

Analysis of Cadmium and Lead in Jullien's mud carp (*Henicorhynchus siamensis*) and Tiger Loach (*Botia hymenophysa*) at Nong Whai Dam area, Pong River.

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The study aims to analyse cadmium and lead contents in Jullien's mud carp (*Henicorhynchus siamensis*) and Tiger Loach (*Botia hymenophysa*) which were sampled from Nong Whai dam area, Pong river during time of July to August 2003. Cadmium and lead were analysed by atomic absorption spectrophotometer (Perkin elmer, Model 300) at Department of Environmental Science, Faculty of Science, Khon Kaen university. The results showed that cadmium and lead contents in all fish samples ranged from 0.517 ± 0.101 to 2.093 ± 0.080 mg/kg dry weight, 4.655 ± 0.057 to 35.052 ± 3.194 mg/kg dry weight, respectively. The highest mean of cadmium and lead contents were found in big size Jullien's mud carp (1.691 mg/kg dry weight), big size Tiger Loach (23.789 mg/kg dry weight), respectively.

The comparison of cadmium contents between big and small size of each species of fish was different significantly ($p < 0.05$) but there were no different significantly for comparison of lead content between the two species of fish ($p > 0.05$).

Key word : *Henicorhynchus siamensis* , *Botia hymenophysa*

Comparison of Nitrogen and Phosphorus Levels between East and West Si-Than Lake , Khonkaen University.

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Comparison of Nitrogen and Phosphorus Levels between East and West Si-Than Lake , Khonkaen University were studied. The water samples were collected for 1 time, With 4 parameters i.e. Orthophosphate-Phosphorus , Ammonia-Nitrogen , Nitrite-Nitrogen and Nitrate-Nitrogen.

The results show that average value of Orthophosphate-Phosphorus , Ammonia-Nitrogen , Nitrite-Nitrogen and Nitrate-Nitrogen in West Si-Than Lake are 0.113, 0.700, 0.024 and 0.483 mg/l respectively. There is higher than average value of Orthophosphate-Phosphorus , Ammonia-Nitrogen , Nitrite-Nitrogen and Nitrate-Nitrogen in East Si-Than Lake are 0.028, 0.219, 0.006 and 0.256 mg/l respectively . Ammonia-Nitrogen in West Si-Than Lake has over the standard of the surface water .

The statistics analysis show that Orthophosphate-Phosphorus , Ammonia-Nitrogen , Nitrite-Nitrogen and Nitrate-Nitrogen in both Si-Than Lake are different value ($p < 0.05$) .Concentration of pollutants in West Si-Than Lake is higher than East Si-Than Lake are 75.02% , 68.70%, 75.00% and 47.00% respectively.

Key word : Nitrogen and Phosphorus

Comparison Study of Copper Accumulation at different levels of Soil Salinity of Yaspthorn Soil Series

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A comparison study of the adsorption of Cu in different levels of soil salinity which the E_{ce} were 1.7, 2.2, 4.4, 8.1 and 20 dS/m of Yasothorn soil series. The soils were leached twice using 250 ml. distilled water each. Then the remaining of Cu was determined using wet digestion. All Cu concentration were determined using Flame Atomic Absorption Spectroscopy.

The result of first leaching and second leaching by distilled water showed that the leached Cu at 5 levels of salinity were not significantly different and the not did increase when the concentration of Cu increased

The remaining Cu from wet digestion at 100 mg./kg. Of CuCl₂ not increased with increasing salinity level and was not significantly different, the result of Cu remain in soils which Cu were quantity of CuCl₂ were 100 mg./kg. And CEC (Cation Exchange Capacity) were 1.75, 1.66, 1.25, 1.20 and 0.35 meq/100 g. Comparison the adsorption of Cu in different levels of Soil Salinity showed that they not different adsorption of Cu in different levels of Soil Salinity to agree CEC of soil which each different levels of Soil Salinity adjacent. Showed that soil had low cation exchange capacity.

