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Paper No: 3rd ISCASE-06

Biosorption of Nanoparticle within a New Membrane Reactor

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Abstract

In this study, a new biosorption reactor was made to remove nickel and cobalt. The biosorption reaction in the reactor was studied under different conditions of pH, biosorbent dose, temperature, and retention time. The concentration of heavy metals was investigated after the fluid had passed through the membrane system. Algae nano-biosorbent was prepared using a planetary ball mill; Scanning Electron Microscope (SEM) and Brunauer–Emmert–Teller (BET) tests showed an average diameter of 95.75 nm and specific surface area of 11.25 m2/g, respectively. A maximum biosorption efficiency equal to 93% and 91% was achieved for nickel and cobalt at pH 6, temperature 35 °C with a retention time of 80 min, at biosorbent doses of 8 and 4 g/l. The kinetic data fit well by pseudo-first-order model and equilibrium data of metal ions could be described well with the Langmuir and Dubinin–Radushkevich isotherm models. The calculated thermodynamic parameters showed that metal ion biosorption is feasibile, endothermic and naturally spontaneous.

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Paper No: 3rd ISCASE-10

Susceptibility of Zabrus sp. (Coleoptera: Carabidae) to steinernematid and heterorhabditid nematodes (Rhabditida: Steinernematidae and Heterorhabditidae)

Ramazan Canhilal[1] --- Yunus Emre Özdemir[2] --- Yunus Emre Taşkesen[3]

[1,2,3]Erciyes University, Faculty of Agriculture, Department of Plant Protection, Kayseri, Türkiye

Abstract

The efficacy of entomopathogenic nematodes has been studied against the adults of Zabrus sp. (Coleoptera: Carabidae), an important insect pest of wheat in the laboratory first time in the world. The trials have been conducted in small plastic pots with a lid (8 cm in height, 6 cm in diameter) containing autoclaved soil and repeated 2 times. Five nematodes; Steinernema feltiae-Commercial, S. feltiae-Endemic, S. carpocapsae, S. bicornutum, Heterorhabditis bacteriophora, and H. indica were tested on Zabrus larvae in the trials with 3 rates of 50, 100 and 200 infective juveniles (IJs)/cm2 at 25 and 32°C. The mortalities caused by nematodes increased by increasing rate. At 25°C, the highest mortality with 85% at the rate of 100 IJs/cm2 was caused by S. carpocapsae, and S. feltiae-Commercial and H. indica at the rate of 50 IJs/cm2, and H. indica at the rate of 100 IJs/cm2 produced the lowest mortality with 17.5%. At 32°C, S. bicornutum at the rate of 200 IJs/cm2 was the one providing the highest mortality with 80% while S. feltiae-Commercial at the rate of 50 IJs/cm2 was causing 10% mortality which was the lowest. As a result, S. carpocapsae and S. bicornutum showed the best efficacy against Zabrus sp. and it was followed by S. feltiae-Commercial and H. bacteriophora.

Keywords: Zabrus spp., Entomopathogenic nematods, Steinernema, Heterorhabditis and biological control

*This study is a part of Project No. 111O786 supported by TUBITAK (The Scientific and Technological Research Council of Turkey)

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Paper No: 3rd ISCASE-12

A Deterministic Analysis of the Tsunami Hazard to Bangladesh

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Abstract

This paper describes a multi-scenario, deterministic analysis of the seismogenic tsunami hazard to Bangladesh from active subduction zones in the Indian Ocean region. Two segments of the Sunda arc, namely Andaman and Arakan, appear to pose a tsunamigenic seismic threat to Bangladesh. High resolution numerical simulations of tsunami propagation towards the coast of Bangladesh have been carried out for eight plausible seismic scenarios in Andaman and Arakan subduction zones. The numerical results have been analyzed to obtain the spatial variation of the maximum tsunami amplitudes as well as tsunami arrival times for the entire coastline of Bangladesh. The results suggest that the tsunami heights are amplified on either side of the axis of the submarine canyon which approaches the nearshore sea off Barisal in the seaboard off Sundarban-Barisal-Sandwip. Moreover, the computed tsunami amplitudes are comparatively higher north of the latitude 21.5o in the Teknaf-Chittagong coastline. The calculated arrival times indicate that the tsunami waves reach the western half of the Sundarban-Barisal-Sandwip coastline sooner whilst shallow water off the eastern half results in a longer arrival time for that part of the coastline, in the event of an earthquake in the Andaman seismic zone. On the other hand, most parts of the Chittagong-Teknaf coastline would receive tsunami waves almost immediately after an earthquake in the northern segment of the Arakan seismic zone.

