Conferences, seminars and workshops attended
Conferences, Seminars and Workshops Attended/Presented the Research Work

1. Participated in **National Seminar** on "Present Scenario of Microbial Life" organized by Dept. of P.G. Studies and Research in Microbiology, Jnanasahyadri, Kuvempu University, Shankaraghatta- 577 451, during 28th and 29th March, 2011.

2. Participated in **62nd Indian Pharmaceutical Congress** held at Manipal University, Manipal during 17th to 19th December, 2010.

3. Attended **XXXII all India Botanical Conference and International Symposium** on "Diversity of plants and Microbes; Present Scenario" held at Department of P.G. Studies and Research in Applied Botany, Kuvempu University, Shankaraghatta during 28th to 30th December, 2009.

4. Participated in the UGC sponsored National seminar on **"Darwin-200, the origin of species-150: Darwin in Modern Prospective"** held at DVS college of arts and science, Shimoga, on 13th march, 2009.

5. Attended three days seminar on **"Basic information on ayurvedic medicines"** held at Ayur life hospital, Shimoga, during 5th to 7th march, 2009.

INTRODUCTION

The central nervous system (CNS) mainly comprises of the brain and spinal cord. The CNS processes the information with the help of chemical messengers which can act as neurotransmitters, neuromodulators, neuroregulators, neuromediators and neurotropic factors [1].

The modern day life is highly competitive and more demanding of mental skills. The working conditions are becoming increasingly stressful. As a result, is the surge in incidence of variety of mental disorders. According to world health report (WHO 2001) approximately 450 million people suffer from a mental or behavioral disorder, but only a small minority of them receives even the most basic treatment. This amounts to 12.3% of global burden of disease and expected to rise to 15% by 2020 [2].

The recent advances in science and technology have contributed to an enormous improvement in the quality of mankind. The CNS acting drugs are invaluable therapeutically because they can produce specific physiological and psychological effects. The path breaking research in psychopharmacology has lead to flow of drugs for specification. For example, Benzodiazepines (Diazepam, Alprazolam, Larazepam, nitrazepam etc) are the most frequently prescribed synthetic drugs for variety of disorders particularly against anxiety, depression, epilepsy and insomnia [3]. But the chronic use of Benzodiazepines can cause deterioration of cognitive function, physical dependence and tolerance [4]. For the past 30 years the barbiturates have been replaced by the benzodiazapines that are less addictive and have lesser abuse potential.

Epilepsy is a common neurological disorder. It is a collective term given to a group of syndromes that involves spontaneous, intermittent, abnormal electrical activity in the brain [5]. An ideal epileptic drug should suppress all seizures without causing any unwanted side effects. Unfortunately, it is observed that the presently available antiepileptic drugs are unable to control seizures effectively in as many as 25% of the patients. The conventional antiepileptic agents like phenytoin, carbamazepine and sodium valporate have reported several side effects, mainly neurotoxicity. Since majority of antiepileptic drugs are to be consumed life long, the administration of other drugs predisposes to the risk of drug interaction [6, 7]. Thus it is necessary to investigate for antiepileptic agents that are safe, efficacious and free from toxicity. The main intention of treating an epileptic is to not only to eliminate the occurrence of seizures but also to help him to have a self sustained life.

In this context, there is resurgence of interest in medicines from natural sources. It may be from plants, animals or microbial origin. The drugs obtained from the natural source will always have significantly lesser side effects than that observed with synthetic drugs and comparably with near equal efficacy. Variety of drugs from plant sources have been tested and are in use for psychopharmacological effects and are found to be effective in the treatment of psychiatric disorders [8, 9]. The drugs obtained from animal life, both from terrestrial and oceanic origin have showed a wide variety of chemical compounds like terpenes, polyketides, actogenins, peptides etc with structural diversity and biomedical importance [10, 11, 12]. One of the major problems of these natural products coming into clinical trials is supply issue. The concentration of active compounds in these organisms is often in minute quantities [13]. Hence, scientists have to look for alternative natural source without extinction of the respective species.