Key word : Soil Salinity

Comparison of Species Diversity in Aquatic Plants between East Sri-Than Lake and West Sri-Than Lake

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Comparison of Species Diversity in Aquatic Plants between East Sri-Than Lake and West Sri-Than Lake was studied the species which can grow in East and West Sri-Than Lake are found including growth factors were measured during July 2003 to August 2003 with quadrat technique (systematic sampling). The study had 2 parts, The studied plants were emerged plants and floating plants, and submerged plants. The result showed that submerged plants are not found in both lakes. Species diversity of emerged plants and floating plants in East Sri-Than Lake had higher than West Sri-Than Lake. Emerged plants and floating plants in East Sri-Than Lake are found 22 species within 19 families and 9 species within 8 families in West Sri-Than Lake. Species of aquatic plants which found in both lakes are 6 species within 5 families (similarity index = 38.70%), and narrow-leave cattail (*Typha angustifolia* Linn.) had the highest distribution and is dominant specie of studied areas with relative frequency and relative dominance are 25.26% and 26.56%, respectively in East Sri-Than Lake, and 36.59% and 57.76%, respectively in West Sri-Than Lake. Temperature and pH of water in both lakes are normal range for growing of aquatic plants. Average of dissolve oxygen is low by in East Sri-Than Lake and West Sri-Than Lake were 1.7 mg/l. and 4.2 mg/l., respectively, and average of electrical conductivity of the water in East Sri-Than Lake and West Sri-Than Lake are 1206 $\mu\text{s}/\text{cm}$ and 1566 $\mu\text{s}/\text{cm}$, respectively.

Key word : Species Diversity, Aquatic Plants

Diversity of phytoplankton in Kaen Nakorn reservoir and the propagation of information through the internet network

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From studying diversity of phytoplankton in Kaen Nakorn reservoir and the propagation of information through the internet network, 5 divisions, 5 classes, 9 orders, 12 families, 25 genera and 57 species were identified in the study including 1 for unknown and 2 for incomplete classification. When the numbers of top 3 genera were arranged, *Scenedesmus*, *Phacus*, *Pediatrum* and *Tetraedron* were those of the top 3 with 10, 7, 4 and 4 in numbers respectively.

All of phytoplankton database were propagated through the internet network in a form of Web application written by PHP script connected to MySQL. The site was designed for 2 groups of people; 1) General clients and 2) Administrator who was permitted to edit data via browser. The site was identified by <http://teenet.kku.ac.th/~splash>

Key word : Phytoplankton

Ethanol fermentation from bagasses by yeast.

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Ethanol production from acid-hydrolyses bagasses by yeast fermentation was studied. Bagass hydrolysate was obtained through treatment with concentrate hydrochloric acid hydrolysis on dried bagasses at a temperature of 121°C, under pressure of 15 pound per square inch for 30 minutes of saccharification. Reducing sugar obtained in the form of glucose was at 2.51 g/l which was used for ethanol fermentation. Comparative fermentation of bagasses hydrolysate by two yeast strains namely *Saccharomyces cerevisiae* Baker's yeast and *Saccharomyces cerevisiae* PP41 was undertaken. The results showed slightly higher ethanol level obtained by PP41 yeast strain at 1.26 g/l as compared to that of Baker's yeast strain with ethanol level of 1.24 g/l after 30 hours of fermentation. Proving that bagasses hydrolysate could be used for ethanol production.

Key word : Ethanol fermentation

Factors affecting variation of ground level ozone in Bangkok

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The study of factor affecting variation of ground level ozone in Bangkok using secondary data collected by Pollution Control Department during 1996 – 2000. The result found low ozone concentration at night, then increase steadily at 8:00 O'clock. During 11:00 – 17:00, there was highest ozone concentration and continued to slightly decrease to less than 10 ppb (part per billion) and close to zero. March to May were found to be high ozone concentration especially at Ramkhamhaeng Station, rised up to 150 hours exceeding the ambient air quality standard. The major cause were the exhaust from vehicles that was source of ozone precursor, medium to high dense population, many educational Institues, commercial area and industrial in some area. In contrast, Huai Knwang Station rised up only 29 hours exceeding the ambient air quality standard. There was medium dense population. Most of areas are Government places, and consumption area. Conclusively, factor affecting variation of ground level ozone in Bangkok is Meteolorogical ; topography might be another factor effects variation of that.