Keywords: Coastal flooding, Disaster risk mitigation, Numerical simulations, Indian Ocean region.

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Paper No: 3rd ISCASE-23

Entropy and Similarity Measure Design for High Dimensional Data with Spatial Information

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Abstract

Research on entropy and similarity measures for high dimensional data was carried out with spatial information. General definition such as distance measure was also applied to high dimensional data. Designed entropy and similarity measure are applied to fuzzy data that has uncertainty. We also derived the summation of similarity measure and entropy between fuzzy set and the corresponding ordinary set, and the summation constitutes degree of uncertainty and certainty of data. As a result, we derived a similarity measure from entropy realization, and showed the maximum similar value can be obtained using minimum entropy by simple example.

Keywords: Similarity measure, Entropy, Spatial information, High dimension data

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Paper No: 3rd ISCASE-45

Ultrasonic Effect on the Photodegradation of 2,4-Dichlorophenol Wastewater

Kai-Yuan Cheng[1] --- Yung-Hsu Hsieh[2] --- Yi-Tze Tsai[3] --- Chen-Yu Chang[4] --- Ching-Yi Chang[5] --- Kun-Jhe Ding[6] --- Yu-Chuan Chang[7] --- Chia-Chen Wang[8]

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Abstract

Chlorophenols (CPs) is one of the organic pollutants and are most widespread in aqueous environment. Advanced oxidation processes (AOPs) have been extensively utilized for the decomposition of hazardous or recalcitrant pollutants in the environment. The study combined UV/TiO2 with ultrasonic procedure to degrade 2,4-dichlorophenol (2,4-DCP) wastewater. The effects of factors including pH value, initial concentration of 2,4-DCP and quantities of TiO2, Fe (II), and Fe (III) added on the removal efficiency of 2,4-DCP wastewater were investigated. Experimental results revealed significant additive effect attributed to the combination of two procedures, 13-watt UV irradiation and 10-watt ultrasound, under the pH 10 and 1g L-1 TiO2. In additional, the destruction removal efficiency (DRE) of 2,4-DCP was raised about 10 % when 250 μM of Fe (II) and Fe (III) were added and this phenomenon was suggested that the Fenton-like reaction occurred.

Keywords: Titanium dioxide, Ultrasonic procedure, 2,4-dichlorophenol, Wastewater, Fenton-like

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Paper No: 3rd ISCASE-53

Comparative Study of Transmission Line And Cavity Model of Rectangular Microstrip Antenna

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Abstract

In this paper a comparative study iscarried out to estimate the performance of transmission line and cavity models of rectangular microstrip antenna mounted on six dielectric substrate materials with variable substrate heights. An artificial intelligence technique namely MATLAB based Adaptive Neuro-Fuzzy Inference System is used to optimize the length and width of the antenna. Random data sets are generated and experimental data are used to carry out the optimization of various antenna parameters to cover almost entire cellular spectrum. With operating frequency 2.1GHz, we analyze the bandwidth of the antenna in both the models. The simulation results predict that the cavity model of rectangular microstrip antenna perform well over transmission line model with thick substrate while transmission line model is better at low dielectric constant and thin substrate.

Keywords: Artificial Intelligence, Bandwidth, Cavity Model, Dielectric Constant, Transmission Line.

