, pointed hairs; biseriate hairs forming a cobweb-like surface to the leaf, together with transitions between these and glandular shaggy types(Megawati *et al.,*2013).

1.4.2. Ethno medicinal or traditional uses

The juice of *Kalanchoe* is used for the local treatment of periodontal disease, cheilitis, cracking lips in children, bruises, wounds, boils in Brazil; insect bites in India and Srilank ;ear infection, dysentery in Nigeria; fever, abscesses, coughs, skin diseases and cytotoxic activity, cholera, urinary diseases, whitlow in Africa and Asia; tissue injuries in Taiwan, crushed leaves are rubbed on or tied to the head to bring relief for headache in Africa; rheumatism in Indonesia; treatment of pulmonary infection.

The antibacterial activity of the methanol extract of *K. farinace* was demonstrated against Gram-positive bacteria including multiresistant *Staphylococcus strain*. Different extracts from the leaves of *Bryophyllum pinnatum* and *K. crenata* were screened for their antimicrobial activities. The leaves were extracted by different solvents viz.water, methanol, local solvents such as palm wine, local gin (Seaman's Schnapps 40%alcoholic drink,) and "omi ekan-ogi" (Sour water from 3 days fermented milled maize). Also one of the methods to prepare an extract was to squeeze raw juice from the leaves. All extracts were lyophilized. Then they were tested against different Gram-negative, Gram positive organisms and a fungus using Agar well diffusion and broth dilution methods were used to determine the minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC); this experiment showed different antimicrobial activities against certain strains. The n-hexane, carbon tetrachloride and chloroform soluble fractions of a crude methanol extract of the whole plant of Bryophyllum daigremontianum were subjected to antimicrobial activity and brine shrimp lethality bioassay. The carbon tetrachloride soluble partition ate of the methanol extract exhibited significant antimicrobial activity and the most potent cytotoxic activity (Martinez, 1996.).

1.5. Solanum incanum

Solanum with approximately 1,500 species is the largest genus in the Solanaceae and includes economically important species such as the tomato, potato, and eggplant. In part due to its large size and tropical center of diversity, resolving evolutionary relationships across *Solanum* as a whole has been challenging. *Solanum incanum* contains solanine which is a steroidal alkaloid with pharmacological activity against many bacteria. Solanine was a bitter gluco-alkaloid first isolated from Solanum *nigram*. The alkaloids are mainly concentrated in unripe fruits and in green potatoes and disappear in ripening process.

The part of the plant collected are the unripe fruit of *Solanun incanum* which contains the active component; glycosidal alkaloid called Solanine(Lin *et al*., 2000). *Solanum incanum* L.is used traditionally for the treatment of different infections. The plants are used in tropical Africa, including Ethiopia, as traditional health care for treatment of diseases such as sore throat, stomach-ache, malaria, common cold, hypertension, diabetics, headache, painful menstruation, liver pain and pain caused by onchocerciasis, pneumonia and rheumatism(Regassa *et al.,* 2000).

1.5.1 Descriptions of the plant

Solanum incanum was a native African *herb* which belongs to family Solanaceae. It was a delicate perennial plant often cultivated as an annual crop). It grows 1–3 m high with simple leaves, ovate, elliptic, 2.5–12 cm long and 2.5–8 cm wide. The fruit is fleshy, less than 3 cm in diameter on wild plants but much larger in cultivated forms. Botanically the fruit is classified as a berry and contains numerous small, soft seeds which are edible, but are bitter because they contain an insignificant amount of nicotinoid alkaloids. The raw fruit have a bitter taste but becomes tender when cooked and develops a rich complex flavor . The globose fruits are bright orange in color. It is herb with spines on the stem, leaves, stalks and calyces, and with velvet hairs on the leaves. Flowers are in clusters along the branches corolla pale to deep blue, purple, occasionally white. Fruit is spherical, green,

often striped or mottled with white, turning yellow to orange brown when ripe.

1.5.2. Ethno medicinal uses

Sore throat, stomach-ache, head-ache, painful menstruation, liver pain and pain caused by on chocerciasis, pneumonia and rheumatism are treated with *Solanum incanum* throughout tropical Africa. For these purposes, leaf, root and fruit decoctions are drunk, roots are chewed and sap swallowed, whereas leaf paste, root infusions and pounded fruits are applied externally or rubbed into scarifications. Leaf sap is used for washing painful areas, and ash of burnt plants mixed with fat applied externally to treat pain. For relief of tooth-ache a root infusion is used as mouth wash, fruit or root is rubbed on the gums or smoke of burning seeds is inhaled. Another wide spread ethino medicinal use of *Solanum incanum* is in the treatment of venereal diseases (Asfaw *et al.,* 2000).