Besides plants and animals, the other alternative natural source that we can look for is microorganisms. There are many microorganisms associated with plants and animals and their metabolites have striking structural similarity of natural products suggesting that microorganisms are the real producers of these metabolites [13]. In the present study, the metabolic extracts of two bacteria Bacillus cereus and Bacillus pumilus were tested for locomotor activity in mice which is an index of wakefulness (alertness) of mental activity using photoacometer and muscle relaxant property by Rota-rod apparatus. The metabolites were also tested for antiepileptic property by maximal electric-shock method.

MATERIALS AND METHODS

Solvent extraction and preparation of samples

The two bacteria B. cereus and B. pumilus were grown separately in large quantity in nutrient broth medium and incubated for three days at 35°C. The broth was centrifuged to separate the cells at 10,000 rpm for 20 minutes. The clear supernatant containing the metabolites was collected. The metabolites of both organisms were subjected to successive solvent extraction with petroleum ether, ethyl acetate and methanol (1:1) in a separating funnel. All the three solvent extracts were dried in separate plates. The B. cereus (BC) petroleum ether extract was labeled as sample BC-1, ethyl acetate...
EVALUATION OF ANALGESIC ACTIVITIES OF BACILLUS CEREUS AND BACILLUS PUMILUS METABOLITES

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ABSTRACT

Soil samples from Malnad regions of Karnataka were screened for bacteria with antibiotic production potential. The two isolates, which showed significant antibacterial activity were identified as Bacillus cereus and Bacillus pumilus. The metabolites of the two bacteria were subjected to various solvent extractions based on polarity and the extracts were tested for analgesic activity by tail warm water-immersion method and Eddy’s Hot-plate method using Swiss albino mice. The methanol extract of B. cereus and ethyl acetate extract of B. pumilus showed significant analgesic activity with a reaction time of 33.63 ± 0.61 seconds and 34.63 ± 1.24 seconds at a dose of 50 mg/Kg body weight. The obtained result promises that both the bacteria can be exploited for bioactive molecules with therapeutic potential.

Key words: B. cereus, B. pumilus, Analgesic

INTRODUCTION

Natural products still remain the most important source for discovery of new and potential drug molecules. Large number of bioactive compounds from plants and animals have been discovered and isolated as pharmaceutical agents from both terrestrial and marine sources. The compounds derived from plants referred as secondary metabolites form the ingredients for bioactive compounds like analgesics, heart drugs, laxatives, anticancer agents, contraceptives, ulcer treatments and diuretics. These secondary metabolites have complex and unique structures and their production is often enhanced by both biotic and abiotic stresses.

Microbes are also known to produce secondary metabolites under normal or stressed conditions. The discoveries of number of antibiotics since 1930’s are the best examples. These antibiotics have been useful in our battle against bacteria and fungi for over 70 years. About 1,00,000 secondary metabolites of molecular weight less than 2500 have

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EVALUATION OF ANTIOXIDANT ACTIVITIES OF *BACILLUS CEREUS* AND *BACILLUS PUMILUS* METABOLITES

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Abstract: Soil samples were screened for bacteria with antibiotic production potential. The two isolates which showed very good antibacterial activity were identified as *Bacillus cereus* and *Bacillus pumilus*. The metabolites of the two bacteria were subjected to various solvent extractions and the extracts were tested for antioxidant activity by DPPH and ABTS radical scavenging assay. The metabolites of both bacteria exhibited significant antioxidant activity by exhibiting 97% and 88.5% radical scavenging by ABTS method for *B. pumilus* and *B. cereus* with IC₅₀ values at 16.2±1.17µg/ml and 55.12±2.51µg/ml respectively. They showed less radical scavenging activity by DPPH assay. The two bacteria by their antioxidant activity promises to have bioactive molecules with therapeutic potential and other useful health benefits.

Keywords: *Bacillus cereus*, *Bacillus pumilus*, Antioxidants, antibacterial activity.

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Evaluation of Antimicrobial Activity of *Bacillus cereus* And *Bacillus pumilus* Metaboites Against Human Pathogens.

