

Water use efficiency and accumulation of trace element in Spinach

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Abstract:

There is a shortage of water resources in the arid regions of the world. The increasing need for water in the arid areas of the world has resulted in the use of wastewater for agriculture and landscaping. The use of non-conventional water resources and opportunities for achieving food security in water-scarce countries was amply justified. The use of waste water for irrigation is on the rise in developing countries like India, because of scarcity of good-quality irrigation water. Wastewaters contain plant nutrients that favor crop growth but leave a burden of heavy metals, which can enter the food chain, causing great concern. The present study is undertaken to investigate the effects of surface and subsurface wastewater irrigations on water use efficiency (WUE) and accumulation of trace elements (TE) in the shoots of spinach (*Spinacia oleracea* L.) grown on a soil column. Wastewater was applied at two levels based on daily pan evaporation (PE) (that is, 50 and 100%). Subsurface wastewater irrigation increased plant growth and WUE better than surface irrigation. Irrigation at 100% PE apparently reduced the WUE. However, WUE was enhanced by subsurface irrigation. Higher concentrations of TE were found in plants irrigated with 100% PE whether under surface or subsurface irrigation. Surface irrigation accumulated more TE in plants than subsurface irrigation. Slightly enhanced accumulation of TE was observed in the 2nd layer (30 to 60 cm) of the soil column under 100% surface irrigation. Subsurface irrigation gave higher concentrations of TE in the lower zone of the soil. Lower moisture was found in the top soil under both irrigation systems, but the middle soil layer had the highest electrical conductivity (EC). Irrigation with 100% PE increased EC more than 50% PE irrigation water. Surface irrigation with wastewater produced slightly greater pH than subsurface irrigation.

Key words: Surface irrigation, subsurface irrigation, wastewater, spinach growth, trace elements

***In-vitro* evaluation of antibacterial activity of *Cassia fistula* against different gram-positive and gram-negative bacteria**

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Abstract:

Cassia fistula (Family - Leguminosae) is a deciduous and ornamental tree native to India and Sri Lanka. It is also known as golden shower, Indian laburnum, baton casse, keyok, klober etc. It is a fast growing tree of deciduous type and grows up to 9 m. The leaves of the tree are compound and have 4-8 pairs. Flowers of the tree are golden yellow in colour and they hang in bunch which looks like a shower of up to 40 centi-meters. They are widely cultivated worldwide because of beauty. The flowers of the tree attract bees and butterflies. There are various species of *Cassia* worldwide which are used for medicinal purposes. Some species of the tree are used for their laxative properties. The study was carried out with an objective to investigate the antibacterial potentials of leaves of *Cassia fistula*. The aim of the study is to assess the antimicrobial activity and to determine the zone of inhibition of extracts on some bacterial strains. The antimicrobial activity was determined in the extracts using agar disc diffusion method. The antibacterial activities of extracts of *Cassia fistula* were tested against Gram-positive and Gram-negative pathogenic bacteria and different zone of inhibition was formed. The results showed that the remarkable inhibition of the bacterial growth was shown against the tested organisms. The microbial activity of the *Cassia fistula* was due to the presence of various secondary metabolites. Hence, these plants can be used to discover bioactive natural products that may serve as leads in the development of new pharmaceuticals research activities. Further long follow up study required to draw final conclusion.

Keywords: *Cassia fistula*, Antibacterial Activity, Antimicrobial Activity, Metabolites.

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***Stevia* : approachable and remarkable phytomedicine for diabetes patients**

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Abstract:

Herbal medicine products are dietary supplements that people take to improve their health. Herbal medicine, also called botanical medicine or phytomedicine, refers to the use of a plant's seed, berries, roots, leaves, barks, or flowers for medicinal purposes. Long practiced outside of conventional medicine, herbalism is becoming more main stream as improvements in analysis and quality control along with advances in clinical research show their value in the treatment and prevention of disease. *Stevia* is an herbal medicine used as a nonsugar, sweetener in food and drinks. It is said to lower blood sugar and blood pressure. *Stevia rebaudiana* is a small herb in the same family as lettuce, chicory and chrysanthemums. It grows wild in Paraguay and Brazil. *Stevia* is zero calorie natural sweetner, hypoglycemic, cardiotionic, vasodilator, antimicrobial, digestive tonic, diuretic, antihypertensive and appetite stimulant. The most important thing about *Stevia* is that, it is 300 times sweetner than sugar. Any patient can use it, with tea, coffee, juice, sweets, etc.