Key word : Ozone

Noise Level Monitoring at the first floor of Food and Service Center, Khonkaen University.

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The result from the study of hourly $Leq(5)$ from 06.00 AM.-12.00 PM. at KKU Food and Service Center showed that noise level was between 50.0 - 70.0 dBA in the area where noise level was lower than 70.0 dBA (area A). When compared with USEPA noise standard where 65 dBA was defined as nuisance noise, the 10.00 - 11.00 AM, 12.00 AM. - 2.00 PM. and 3.00-9.00 PM. time series were detected to be over noise standard. In the case of academic area, the time series 10.00 - 11.00 AM., 12.00 AM. - 2.00 PM., 3.00 - 9.00 PM. and 10.00 -11.00 PM. were found to be over the NEB noise standard. When compared with NEB standard for commercial area, all noise levels were in accordance with the standard. While in the area with noise level was over 70.0 dBA (area B), noise level was between 55.0-70.0 dBA in all time series except during 12.00 AM. - 1.00 PM.. Hourly noise level was measured and compared with the USEPA standard and it was found that between the time 9.00 AM. - 9.00 PM. was nuisance . When it came to the noise standard in community, 9.00 AM. - 9.00 PM. and 10.00 - 12.00 PM. were nuisance incase of academic area and 12.00 AM. - 1.00 PM. was considered to be nuisance incase of commercial area. Noise can be effectively absorbed with styrofoam with is 1.2 centimetre thickness.

Key word : Noise Level Monitoring

Quality of Drinking Water from Male student Dormitories at Khon Kean University.

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The objective of this study was to determine the physical , chemical and biological quality of drinking water in all male dormitories at Khon Kaen University. The results show that physical quality, such as taste , odour and turbidity (0.5 ± 0.12 SSU) ; chemical quality such as pH, total solid , total hardness , chloride , sulfate , nitrate , iron , copper and zinc were (7.1 ± 0.1) , (156 ± 31 mg/l) , (41 ± 5 mg/l) , (21 ± 5 mg/l) , (29 ± 4 mg/l) , (0.00 ± 0.00 mg/l) , (0.16 ± 0.03 mg/l) , (0.14 ± 0.02 mg/l) and (0.04 ± 0.02 mg/l) respectively ; biological quality such as coliform bacteria was (85 ± 143 /100 ml) but fecal coliform bacteria was not found .

The result in this study can be concluded that all parameters were within the standards criteria of drinking water that announced by Ministry of Public Health (1991 Edited) except the quantity of coliform bacteria .

Key word : Drinking Water

Quality of Groundwater for Consumption in the Area surrounding Community at KhonKaen Landfill Site.

