



***In vitro* degradation of endosulfan by soil fungi**

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Abstract : *Endosulfan, a chlorinated cyclodiene insecticide is of environmental concern because of its apparent persistence and toxicity. This preliminary study was conducted to isolate efficient endosulfan degrading fungal strains from soil having history of repeated endosulfan exposure. Czapeks.dox nutrient media amended with endosulfan (100mg/L) was used for the isolation of fungi from the contaminated soil. Among the isolated fungal strains, four efficient fungal isolates were selected for the analysis of endosulfan degradation. The selected fungal isolates were identified as Aspergillus spp. and yeast-like organisms. Biodegradation of endosulfan by soil fungi was*

accompanied by a substantial decrease in pH of broth from 7.0 to 1.4. Effect of agitation on biodegradation was also studied. Degradation under agitation conditions was found to be more faster than that under the static conditions. Endosulfan and its metabolites were analyzed through thin layer chromatography. The major metabolites detected were endosulfan diol, endosulfan lactone and endosulfan ether. Interestingly, endosulfan sulfate; a persistent and toxic metabolite was not detected.

Key words: *Biodegradation, soil fungi, endosulfan.*

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Embryotoxic and gonadotoxic effect of carbendazim on female Swiss albino mice

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Abstract : *An experiment was conducted to investigate the effect of Carbendazim on the structure and function of liver, ovarian histology and development of embryo in the uterus of female Swiss albino mice. The study revealed significant embryotoxic and gonadotoxic effect in the group of mice treated with carbendazim (400 mg/kg BW). Histopathological changes were also found in the liver of treated group.*

Keywords : *Carbendazim, ovary, liver, embryo.*

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Introduction :

Carbendazim is used to control fungal pathogen on cereals, vegetables, fruits and is widely used as broad spectrum fungicide. Its trade name in India is Ruston-50, Benfil and Bavistin.

Carbendazim has been reported to cause endocrine and developmental toxicity in rats and mice (Sitarek 2001; Lu et al 2004; Farag et al 2011). Surprisingly, Carbendazim was classified by the World Health Organisation (WHO) as 'unlikely to present hazard in normal use' in 1993. But, now, it is considered one of the twelve most commonly detected pesticides in EU monitoring programmes, most often in apple samples, followed by grapes and strawberries (EC 2001). Carbendazim is one of the 23 active substances that are currently approved (or close to be approved) for use in plant protection products, but may be withdrawn from the European market, due to their particularly serious properties such as being a carcinogen, toxic for reproduction, and Endocrine disruptors (ED) (SCA 2009).

Animals are exposed to Carbendazim through food. Liver is the most important site of detoxification. Information on the effect of a single oral dose of carbendazim on the liver of swiss albino mice is lacking.



A study of effect of size of divalent metal on structural and magnetic properties of synthesized MFe_2O_4 ($M=Mg, Ni, Cu$ and Ca) ferrite nanomaterials using citrate approach and annealed at 450C.

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Abstract : Ferrite nanoparticles, MFe_2O_4 ($M=Mg, Ni, Cu$ and Ca) were synthesized using chemical based citrate precursor method. The citrate precursor was annealed at a single temperature 450C only. The annealed powder was characterized using X-ray diffraction (XRD), Vibrating sample magnetometer (VSM) and Scanning Electron Microscopy

(SEM). The average particle size was determined using Scherrer equation. They were found to be 13 nm, 23 nm, 11 nm and 43 nm for $MgFe_2O_4$, $NiFe_2O_4$, $CaFe_2O_4$, $CuFe_2O_4$ respectively and the prominent peak position for each ferrite was found at 35.355, 35.645, 35.697 and 35.975 respectively. The height of the intensity peak position was largest (2700 cps) for Nickel ferrite and lowest for Cu-ferrite (880 cps). Magnetization, retentivity, coercivity and particle size have different values for each ferrite while annealing temperature 450C was kept constant for all ferrite samples. Range of magnetization, retentivity and coercivity was observed from 10.486 emu/g to 32.727 emu/g, 0.108 emu/g to 6.283 emu/g and 13.382 G to 481.56 G respectively.