Keywords: Herbal Medicine, Phytomedicine, Diuretic, Antihypertensive, Appetite stimulant.

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Conservation of diversified wild mushrooms isolated from Bilaspur region of Chhattisgarh.

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Abstract:

Nature has introduced man with an uncountable diversified life forms, that are directly or indirectly associated with our life and thereby affects us in a either positive or negative way. Focussing the higher fungi, a survey of the wild mushrooms was conducted in the Bilaspur district by dividing it into different zones; comprising variable sampling sites viz. agricultural fields, pasture fields, barren area and forest area etc. Mushroom's samples were collected in triplicate in zipped polythene bags, taken to the laboratory and were subjected to their identification and characterization. Twenty four diversified forms of mushroom were collected, out of which few were identified, three samples i.e. *Agaricus* sp., *Pleurotus* sp. and *Volvariella* sp. were identified as edible mushrooms and three samples i.e. *Trichoma* sp., *Russula* sp. and *Amanita* sp. as non-edible mushrooms. Anti pathogenic activity of basidiocarp extracts was assayed against the bacterial and fungal strains by employing the method given by Bauer *et. al.* (1966) and Grover *et. al.* (1962) respectively. As a result of which they were found to possess great potential, containing utmost medicinal properties. Due to such significant role and for their better exploitation, mushrooms were conserved by employing the Spawn culture technique.

Keywords: Diversity, Wild mushrooms, *Agaricus* Sp. Bacterial Strains, Fungal Strains, Spawn

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Optimization of hormone concentration for *in vitro* culture initiation of *Asparagus racemosus*, a vulnerable medicinal plant.

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Abstract:

In the present scenario, medicinal plants have occupied a significant place in our lives ranging from herbal medicines, cosmetics as well as rural livelihood development. *Asparagus racemosus* commonly called Shatavari is an important medicinal plant of Chhattisgarh region and used in Ayurvedic system of medicine since time immemorial for combating gynaecological problems. The plants are being overharvested for its roots containing its phytoestrogenic properties and are thus regarded as vulnerable in its natural habitat. Ex-situ conservation of plant involving *in vitro* tool has been initiated through axillary branching using nodal explants. Different concentrations of cytokinin have been observed for their role in *in vitro* establishment of cultures. A combination of BAP and Kinetin was found to be more effective. A concentration of 0.5 mg/l BAP + 0.5 mg/l Kinetin was found to yield healthy shoots with an average of 5 shoots per node. Higher concentration of cytokinin enhanced multiplication rate but with callus formation and stunted growth.

Keywords: In-vitro culture, Medicinal plants, Hormones

Diversity in soil fungi: an urgent need to conserve the flora for sustainable agriculture

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Abstract:

A variety of microorganisms are found in crop fields. These live saprophytically but many of them are able to survive in close association with plant roots showing symbiotic relationship. Such fungi are known as mycorrhiza. The advantages to the two partners lie in the easy access to assimilation products of the plant for the fungus and the highly effective absorption of mineral salts from the soil for the plant. Fungi also make some growth hormones available to plants. They also protect plants from certain soil parasites.

But an unfortunate part of agriculture is that consumption of fungicides is increasing day by day. Such chemicals are unable to distinguish between parasitic and symbiotic fungi. As a result beneficial soil fungi are being destroyed rapidly by such chemicals. With increase in fungicide application a corresponding decrease in the population of soil fungi has been reported by many workers. This situation is alarming for world agriculture.

We put forward a suggestion to minimize the loss in symbiotic fungal population in soil. Fungicides should be critically evaluated for their effectiveness against wide variety of fungi so that only those such chemicals may be used in agriculture that pose minimum risk to mycorrhiza. Moreover, biofungicides may also be a good alternative for conservation of beneficial soil fungi

Keywords : Mycorrhiza, Agriculture, Fungicides, Biofungicides, Conservation.