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Paper No: 3rd ISCASE-58

Tilapia Fish Production in Cage Culture by Using Local Feeds and Temporal Dynamics of Physical, Chemical and Biological Parameters in Lake Babogay, Oromia Region, Ethiopia

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Abstract

Ethiopia is well known for its richness in water potential. Lake Babogaya is one of the Crater Lake. From the biological view and utilization the lake is not this much utilized and fish production in cage culture has not been studied. So, the research work has explored the means of enhancing Tilapia fish production in Cage Culture by using local feeds and also temporal dynamics of physical, chemical and biological aspects in Lake Babogay from April 7,2013 to October 14,2013.The sampling station of the present study was selected from the near shore of Lake Babogaya for physic-chemicals and phytoplankton species composition. Water samples were collected twice a month from the stations with a bottle sampler. Tilapia fish species was grown in the cage with the stocking of up to 180 fingerlings at near shore of 2m. At the study period, the weight, length relationship, daily growth rate, feed conversion ratio and Fulton's Conditioned Factor were measured.Major species of phytoplankton preserved with Lugol's iodine found in samples collected on each sampling date were identified.Phytoplankton biomass was estimated as chlorophyll a concentration spectrophotometrically from water samples filtered through glass filters (GF/C). Composition of dry feed was given two times a day(early morning at 8:00 am and late afternoon at 4:00 pm).Feeding rate tables were adjusted every two weeks based on the average weight of fish. The daily growth rate of Oreochromius niloticus species at study period were ranges from 0.86 g in April

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and maximum 1.23 g in the month of July. Feed added to the cage was 3% of the body weight of fishes for a given date. Fingerlings of 180 with a weight of 10-18 gm weight (mean weight of 13g) or total weight of 2.288 kg and 4-6.5(mean length of 5.02 cm) cm length were collected and introduced to the lake. The initial mean weight of recruited fish was 13 g while the final mean weight of one fish was 194.6 g within the incubation period of 186 days.The daily mean weight gain was 1.05 g.The feed conversion ratio of the cultured fishes ranged from 0.86 in April 2013 to 6.23 in October 2013.The phytoplankton community of Lake Babogaya was dominated by Bacillariophyceae (Diatoms) and Chlorophyceae (Green algae). Phytoplankton biomass of Lake Babogaya was found to vary from 5 to 13 mgChl a m-3 during the study period.A positive but fairy strong correlation between phytoplankton biomass in the composite samples and nitrate-nitrogen (r=0.45) and silica (r=0.53) was found while its correlation with phosphate was positive, but weak (r=0.37). The surface water temperature of lakeBabogaya ranged from a low value of 22 °c at the shore station at the end of August, 2013 to a high value of 28.3 °c in May, 2013 and varied directly with air temperature. The pH of the surface water ranged from 8.76 to 9.05 in April and September 2013 respectively. Dissolved oxygen (DO) concentration at the surface of Lake Babogaya ranged from a minimum of 5.77 to maximum of 9.34 mg l-l in September and October 2013.Carbonate-bicarbonate alkalinity determined over the study period ranged from 8.4 to 11.15 meq l-1 .Nitrate-N varied from near the lower limit of its minimum of 3 µg l-1 to 30 µg l-1.Soluble reactive phosphate (SRP) of Lake Babogaya varied from below 0.5 µg L-1 to about 15µg L-1.In opposite to nitrate and phosphate, molybdate reactive silica was found at concentration 11 mg l-1 to 54 mg l-1 in October 2013 to August 2013 respectively.

Keywords: Cage culture, Tilapia, phytoplankton

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Paper No: 3rd ISCASE-64

Development of Internet of Things (Iot) With Mobile Voice Picking and Cargo Tracing Systems in Warehouse Operations of Third-Party Logistics

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Abstract

The increased market competition, customer expectation, and warehouse operating cost in third-party logistics have motivated the continuous exploration in improving operation efficiency in warehouse logistics. Cargo tracing in ordering picking process consumes excessive time for warehouse operators when handling enormous quantities of goods flowing through the warehouse each day. Internet of Things (IoT) with mobile cargo tracing apps and database management systems are developed this research to facilitate and reduce the cargo tracing time in order picking process of a third-party logistics firm. An operation review is carried out in the firm with opportunities for improvement being identified, including inaccurate inventory record in warehouse management system, excessive tracing time on stored products, and product misdelivery. The facility layout has been improved by modifying the designated locations of various types of products. The relationship among the pick and pack processing time, cargo tracing time, delivery accuracy, inventory turnover, and inventory count operation time in the warehouse are evaluated. The correlation of the factors affecting the overall cycle time is analysed. A mobile app is developed with the use of MIT App Inventor and the Access management database to facilitate cargo tracking anytime anywhere. The information flow framework from warehouse database system to cloud computing document-sharing, and further to the mobile app device is developed. The improved performance on cargo tracing in the order processing cycle time of warehouse operators have been collected