Antibacterial activity studies

Ethno botanical studies revealed that a wider range of Ethiopian plants are being used in the treatment of wounds and other diseases in the traditional health care system of the country (Giday *et al,*, 2007; Teklehaymanot *et al.,* 2007; Assefa *et al.,* 2010; Teklehaymanot *et al.,* 2010). Crude extracts of Ethiopian plants and others used elsewhere (Tadege *et al.,* 2005; Bayoud *et al.,* 2007; Ermolaeva *et al.,* 2011) revealed strong antibacterial activities indicating that these plants can serve as sources of effective drugs against wound-causing bacteria. The crude extracts of *A.gummifera, S. guineense*, showed good antimicrobial activities against a diarrhea causing bacterial pathogens. Thymus species are well known for their medicinal importance because of their biological and pharmacological properties. The substances extracted from thyme especially the phenolic components *thymol* and *carvacrol* showed antibacterial activity against gram-positive and gram-negative bacteria due to their effects on the bacterial membrane (Asfaw *et al.,* 2000). Because of its antibacterial activity, thyme is also useful as an antiseptic for the urinary tract, mouth and skin wounds. Tea and decoction prepared from thyme have successfully been used against gastro-intestinal complaints. Thyme oils are remedies to expel intestinal parasites, particularly hookworm. Thyme *schimperi* (locally called Tosign) was found to have significant antioxidant activity and food preservative effect (Hailemariam and Emire, 2013). However, it is not well investigated on the modern scientific grounds.

In Ethiopia, roots and leaves are the most widely utilized plant parts. According to Tizazu (2005), roots are the most used plant part (35.7%), followed by leaves (32.9%). Moreover, the study explained that 68.6% of herbal remedies were applied orally and 31.4% were applied externally. Further, swelling, rheumatism, spasm, snakebite, tooth pain and eye pain were among the human ailments treated with medicinal plants. However, the finding of Debela, *et al.,* (2004) indicated that leaves are the most widely used plant part (33%) followed by roots (28%). Crude preparations of four types of traditional medicinal plants like *A.afra* (5%), *V.amygdalina* (7%), *L.sativum* ((2%) and *C.copticum* (10%) were collected from local markets in Ethiopia and assessed for their antimicrobial activity against some food borne pathogens like *B.cereus, S.aureus, S.boydii, S.flexineri, S.typhimurium, and E.coli* and found that promising activities (Ashebir and Ashenafi, 19 activity against *E.coli, K.pneumoniae* and *S.flexneri*. Due to rapid development of resistance and high cost of the new generation antibiotics lots of efforts are being made to discover new antimicrobial agents from different sources A number of medicinal plank2ts with significant antimicrobial activity have also been reported by different workers (Desta,1993;Ashebir and Ashenafi, 1999; Geyid *et al.,* 2005). Another study revealed that extracts from *J.abysinicum* showed promising activity against S.*aureus, P. aeruginosa and S. pyogenes* isolated from human patients.

Antimicrobial activity of nine medicinal plants *Achyranthes aspera, F.caria, M.parviflora, Vernonia* species*, S.hastifolium, C.aurea, N.tabacum, Z.spina-christi, C.macrostachys* were traditionally used against mastitis, wound and gastrointestinal tract complication results showed promising results followed by Taye, (2011) studied the plants *C. aurea, C. macrostachyus, N. tabacum, A. aspera* and *Vernonia* species (local name Alakit) showed promising activity against some of the common microorganisms of veterinary importance. Indigenous knowledge and stakndard practices for human and livestock disease control, of three ethnic groups (Aari, Maale and Bena-Tsemay) in South Omo Zone of Southern Nations, Ethiopia was conducted taking statically analysis on 91 plants and his study found that most of the plants are playing a significant role in meeting the primary health care needs of the three ethnic groups. The methanolic extracts of A.vera, *Z.officinale* and *V.major* medicinal plants were evaluated for their antibacterial activity on the Gram negative (*S. typhimurium* and *E. coli*) and Gram positive (*S. aureus* and *S. agalactia*) bacteria. The results showed that the compounds from *A. vera* and *Z. officinale* medicinal plants have an activity against the selected Gram-negative and Gram-positive bacteria (Robbers *et al.,* 1996).