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Keywords : Ferrite, Nanoparticles, Divalent cations, Structural and Magnetic properties.



A study of the effect of annealing temperature on structural and magnetic properties of LiFeO (Lithium Ferrite) nanomaterials and synthesized by citrate precursor method

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Abstract: *Lithium ferrite (LiFeO) nanoparticles were synthesized using chemical based Citrate precursor method. The citrate precursor was annealed at temperatures 700C and 800C. The annealed powder were characterized using X-ray diffraction and Vibrating sample magnetometer. The average particle size was determined using Scherrer equation and its crystalline size were found to be 56nm and 86nm at annealing temperatures 700C and 800C respectively. The magnetic parameters were found different for these two samples. The magnetization, coercivity and retentivity were found 23 emu/g, 135G, 9emu/g at annealing temperature 700C and 59 emu/g, 55G, 6 emu/g at annealing temperature 800C respectively.*

Keywords : Ferrite, Nanoparticles, Annealing temperature, Magnetic behaviour.

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Introduction:

Ferrites are mixed oxides of iron having the general formula MFe_2O_4 , $MFeO$ and $MFeO$ where M stands for Zinc, Strontium, Barium, Cobalt, Nickel, Lithium etc (Ishino and Narumiya 1987; West 2007). In last two decades Ferrites have been receiving growing attention because of their various commercial and technological applications in Electronics, Medical sciences, Material technologies etc (Ishino and Naruiya 1987; Smit and Wijn 1959). The spinel structure of ferrites was first proposed by Hilpert (1909) and has been investigated since then in quite detail. Ferrites were prepared in nanocrystalline state for the first time in late eighties (Hilpert 1909; Hilpert and Wille 1932). In the nanocrystalline phase, ferrites exhibit properties that are notably different from their bulk phase properties and are strongly dependent on the conditions, size and method of preparation.

Lithium ferrite (LiFeO) has been of great technological interest in many electromagnetic devices for a long time. High electrical resistivity, low eddy current losses, low magnetic losses, and very good thermal and chemical stability make



Erosive effect of carbonated soft drinks on dental enamel

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Abstract : *Laboratory research was conducted to estimate the erosive potential of eight different commercial soft drinks – Fanta, Sprite, 7up, Limca, Mirinda, Mountain Dew, Coca Cola and Pepsi on dental enamel. Research analysis was also done to find out the relationship between the pH of the test soft drinks and their aggression towards enamel. These tests were carried out for one month at room temperature. It was found that non-cola drinks were two times more erosive than cola drinks. There was no co-relation between the pH of the test beverages*

and their enamel erosive capacity. Many factors are concerned with the erosive capacity of the soft drinks including type of acids, their calcium chelating properties, exposure time and temperature.

Keywords : *Enamel, dental erosion, soft drinks, pH.*

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Introduction :

Soft drinks are the non-alcoholic artificially carbonated drinks which are consumed by a high percentage of people. The consumption of soft drinks by children, teenagers and adults has increased drastically in the last few decades. The greatest increase in consumption has been seen among children and adolescents. Nearly 40% of preschool children drink more than quarter of a litre of soft drinks per day (Harnack et al 1999). Majority of people consume them for their tangy flavour while some others consider them to provide a feeling of lightness. But soft drinks, which tend to be carbonated, have a low pH and mainly contain



Study on the animal behaviour of *Macaca mulatta*, *Macaca silenus*, *Selenarctos thibetanus* and *Melursus ursinus* at Sanjay Gandhi Biological Park, Patna

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Abstract : A study was conducted on the behaviour of *Macaca mulatta*, *Macaca silenus*, *Selenarctos thibetanus* and *Melursus ursinus* for 16 days in the month of September, 2011 at Sanjay Gandhi Biological Park, Patna. Abnormal behaviour such as stereotypic nodding was observed in both *Selenarctos thibetanus* and *Melurus ursinus*. *Macaca mulatta* and *Macaca silenus* also showed abnormal behaviours such as stereotypic

pacings, self – biting and hair plucking. The factors influencing the exhibition of abnormal behaviours were indentified to be group composition and size, enclosure design and increasing number of visitors.