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and evaluated. The developed mobile voice picking and tracking systems brings significant benefit to the third-party logistics firm, including eliminating unnecessary cargo tracing time in order picking process and reducing warehouse operators overtime cost. The mobile tracking device is further planned to enhance the picking time and cycle count of warehouse operators with voice picking system in the developed mobile apps as future development.

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Paper No: 3rd ISCASE-08

Environment-Friendly Nanostructured Etching of Glasses Utilizing Vapor from Hot Electron-Activated Liquid Water at Room Temperature

Hsiao-Chien Chen[1] --- Fu-Der Mai[2] --- Kuang-Hsuan Yang[3] --- Hui-Yen Tsai[4] --- Chih-Ping Yang[5] --- Chien-Chung Chen[6] --- Chao-Hsuan Chen[7] --- Yu-Chuan Liu[8]

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Abstract

Dry plasma treatment and wet chemical corrosion are two of the most popularly methods used for etching silicate glasses. However, the former is laborious; while the latter is environment-unfriendly. In wet etching, environment-unfriendly etchants such as NaOH, H2SO4 and HF were always used and energy-consumed heating process was also reported. Here we report an innovative and facile strategy for etching silicate glasses utilizing vapor from hot electron-activated (HEA) water at room temperature. The activated pH-neutral water has a weakly hydrogen-bonded structure and is stabilized by the decayed hot electron. The distinct structure, as compared to conventional deionized (DI) water, makes it more vapor water molecules available. Moreover, the activated water is electron-rich, which is responsible for facile fabrication of glass nanostructures. After three hours exposure to vapor of activated water at room temperature, the etched glass developed an evenly

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nanoscale-granulated surface morphology. After etching the contact angle recorded on the nanostructured glass is significantly increased. Compared to an obtained nanoscale-flat surface using vapor from DI water, the resulting nanostructured glass exhibits excellent advantages in applications for obtaining uniform signal intensity of surface-enhanced Raman scattering and strong adhesion of deposited metal on it. Moreover, the proposed strategy is effective for various silicate glasses, silicon wafers, and even metal films. This innovative concept has emerged as a promising strategy on environment-friendly nanostructured etching.

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Paper No: 3rd ISCASE-09

Computational Analysis and Functional Characterization of Oryza Sativa Germin-Like Protein 1 (Osrglp1) Gene Promoter

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Abstract

Germin and germin-like protein is an important family of extracellular plant glycoproteins providing resistance against biotic and abiotic stresses. Though various enzymatic activities have been assigned to these proteins but still their function is not fully understood. In the present study, 1228bp upstream promoter region of Oryza sativa root germin-like protein 1 (OsRGLP1) gene was characterized by computational as well as in vivo analysis. Computational analysis of OsRGLP1 gene promoter sequence was also investigated. Transcriptional factor binding sites (TFBS) analysis revealed a total of 190 matches of 46 different TFs families. The most frequent (Yeast TATA box binding protein (YTBP) (19 copies), Arabidopsis homeobox protein (AHBP) (15 copies) and Vertebrate TATA box binding protein (VTBP) (14 copies) and unique cis-regulatory elements were also investigated. In-silico functional analysis revealed three modules in which DOFF_OPAQ_03 was the most frequent. Interaction of three long stretches of promoter (-408 to -378, -537 to -513 and -708 to -638) with TBP (TATA box binding protein) was analyzed using Haddock webserver suggesting that Adenine, Thymine, Serine and Lysine were the most active residues. For in vivo studies, OsRGLP1 gene promoter was ligated upstream to GUS reporter gene and transformed into Nicotiana tabacum using agrobacterium mediated transformation. In transgenic plants, GUS expression was observed in root, shoot and leaves. Strong GUS activity was noticed in leaf veins, epidermal hair, stomata guard cells, cell wall, stem cortex, petiole stem junction, root and root hair etc. Moreover, wound inducibility was

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analyzed in root, shoot and leaves at different time interval (10, 30 min, 1, 2, 3, 4, 5 hours), which showed linear association. Wound inducible property of this promoter confirmed its involvement in various biotic and mechanical stresses which can be used for the production of biologically important crop species in deriving tissue specific expression at the site of injury/wound.