1.6. General over view common human bacteria pathogens

1.6.1. Escherichia coli

Escherichia is the genus of the *Entero bacteriaceae* Family and *E.coli* is the species of the genus *Escherichia.* It is a catalase- positive, oxidase- negative, Fermentative, short, Gram- negative, non-spore forming rod (Adams and Moss, 2008). Genetically, *E.coli* is very closely related to the genus *Shigella*, although characteristically it

ferments the sugar lactose and is otherwise far more active biochemically than *Shigella* species (Parish and Davidosn, 1993). Late lactose fermenting, non- motile, biochemically inert stains of *E.coli* can be difficult to distinguish from *Shigella*. *E.coli* can be differentiated from other members of the *Entero bacteriaceae* on the basis of a number of sugar fermentation and other biochemical test (Sakagami *et al*., 2007). *E. coli* is the best-known coli form, its use as a focus for laboratory studies. It is called the colon bacillus and sometimes regarded as the predominant species in the intestine of humans. Because of its prominence as a normal intestinal bacterium in most humans, *E.coli* is one of the indicator bacteria to monitor fecal contamination in water, food, and dairy products because they are present in larger numbers, can survive in the environment, and are easier and faster to detect than true pathogens (Mohsenzadeh, 2007). Although many of the strains are not infectious, some have developed greater virulence through plasmid transfer, and others are opportunists. *E. coli* is the predominant cause of both community and nosocomial urinary tract infection (Behailu, 2006).

1.6.2 Staphylococcus aureus

Staphylococcus aureus is the species of the genus, *Staphylococcus*, which are Gram positive, facultative anaerobic, non-motile and non-spore forming, catalase positive, coagulase positive cocci that divide in more than one plane to product irregular clusters of cells (Adams and Moss, 2008). *S. aureus*is a common case of skin and wound infection in humans and a significant proportion of the population also carries the organism as a commensally of the skin and nose. It is therefore frequently introduce into food by food handlers and indirectly by equipment. *Staphylococcus* is quite resistant to desiccation and high-osmotic conditions. These properties facilitate their survival in the environment, growth in food, and communicability. Pathogenic *Staphylococci* are usually opportunists and cause illness in compromised hosts. *S. aureus* is the most pathogenic species. It causes skin and tissue infections and can invade many other organs and some strains produce toxins (Roberts and Greenwood, 2003). The major diseases are abscesses, osteomyelitis, endocarditis, toxic shock syndrome, bacterial pneumonia, common food poisoning, and other diseases. Food poisoning strains of *S. aureus*produce a heat-stable enterotoxin that has a direct effect upon the central nervous system (Celikel and Kavas, 2008).. *S. aureus* remains an important pathogen, particularly among people who are hospitalized and some of these Staphylococci are resistant to penicillin (Mohsenzadeh, 2007).

1.6.3 Klebsiella pneumoniae

Klekbsiella pneumoniae is a Gram-negative, non-motile, encapsulated, lactose fermenting, facultative anaerobic, rod shaped bacterium found in the normal flora of the mouth, skin, and intestines. It is clinically the most important member of the *Klebsiella* genus. As a general rule, *Klebsiella* infections tend to occur in people with a weakened immune system. Many of these infections are obtained when a person is in the hospital for some other reason (a nosocomial infection). The most common infection caused by *Klebsiella* bacteria outside the hospital is *pneumoniae*. New antibiotic resistant strains of *K. pneumoniae* are appearing, and it is increasingly found as a nosocomial infection. *Klebsiella* ranks second to *E. coli* for urinary tract infections in older persons. It is also an opportunistic pathogen for patients with chronic pulmonary disease, enteric pathogenicity, nasal mucosa atrophy, and rhino scleroma. Feces are the most significant source of patient infection, followed by contact with contaminated instruments. *Klebsiella pneumoniae* usually infects a patient who has had a bout of flu and colds. The virus infection provides the bacteria an opportunity to infect the respiratory system and lead to an infection. *Klebsiella pneumoniae* is similar to the symptoms of colds (Roberts and Greenwood, 2003).