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Water quality of groundwater for consumption in the Area surrounding Community at KhonKaen Landfill Site. this studies were conducted between July to August in 2010. The objective of this study was to determine physical, chemical and biological qualities of four artesian well namely Ban Noikhambon (Noikava), Ban Khambon, Ban Non and temple of Ban Buenggae with various distance from landfill sites of 0.3, 1.3 and 4 km respectively. The results of four artesian well showed that physical quality namely turbidity with values of 0.6, 0.5, 1.6 and 9.5 NTU respectively, pH at values of 6.25, 5.73, 6.24 and 6.50 respectively and conductivity at values of 881.2, 772.5, 1558.3 and 284.0 $\mu\text{g}/\text{cm}$ respectively. Chemical quality namely total dissolved solid with values of 615.5, 726.0, 319.5 and 196.5 mg/L respectively, total hardness at values of 270.1, 225.8, 469.0 and 278.2 mg/L respectively, chloride with values of 226.2, 1553.277.5 and 12.7 mg/L respectively, and nitrate concentrations were found only in Ban Noikaya and temple of Ban Buenggae artesian well with values of 0.7199 and 0.7309 mg/L respectively. Biological quality namely total coliform bacteria showed to have values of 5, 3.7, <3 and 6.3 MPN/100 ml respectively. Results compared to quality of groundwater for consumption show that physical and chemical quality of groundwater were within the acceptable standard. However the chemical values found at temple of Ban Buenggae artesian well were lower than acceptable standard for pH values and higher than acceptable standard for total dissolved values. Biological quality of groundwater with reference to coliform bacteria were mostly higher values than acceptable standard. These findings could be concluded that quality of groundwater showed to have a closed relationship with distances from landfill site. Groundwater from Ban Noikaya, Ban Khambon and Ban Non found to have similar qualities. Temple of Ban Buenggae artesian well had physical chemical values within the standard, except for

biological values showing higher coliform bacteria number over the acceptable standard value.

Key word : Quality of Groundwater

Quantity of Heavy Metals Contaminated in Water at Kaen Nakorn Reservoir, Khon Kaen Province.

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Heavy metals including Cadmium(Cd) Copper(Cu) Mercury(Hg) Lead(Pb) and Zinc(Zn) were analyzed by flame technique. Mercury(Hg) was analyzed using FIAS MHS technique. Quantity of the analyzed heavy metals are as follow : Copper(Cu) 0.0063 - 0.0212mg/L, Mercury(Hg) ND - 0.0004 mg/L, Lead(Pb) 0.0082 - 0.0260 mg/L and Zinc(Zn) 0.0227 - 0.0397 mg/L. These quantities indicate that water quality is accepted the surface water standard. The content of Cadmium varies from ND - 0.0110 mg/L, but most the majority of samples is above the standard value.

The water might be contaminated by non - point source. The contamination may be due to some activities such as using of phosphate fertilizer for trees around the reservoir and old tires which compose 20 -90 ppm of cadmium. Waste water from cars garages also cause oil spill. Restaurant's parking lot is another possible source of heavy metals contamination in the reservoir (e.g. eroded tires, engine oil and grease).

Key word : Heavy Metals

Risk assessment of Chemicals in Center Environmental Science's Laboratory ,Faculty of Science, Khon Kaen University

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This study is aimed to assess the risk of chemicals in Center Environmental Sciences Laboratory : to identify the type of chemicals, factors could lead to hazard by data collection, checklist, observation, analysis and assessment

The results found that there were 247 items of chemicals and 8 gas containers which used in laboratory during the first July to August 2003. They were classified to 7 types of hazardous chemicals as gas, flammable solid, flammable liquid, oxidizing agents, toxic substance, corrosive and miscellaneous. Two factors were found that the potential cause of harm: unsafe acts of users and the unsafe condition such as lack of detector and warning signal facility, draining of hazardous liquid waste without treatment, lack of information on how to handle hazardous chemicals, lack of good practice for chemical storage, no material recycling, damaging fume hood, lack of safety handle, chemical shelf was too narrow, none of maintenance, none of detected decay tools to repair, pipe was decayed, none of separate garbage and odouring problem.

The suggestion is a good practice for hazardous chemical use by applied Clean Technology.

Key word : Risk assessment

Some Heavy Metal Content in Water from the Final Pond of Oxidation from Series of Khon kaen University of SRINAKARIN Hospital Treatment Plant in Rainy Season.

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The Treated waste water from the polishing pond of Srinakarin Hospital Wastewater Treatment Plant were collected during July 2000 to August 2000 and analyzed for heavy metal , Pb , Cd , Cr , Cu and Mn by Flame atomic absorption method. It was found that the content of Pb , Cd , Cr , Cu , and Mn were between 0.008-0.0015 , ND-0.004 , ND-0.005 , 0.010-0.021 , and 0.525-1.045 ppm respectively.