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Paper No: 3rd ISCASE-11

Applications of Nanotechnology in Marine Drug Research: An Overview

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Abstract

Out of earth's total surface area, more than 70% is covered with marine/salty water. World oldest, most revered & holy texts, the Vedas, term the Ocean as 'Ratnakar', or the bestower of immense riches. From times immemorial the oceans have been a source of inspiration, awe & adventure for Humankind. Modern science for the first time in the nineteen fifties discovered for the first time, potent bioactive, chemical compounds from marine organisms. Ara-C, & related nucleotides, were the foremost discoveries of cytotoxic metabolites from marine fauna. These secondary metabolites are bio-synthesized in the organisms, as a means for offense &/or defense, in order to sustain their existence in an otherwise highly hostile marine environment. Umpteen number of cytotoxic organic compounds have been isolated from marine organisms, particularly marine fauna. Some of these like, the Bryostatins, are in final stages of pre-clinical trials, and are on the way of becomes potent drug leads in the future. The unfortunate trend of global warming & climate change has dealt a severe blow to the natural habitats, threatening the very existence of most of economically valuable marine organisms, which can be a gold mine of priceless chemicals1. The power of Nanotechnology, in the area of Marine Drug Research is yet to harnessed, & exploited. Here, an attempt has been made in this direction, to explore ways to enable us harvest the fruits of this revolutionary technology in the interest of Science & Humankind.

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Paper No: 3rd ISCASE-13

Thermoregulation Mechanisms and Grazing Behaviors of Dairy Goats

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[1]Dept. of Animal Science, Agricultural Faculty, Cukurova University, Adana-Turkey

Abstract

The objectives of this paper are to: define the thermal challenges that create negative animal responses during direct effect of solar radiation at grassland, to characterize those animal behaviors that they can be recognized and ameliorated. Twenty Saanen and twenty local Hair goats were used for determine to the adaptation mechanisms and the grazing behavior under an extensive system of a subtropical region at Eastern Mediterranean region of Turkey. Respiration and pulse rates, rectal and surface temperatures (from head, foot, back and udder skin) were taken four times a day (06.00 - 07.00; 12.00 -13.00; 16.00-17.00 and 00.00 - 01.00 h) twice a week from June to August-2008. Some behavioral aspects such as eating, ruminating, walking and lying times, as well as milk yields and consumed feed levels were regularly measured. Rectal temperatures, pulse and respiration rates, udder and head temperatures differed among groups. Rectal, head and udder temperatures and respiration and pulse rates increased from 08.00 to 12.00 h , and at 00.00 returned to the level reached at 08.00 for both groups. Hair goats showed smaller increases in all physiological measurements than the other group. Hair goats spent more time than Saanen goats, in terms of eating ($p<0.01$) and walking ($p<0.01$), but less time lying ($p<0.01$) and ruminating ($p<0.01$). Thus, Hair goats grazed more ($p<0.01$) than the Saanen goats. But Saanen goats ate more concentrate when they returned to barn. Ultimately, the Saanen goats, in spite of having heat stress under the hot and humid climate, had higher milk yield than native Hair goats. As underlined previous studies the goal should be improving herd performance; therefore the economical production traits of goats and their ability to adapt to environmental stress is

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crucial and a study based on behavioral characteristics and animal welfare should taken into consideration for this aim.

Keywords: Adaptation- Heat stress- Grazing behavior-Saanen goat-Hair goat.