1.6.4 Pseudomonas aeruginosa

The genus *Pseudomonas* contains a very diverse group of bacteria that are aerobic, oxidase-positive, catalase; positive, non- fermentative. Gram-negative rods, that is motile with polar flagella (Roberts and Greenwood, 2003). Some species attack sugars by oxidation and produce a diffusible fluorescent pigment; others produce alkali. The psychrotrophic strains are low temperature spoilage organisms of fresh egg, fish, meat and milk and are found widely in the soil, water and vegetation (Roberts and Greenwood, 2003). *P. aeruginosa* commonly causes eye and ear infections as well as wound infections in burned body. It can sometimes be found in food, soil and water and should regard as a hygiene parameter; it is not thought to cause gastrointestinal illness. *P.aeruginosa* is able to grow and survive in almost any environment, soil, water and vegetation. This is due to their metabolic diversity and the production of side rehire and fluorescein by some of the most dominant members of the group. *P. aeruginosa* is one of such members that are not only dominant in different habitats, but also associated with community- acquired and nosocomial infection in immune-compromised patients and hospitals. As a result, the pathogen is considered as an opportunist. One of the most striking characteristics of *P. aeruginosa* consists in its low antibiotic susceptibility. This low susceptibility is attributable to a concerted action of multi drug efflux pumps with chromosomally-encoded antibiotic resistance genes and the low permeability of the bacterial cellular envelopes. Besides intrinsic resistance, *P.aeruginosa* easily develops acquired resistance either by mutation in chromosomally encoded genes, or by the horizontal gene transfer of antibiotic resistance determinants (Srikumar *et al*., 1998).

1.6.5. Salmonella typhi

The *Salmonellae* belong to a genus of the family *Enterobacteriaceae*. They are gram negative; facultative anaerobic, non-spore forming rods and motile forms have peritrichous flagella. They are usually catalase positive, oxidase negative and reduce nitrates to nitrites (Adams and Moss, 2008). *Salmonellae* are recognized as a major cause of enteric fever and gastroenteritis. Many foods, particularly those of animal origin, have been recognized as vehicles for transmitting the organisms to human and to the food processing and preparation environment (Behailu, 2006). *Salmonellae* are known to cause disease in humans, animals, and birds (especially poultry) worldwide. The two major diseases caused by *Salmonella* spp. are gastroenteritis and typhoid fever (typhoid and paratyphoid fevers) in humans. Typhoid fever is a life threatening illness caused by the bacterium S. *typhi* (Celikel and Kavas, 2008).

Typhoid fever is still common in the developing world, where it affects about 21.5 million persons each year. It lives only in humans; Persons with typhoid fever carry the bacteria in their bloodstream and intestinal tract. In addition, a small number of persons, called carriers, recover from typhoid fever but continue to carry the bacteria. Both ill persons and carriers shed *S. typhi* in their feces (stool) (Kumaraswamy *et al*., 2008). The protean manifestations of typhoid fever make this disease a true diagnostic challenge. The symptoms include prolonged fever, headache, malaise, diffuse abdominal pain, muscle pain and constipation. Untreated, typhoid fever is a grueling illness that may progress to delirium, obtundation, intestinal hemorrhage, bowel perforation, and death within one month of onset. Survivors may be left with long-term or permanent neuropsychiatric complications (Talaro and Talaro, 2002). *S. typhi* has been a major human pathogen for thousands of years, thriving in conditions of poor sanitation, crowding, and social chaos. Antibacterial activity of neem oil was found to show 92% susceptibility of *P.aeruginosa, S.pyogenes, E. coli,* Proteus group and K. pneumoniae (Jahan *et al.,* 2007).

Conclusion

The review stated that plants were valuable sources for new compounds and should receive special attention in research strategies to develop new antimicrobials urgently required in the near future. The importance of medicinal plants and traditional health systems in solving the health care problems of the world is gaining increasing attention. Because of this resurgence of interest, the research on plants of medicinal importance is growing phenomenally at the international level, often to the detriment of natural habitats and protects populations in the countries of origin. In Ethiopia since many years the peoples are using plants as the medicine. The plant contains various phytochemical, which would act on the pathogenic microorganism and hinder their growth. The scanty of researches are available on antibacterial activity of medicinal plants in Ethiopia, but still we need to explore many antimicrobial compounds from plants. These kinds of the review are baseline information for the development of new drugs, which is bench mark in science. Commercially many synthetic drugs are available in market, but microorganisms are resistant to many antibiotics. So research should need to develop new synthetic compound from the plant source.

Competing Interests

The authors declare that they have no competing interests.

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