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ABSTRACT
Soil samples were screened for bacteria with antibiotic production potential against human pathogens including bacteria and fungi. Crude metabolites of the selected 12 isolates were tested for antibacterial activity. The best two isolates were selected for further antimicrobial screening. The two bacteria were identified as *Bacillus cereus* and *Bacillus pumilus*. The metabolites of the two bacteria were subjected to various solvent extractions and the extracts were tested for antibacterial and antifungal activity. The ethyl acetate extracts of both the organisms showed good antibacterial activity but insignificant antifungal activity. The Minimum Inhibitory Concentration (MIC) studies proved the potency of the isolates for antibiotic production. During TLC-bioautographic studies, the bands obtained at Rf values 0.87 and 0.85 showed components with antibacterial properties for *Bacillus cereus* and *Bacillus pumilus* respectively.

Key words: *Bacillus cereus*, *Bacillus pumilus*, antimicrobial activity, solvent extraction, human pathogens.

INTRODUCTION
Microorganisms are known to produce some of the most important medicines for various diseases. They are the source of many life saving drugs and also effective antibiotics against bacterial and fungal infections. After the discovery of penicillin in 1928, antibiotics have been recognized as the only means of effective control of microorganisms. Since then, there has been continuous search for...
Evaluation of *Bacillus cereus* and *Bacillus pumilus* metabolites for anthelmintic activity

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**ABSTRACT**

The metabolites of the two bacteria *Bacillus cereus* (BC) and *Bacillus pumilus* (BP) were subjected to successive solvent extractions with petroleum ether, ethyl acetate and methanol. The solvent extracts were tested for anthelmintic activity against *Pheretima posthuma* at 20 mg/ml concentration. The time of paralysis and time of death of the worms was determined for all the extracts. Albendazole was taken as a standard reference and sterile water as a control. All the sample extracts showed significant anthelmintic activity in paralyzing the worms comparable with that of the standard drug. The time of death exhibited by BP metabolites was close to the time exhibited by standard. However, the extracts of BC took more time for death of worms than BP.

**Key words: Anthelmintic, Bacillus cereus, Bacillus pumilus, Pheretima posthuma**

**INTRODUCTION**

Helminthes infections are among the most common infections in humans, affecting a large population of the world. About 1/3 of the world’s population harbors helminthes of one species or another. The intestinal roundworms, including hookworms and whipworms, harm the host by depriving him of food, causing blood loss, injury to organs, intestinal or lymphatic obstruction and by secreting the toxins. These infections have led to lowering of immune systems for HIV, malaria and tuberculosis and debilitating the individual both physically and cognitively. Majority of infections are generally limited to tropical regions and contribute to the prevalence of malnutrition, anemia, eosinophilia and pneumonia.

Internal parasitic infection is a great threat not only to humans but also to the productivity of the sheep and goat industry. It has a great impact on the economy of the economically developed livestock throughout the world due to their adverse effect on productivity.

Tremendous progress has been made in the development of anthelmintic drugs in the past 50 years. During this period, the current classes of synthetic drugs were developed including the benzimidazoles and imidazothiazoles. Another major step was achieved with the introduction of the avermectin class of macrolactones in the early 1980's. The discovery of this compound class led to anthelmintics drugs such as ivermectin and doramectin, which have excellent broad spectrum activity and superior potency.

Though many drugs are currently available in the market, still nematodes represent a serious threat to both plants and animals. Resistance to all of these classes of drugs has been observed. New methods of control of these parasites are being sought since a number of soil applied commercial nematocides are being phased out and resistance to anthelmintics is an increasing problem. The resistance to nematodes has been reported from several countries.

Hookworms and some other parasitic nematodes have shown signs of resistance to albendazole, the current treatment approved by the World Health Organization. The increasing prevalence of helminthes parasites that are resistant to conventional anthelmintics has been the spur for different research programs exploring alternative approaches to control the parasites and to discover new classes of anthelmintics, especially those with a novel mode of action.

For much of our past history forages, plant parts or extracts have been used to combat parasitism and in many