Key word : Heavy Metal

Species diversity of phytoplankton in east and west Si Than Lakes, Khonkaen University.

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The study is to compare the species diversity of phytoplankton in the east and west Sithan Lakes, Khon Kaen University. First, the water samples were collected in the same period of time, which was 1-4 p.m. of 13th and 14th September 2003. Then, the water samples were studied in order to examine the species diversity of phytoplankton in both sides of the lakes and physical factors, chemical factors, and biological factors that might effect to the species diversity of phytoplankton. These factors are temperature, pH, dissolved oxygen, salinity, transparency, depth and biochemical oxygen demand. The result shows that the species diversity of phytoplankton in east Si Than Lake is higher than the species diversity in west Si Than Lake. It can be expected that temperature, pH, DO, salinity, and depth seemed not to have effect on the species diversity of phytoplankton in Sithan Lake while BOD and transperacy were likely to influence to the species diversity of phytoplankton in Sithan Lake. Furthermore, there probably be other factors that were not studied and have influence to the species diversity of phytoplankton in Sithan Lake.

Key word : Species diversity, phytoplankton

Species Diversity of Undergrowth Plants in Phu Poe Community Forest

(Kalasin Province).

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Phu Poe community forest in Tambon Naboan, Ampur Kammuang, Kalasin Province, consists of compound deciduous dipterocarp forest with mixed deciduous forest. The main objective of this study is to compile a checklist of undergrowth plants and explore their ethnobotanical information. The belt transect method, 10 meters wide with 1,200 meters long from ground level to the top of the mountain, was applied for plant collection. There were all together 16 belt transect with a distance of about 250 meters each. The plant specimens were collected from July to October 2003. General morphology and habitat of the plant collected with their uses (if any) were documented. A total of 101 species (72 genera in 49 families) were enumerated with one species each of non – seeded plant and the gymnosperm, 20 species (11 genera in 7 families) of the monocotyledonase and 79 species (59 genera in 40 families) of all the specimens collected, number of the family Zingiberaceae were the greatest in number (10 species)

Key word : Species diversity, Community forest

Studies of The Potential of Nongplathao Public Park as Recreational Tourist Place in Chaiyaphum.

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The study of the potential of Nongplathao Public Park which located in Chaiyapoom provincial management organisation's responsibility area for development to be a recreational place by Weighting Score Method which using 6 factors: reaching ;facility in the touring ; important and attraction of the touring place ; time that available for touring ;summing of touring places and safety for this study which using 103 questionnaires for tourists and a basic data surveying form then field surveying to analyze the potential for development to be a recreational place. In the study , the tourists which are surveyed are 60% female and 40% male and their age are between 16-25 years, 88% of the tourists are local people , almost tourists are student and to tour for relaxing which are 35% and 92.2% ,respectively, and 100% of surveyed tourists think that their will come back to Nongplathao Public Park again. In case of 6 factors of the study showed that reaching and summing of touring places 's score is 2.67 and 3 ,respectively, which is the high potential of Nongplathao Public Park .Facility in the touring , time that available for touring and safety's score is 1.047 , 2 and 2 ,respectively, which is the medium potential . Important and attraction's score is 0.78 which is the low potential. From the Nongplathao Public Park 's analysis indicated that there are things which should be improved is brochure that advise tour place, provide touring place distribution and provide the souvenir because in this part is still low potential and in the other part are medium potential. From the analysis of potential to be a recreational place of Nongplathao Public Park indicated that the potential score is 1.916 which could be classified as medium potential and important and is a minor recreational place means the tourists might go to the recreational place in second place when they come to that location.

Key word : Recreational Tourist

Study of Potentiality and Impact of Phu Pha Marn National Park, Khon Kaen – Loei as Ecotourism Tourist place.

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Study of Potentiality and Impact of Phu Pha Marn National Park, Khon Kaen – Loei as Ecotourism Tourist place. Basic information was observed and evaluated by Weighting Score Method.