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Paper No: 3rd ISCASE-63

A Study of Regeneration Performance in the Hybrid Solar Desiccant System for Making Hot Water and Heated Air

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Abstract

Solar thermal energy can be used as a heat source for regeneration of liquid desiccant in the solar desiccant cooling system. In this process, the heated air and hot water acquainted from a hybrid solar air-water heater can be used to regenerate the weak liquid desiccant. The hybrid solar air-water heater has a flat plate solar collector that can make both hot water and heated air during daytime and the air channels are installed beneath absorbing plate of the flat plate solar collector for heating water. Regeneration performance was investigated according to use of hot water and heated air on the same collecting area. As a result, that regeneration performance, when the heated air and hot water were used simultaneously, has shown the highest result about 0.31g/s. In case of using only heated air, mass transfer rate of moisture from liquid desiccant to air was about 0.22g/s. In addition, it has 0.13g/s of mass transfer rate when the hot water and heated air were only used. It means that simultaneous operating process is better than only using hot water or heated air on same collecting area, even though it has a lower temperature increment of each heating medium and the necessity of profound study about regeneration performance when the heated air and hot water are used simultaneously.

Keywords: Solar desiccant system, Liquid desiccant, Regeneration, Hybrid solar air-water heater.

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Paper No: 3rd ISCASE-14

In Vitro Differential Effect of Nerve Growth Factor on Functional Parameters of Murrah Buffalo Spermatozoa in Low and High Fertile Groups

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Abstract

Aim of the present study was to examine the influence of in vitro supplementation of Nerve growth factor(NGF) on functional parameters of Murrah buffalo (Bubalus bubalis) spermatozoa from fresh semen, like, motility, plasmalemma integrity, acrosomal integrity, ATP concentration . Fresh semen samples (n=6) were washed in Tris buffer and divided into two equal parts (control and NGF groups). Only in the NGF group, NGF was added to a final concentration of 50 and 100 ng/ml. The samples were incubated at 37o C for different time intervals in TCM 199 medium supplemented with BSA and the effects were observed at 0, 30, 60 and 120 min of incubation. The experiment was performed in low (LF) and high fertile(HF) groups based on previous three years conception rate and taking cutoff value , below and above this value were categorized as LF and HF group. The mean concentration of the buffalo seminal plasma (n=12) NGF was 67.7±3.25ng/ml and 65.5± 2.76 in LF and HF groups respectively. The concentration of NGF in blood plasma was 83.5±7.82 and 68.6±3.82 in HF and LF groups respectively. The concentration of blood plasma NGF being higher ($P<0.05$) in HF group. With either dose of NGF in vitro significant effect on the total motility ($P<0.05$), progressive forward motility ($P<0.05$) was observed. It could be maintained in HF group till 120 min but in LF group it was restricted to 60 min when compared with their respective control. The functional membrane integrity did not differ significantly between groups (control and NGF treated) in both LF and HF groups with either concentration of NGF. The plasma lemma integrity was significantly less ($P<0.05$) at 120

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min of incubation when compared with the initial value at 0 min of incubation. The percentage of acrosomal intact spermatozoa decreased continuously over a period of time in both the groups. As compared to 0 min of incubation, the significant ($P<0.05$) loss of acrosome was observed at 60 and 120 min of incubation in LF and HF control groups and NGF supplementation could maintain acrosome integrity in HF group for 60 min where as in LF group it could be maintained significantly only till 30 min of incubation when compared with the intial values of respective groups. Viability of spermatozoa was not significantly different when compared between groups with their respective control, However when compared at different time intervals, the viability of sperms in HF and LF supplemented groups was significantly different from initial values only at 120 min of incubation whereas in respective control groups the loss in viability was significant from 60 min itself. With respect to ATP concentration of spermatozoa in different groups it was observed that 100ng dose could increase the concentration of ATP in HF group significantly ($P<0.05$) at 60 min of incubation only with NGF in vitro when compared with its respective control. In conclusion, all the parameters decreased significantly at 120 min of incubation when compared with their respective initial values for all the groups. In HF group supplementation of NGF@50ng/ml could maintain functional parameters of spermatozoa for a greater duration of time when compared with LF or control group.

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