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Occurrence and diversity of bacteria in drinking water Bilaspur city of Chhattisgarh state

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Abstract:

The present study was under taken to determine the potability and quality of drinking water of Bilaspur city. The survey was conducted for one year from Feb, 2011 to March, 2012. Water samples were collected bimonthly from different sources at six sampling sites of Bilaspur city. Water samples were collected thrice throughout the year considering the seasonal variation i.e. summer, rainy and winter seasons. Samples of bore-well, hand-pump, well water and tap-water were collected and analysed the microbial/bacterial occurrence using standard method. Each sample was subjected to plating method to determine bacterial content in water. Through *in vitro* culture technique, six bacterial strains were isolated. Highest contribution was recorded by *E. coli* and *Proteus sp.*, whereas coli-form bacteria were most common in tap-water as well as bore well water samples. Present study indicates the occurrence of diversified bacterial forms in common source (tap and well) of drinking water of this city that may poses a serious threat to public health, therefore need a urgent intervention.

Key words: Bacterial diversity, Drinking water, Potable water, Microbiological analysis.

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Seasonal incidence of airborne fungal spores in tribal area of Rajnandgaon district

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Abstract:

The investigation of airborne fungal spore concentrations was carried out in tribal area between 2005 and 2006 using petriplate method containing Potato Dextrose Agar medium. During present study 38 fungal species (230 fungal colonies) were recorded. Among them, the percentage contributions of different fungal groups are as follows, Zygomycotina (5.26%), Ascomycotina (10.52%), Anamorphic Fungi (81.57%) and mycelia sterilia (3.44%) were observed. Anamorphic fungi were dominated to the total fungal groups. *Cladosporium cladosporioides* was found to be most dominant (10.43%) fungal species followed by *Aspergillus niger* (9.13%), *A. fumigatus* (7.39%), *Emericella nidulans* (6.08%), *Alternaria alternata* (5.21%) and *A. radicina* (3.47%). The objective of the studies was to determine a seasonal variation in concentrations of fungal spores due to meteorological parameters.

Keyword: Seasonal Variation, Airborne fungi, Tribal area.

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Different carbohydrate sources for bioethanol production

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Abstract:

Bioethanol is an alcohol made by fermenting the sugar components of plant materials mostly from sugar and starch crops. Biofuels are a wide range of fuels which are derived from biomass. Biofuels are gaining increased public and scientific attention, driven by factors such as oil price spikes, the need for increased energy security and concern over greenhouse gas emissions from fossil fuels. Ethanol is high octane fuel that can replace lead as an octane enhancer in petrol by helping to oxygenate the fuel mixture so it burns more completely and reduced polluting emission. Fermentation is process by which large organic molecules are broken down in to simpler molecules as the result of the activity of microorganisms. The present work deals with the bioethanol production from some carbohydrate source like rice bran, jatropha oil cake and mahua flowers. Among all mahua flowers was given maximum production of bioethanol 9.40%. Rice bran and jatropha oil cake can also be able to produce bioethanol. All substrate produced maximum bioethanol on fifth day of incubation.

Keywords: Biofuel, Fermentation, Mahua, Bacteria

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Pharmacognostical and antifungal properties of *Anthocephalus cadamba* plants in Chhattisgarh region: our experiences

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Abstract:

Anthocephalus cadamba is widely used plant pacifies vitiated pitta, inflammation, urinary retention, wounds and ulcers, burning sensation in Urine in the different form by tribe in Chhattisgarh for treating skin diseases. In this context, Pharmacognostical and Antifungal properties of *Anthocephalus cadamba* against a wide range of pathogens were studied. The alcoholic and aqueous extracts of fruits and bark of this plant showed significant antifungal activity against the organisms: *Trichophyton rubrum*, *Candida albicans*, *Microsporum*, *Aspergillus niger*, with zone of inhibition of the maximum 16.2 mm and 11.6 mm against *Trichophyton rubrum* for ethanolic and hot water extracts, respectively. The minimum MIC determined, was as low as 1.5 mg/ml and 2.0 mg/ml for ethanolic and methanolic extracts of ripened fruit of *A. cadamba* against *Trichophyton rubrum* and *Aspergillus niger*, respectively. The bark of it is to be reported to have good medicinal values in traditional system of medicines.

Keywords: *Anthocephalus cadamba*, Extract, Microscopy, Bark, *Trichophyton rubrum*, *Candida albicans*, *Aspergillus niger*.