The results showed that 2.32 and 0.69 were scored and classified to be high potentiality and low impact respectively for ecotourism tourist place.

However, tourists commented that the place had to be promoted to be a well-known ecotourism tourist place. Facilities and accommodations would definitely be developed and to be increasing in numbers in leading to sustainability.

Key word : Phu Pha Marn National Park, Ecotourism

Study of relationship between plant community and soils fertility.

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Apart from studying plant community on different soils with fertility in the area of Wat Pa Tammada Nakhonrachchasrima during June-August 2003 . The scope area was deciduous dipterocarp forest . *Shorea obtusa* and were dominant species in the community divided into 2 deciduous dipterocarp forest types . The deciduous dipterocarp forest type were classified by dominant species (deciduous dipterocarp forest shorea obtusa type , deciduous dipterocarp forest dipterocarpus obtusifolius type) . *S. obtusa* was dominant species in deciduous dipterocarp forest shorea obtusa type 121.86 for importance value index shown as with 70% ground cover . While *D. obtusifolius* was dominant species in deciduous dipterocarp forest dipterocarpus obtusifolius type 162.95 for importance value index shown as with 20% ground cover . 9 species of tree found in deciduous dipterocarp forest shorea obtusa type and 7 species of tree found in deciduous dipterocarp forest dipterocarpus obtusifolius type . 13 species were found and both similarity index were 50% indicating to be different for species similarity in the areas .

Soil texture in selected areas defined as sand . Soil color at 0-10 was darker than 10-40 cm. Deep . Comparatively , soil color in deciduous dipterocarp forest shorea obtusa type was more than deciduous dipterocarp forest dipterocarpus obtusifolius type . Analysed soil results in deciduous dipterocarp forest shorea obtusa type indicated to be more than deciduous dipterocarp forest dipterocarpus obtusifolius type for CEC , pH , OC and OM except EC 6 nutrients were analysed . The result showed that K , Mg , N and P in deciduous dipterocarp forest shorea obtusa type were more than deciduous dipterocarp forest dipterocarpus obtusifolius type for but Na and Ca was less .

Similarity index in both forest type were 50% but importance value index were different indicating nutrient quantities in soil related to plant species in the scoped area affecting to plant growth in both areas .

Key word : plant community, soils fertility

Tap Water Quality in Female Dormitory at Khon Kaen University.

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Project advisor : Dr. Lamyai Neeratanaphan

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The objective of this study was to determine the physical, chemical and biological of Tap water quality in Female dormitory at Khon Kaen University and compared this parameters with standard of Provincial Waterworks Authority. Sampling of Tap water from 4 dormitories during June - July 2011. The result of physical quality, average value of turbidity and pH was 1.25 NTU and 6.65, respectively ; chemical quality, average value of total dissolved solid and chloride was 132.37 mg/L and 12.87 mg/l, respectively ; biological quality, average value of coliform bacteria was 1.13 MPN/100 ml. The results in this study can be concluded that parameter such as turbidity, pH, total dissolved solid and chloride were within the standards. However the results for biological parameters were not within the standards because of the pipe water systems or faucet was contaminated. Thus, the manager systems should be check water quality continuously for be safe to users.

Key word : Tap Water Quality

Termites at Khon kaen University.

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Project advisor : Dr. Lamyai Neeratanaphan