Keywords : Behaviour, visitors, time interval, enclosure type.

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Introduction :

Animal behaviour is the response of animal towards the external stimuli or environmental factors which are interwoven with life and the responses of the living organism with them. Behaviour of species should be best studied in the wild, but often watching is difficult, especially for human-shy species. On the other hand, animal under captive condition can be the object of organised studies though captive environment restricts the animal biologically and spatially, from performing its species-specific natural behaviour. Being unable to adapt to the artificial surrounding they develop a specific abnormal behaviour under captive condition. Lion-tailed monkey and Rhesus monkey are diurnal, arboreal and terrestrial quadruped animals which feed on fruits, cereals,



Effect of carbendazim on the testis and kidney of male Swiss albino mice

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Abstract : *An experiment was conducted to investigate the effect of carbendazim on the structure of testis and Kidney of Swiss albino mice, and also to detect the possible ameliorative effect of L-ascorbic acid on carbendazim toxicity. The study revealed significant changes in the weight of testes in the group of mice treated with carbendazim +ascorbic acid (dissected after two days) as compared to Carbendazim treated group (dissected after five days). Histopathological changes caused by carbendazim were also observed in both testis and kidney. However mice pre-treated with ascorbic acid showed improvement in both the organs.*

Keywords : Carbendazim, Ascorbic acid, Testes, Kidneys.

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Introduction :

Carbendazim is a widely used broad spectrum fungicide. It is used to control fungal pathogen on cereals, fruits, cotton, tobacco, turf, ornamentals, vegetables, etc. It is also used in post-harvest food storage and as a pre-sowing seed treatment. In India, its trade name is Ruston-5 (Benefil and Bavistin). Carbendazim has foetotoxic and teratogenic effects. A study by Nakai et al (1992) has shown the acute and long term effect of a single dose of the fungicide carbendazim on male reproductive system in mice. Goldman et al (1989) studied the effect of carbendazim on the hypothalamic pituitary reproductive axis in the male rat.

Ascorbic acid has a therapeutic role. It plays an important role as antioxidant agent in the hepatic toxicity and prevents the effect of free radicals for vital cells (Sinsa et al 2008). Ascorbate can both chelate and reduce transition metal ions and in turn can reduce O₂ or HO₂ super oxide and hydroxyl radicals respectively (Carr and Frei 1999). Selmanoglu et al (2001) treated male rats with Carbendazim for 15 weeks to see the effect on liver and kidney. Sakr et al (2011) had studied the effect of metalaxyl fungicide and the ameliorative effect of ginger on the kidney of Swiss Albino mice.



Isolation of laccase enzyme producing bacteria and optimization of its production parameters to obtain maximum yield

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Abstract : *Enzymes are among the most beneficial products obtained for human needs through microbial sources and they have come up as a sustainable alternative to the use of harsh chemicals in industries. Laccase, a multicopper oxidoreductase, able to catalyse oxidation of phenolic and other toxic compounds, finds a potent substrate in the lignocellulosic agro-industrial residues. For the purpose of study, soil containing dumped saw dust were collected from two small scale saw mills located in Rajendra Nagar and Pirmuhani*

areas of Patna respectively. Bacterial population from these samples were isolated and screened for laccase activity on a guaiacol supplemented medium. Results indicated five strains to exhibit a positive response. However only one among them (Lac4) was found to show a visibly significant activity. On biochemical analysis, the strain was identified to be of Bacillus species. The enzyme production was carried out and assayed under normal conditions by spectrophotometric analysis. For optimization of production conditions, three parameters were kept under observation, i.e.; Incubation time and temperature, pH and different carbon sources. Study revealed that the maximum enzyme activity was obtained at 37°C after 24 hours of incubation if the pH is kept at 6 and Dextrose (1%) supplemented as carbon source. The methods used were practical for a microbiology laboratory that chooses to perform enzyme assay by spectrophotometric analysis and assures a significant rate of accuracy in the result.

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Keywords: *Enzyme activity, Guaiacol, Laccase.*