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The study of Termites at Khonkaen University. Two nature forest were Plastic pond and Twenty-five years old building between July to August 2003. Study on taxonomy and some ecological factors; soil textures soil moisture soil temperature and soil pH. , tree plant shrubs and herbs. The following was found 4 genus of 2 families were found in this study namely *Microtermes*, *Macrotermes*, *Odontotermes* of Family Termitidae and *Coptotermes* of Family Rhinotermitidae. Plastic pond was found 4 genus of 2 families namely *Microtermes*, *Macrotermes* and *Odontotermes* of Family Termitidae and *Coptotermes* of Family Rhinotermitidae. Twenty-five years old building was found 3 genus of 2 families namely *Microtermes* and *Odontotermes* of Family Termitidae and *Coptotermes* of family Rhinotermitidae. Tree plants 16 species 10 family and Lower plants 14 species 9 family. Physical factor of nature forest at Plastic pond and Twenty-five years old building are soil textures loam,loam sandy ;respectively . soil moistures 5.95, 6.57 ; respectively. Soil temperature 30.78 °C , 25.82 °C; respectively. Soil pH 5.16, 4.24; respectively.

Key word : Termites

The study of environmental and safety on the area of A Foundry Industry in Khon Kaen Province : case study factory one.

Student : Miss Thanatsanee somboon

Project advisor : Dr. Lamyai Neeratanaphan

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The study of the environment and safety in A Foundry Industry in Khon Kaen Province:case study factory one with ten factors, i.e. The illumination, noise exposure, temperature, total dust, waste water management, solid waste management, chemical management, Ventilation and inspection to folk lifts operation.

The result showed that, there are five factors exceed the standard in all sectors, that are temperature (in the range of 22.00 – 31.67 °C), noise exposure (in the range of 64.40 – 88.43 dBA, total dust (not exceed 15 mg/m³). Ventilation is fine, inspection to folk lifts operation is good and ready to be used. The illumination in five sectors did not exceed the standard and the waste water management, solid waste management and chemical management should be improved.

Key word : Environmental and safety

The Study Potential of Wind Energy in Southern Thailand .

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This study examines the potential of wind energy in Southern Thailand using Wind Rose analysis. Meteorological data (wind speed and direction) during 2-year period (2000-2001) of 21 meteorological stations were analyzed. The result of Wind Rose analysis shows that Songkhla, Phuket(airport), Ko Lanta, Ko Samui, Hat Yai(airport), Krabi, Prachuap Chiri Khan, Trang(airport), Nakhon Si Thammarat, Kanom, Phuket, Phetchaburi and Hua Hin Station are have potential to become a wind-power generating station. At Songkhla Station the mean wind speed during the day (10:00-19:00hr.) is higher than the wind speed at night. Most of the wind direction is westward. The highest mean wind speed is in winter season. The range of % calm is 29-94 % and the maximum wind speed is 20 knots or 10.29 m/s. This information is very useful for design a wind mill that will not destroy by fastest wind speed.

Key word : Wind Energy

The Dispersion of Pollutants in Eastern, Thailand.

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Annual and monthly wind speed and direction data of the year 2000-2002 from 11 meteorological stations in the East were used to create progressive wind vector using a program called Wind Rose. The progressive wind vector was then analyzed to determine dispersion of air pollutants. Most wind blew with southwestern direction. The maximum mean wind speed at 3.4- 10.9 knots most frequently occurred on November 4, 2002. Progressive wind vector within 24 hours at Prachin buri meteorological station shows that the wind blew southwestern direction and caused the furthest dispersion of air pollutants (75 kilometers). The nearest dispersion was recorded at Pattaya station. Nonetheless, approximately 20 kilometers-northeast side of Pattaya was determined the most sensitive zone.

Moreover, dispersion of pollutants from Map Ta Phut Industrial Estate, Rayong was particularly analyzed. Progressive wind vector within 24 hours at the closest station to the site, Sattahip, presents that the maximum mean wind speed (9.5 knots) occurred on August 25, 2002. The most various wind direction occurred on August 29, 2000. Pollutants were dispersed northeastern and northwestern directions away approximately 12.3 and 1.14 kilometers respectively. Areas with high risk of heavy wind variation and air pollution are at Map Ta Phut Wittayakarn School, Ban Plong, Ban Saklukya, Ban Takwan, Ban Tung Sumneuk and Sattahip.

Key word : Dispersion of Pollutants

The Eco-tourism of Dinosaur Archaeological Place at Phu Kum kaw Wat Pasakkawan Amphur Sahassakhan Changwat Kalasin.

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The studies of the Eco-tourism of Dinosaur Archaeological Place at Phu Kum Kaw Wat Pasakkawan Amphur Sahassakhan Changwat Kalasin , two main purposed , these were the potential as ecotourism tourist attraction and the knowledge of the tourist interm of ecotourism , the results obtained could be utilized as basic data to establish development plan and management. The tourrism potential evaluation form was used in this studies and 104 set of questionare were used to obtain data form tourists.

The result show that Phu Kum Kaw Dinosaur Archaeological Place has high potential interm of tourists visited Phu Kum Kaw Dinosaur Archaeological Place understand about ecotourim and know this tourist attraction quite well. The knowledge about ecotourism and occupation are independent ($p>0.05$) . The knowledge about ecotourism and level of education are dependent($p<0.05$)

Key word : Eco-tourism

The possibility of using herb extract for knocking fruit fly instead of using anesthetic ether.

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From studying the possibility of using clove oil and volatile oil which was directly treated to 10 fruit flies in 215 ml. test tube, extract by steam distillation, the result showed that 15 g, 30 g, and 60 g of dried clove using in extraction could release 1.42 g, 2.32 g and 4.11 g of extract oil respectively. Contrary, 15 g of fresh volatile could not release enough amount of extract oil to experiment while 30 g and 60 g could respective release 1.76 g and 3.04 g of extract oil. The capability experiment with 10 fruit flies of both oil, clove oil and volatile oil, show that they could not be used to stop the movement or faint the object oppositely the study showed that 1 g, 2 g, and 3 g Of clove oil, which is generally be found in the market, using to faint 10 fruit flies in 130 ml. test tube by indirectly applied to objects could chronologically stop all of their movements in 5, 4, and 4 minutes. During the examination on fruit flies, it is found that some objects quickly flew away. In addition, the length of time for fainting the objects should be longer.

Key word : herb extract, knocking fruit

The quality of clushed ice sold in Food and service center of Khon Kaen University.

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The determination of clushed ice quality was sold six shop at Food and service center of Khon Kaen University .The study was analyzed physical ,chemical ,biological characteristic of clushed ice. The result show that pH value had over than standard criteria (93.75 % of total samples) turbidity not above standard criteria, total solid and Lead under standard limited, but Cadmium is not (87.5% of total samples) The coliform bacteria and fecal coliform bacteria had above standard criteria (100% and 50% of total sample, respectively.) however the coliform bacteria and fecal coliform bacteria value contaminated in clushed ice container and glass was not significant statistic different ($p>0.05$)

Key word : quality of clushed ice

The Quality of Drinking Water in Khon Kaen University

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The study of quality was done to be a safety information for consumers in Khon Kaen University. First the water samples were collected from Food and Services Center , cafeteria 2 and U -Center with in six samples in each station (totally 24 samples).Then ,the water samples were studied in order to know turbidity ,pH ,total solid ,lead ,cadmium ,total coliform bacteria and fecal coliform bacteria. The result showed that turbidity was in the range of 0-0.5 NTU ,pH was in the range of 7.0-7.8 ,total solid was in the range of 8-29 mg/l ,lead was in the range of 0-0.1 mg/l ,cadmium was in the range of 0-0.05 mg/l ,total coliform bacteria was in the range of 3-460 MPN/100cm³ and fecal coliform bacteria was in the range of 0-9.1 MPN/100cm³ .

The result can be concluded turbidity ,pH and total solid had in the standard.Lead ,cadmium ,total coliform bacteria and fecal coliform bacteria had not in the standard (12.5 % ,41.67 % ,91.67 % and 16.67 % respectively) and drinking water in Food and Services Center and cafeteria 2 were not gave for health of consumer.

Key word : Drinking Water

The Relationship between Ammonia-Nitrogen and Total Phosphate in Water and Phytoplankton Quantity in Rice Paddy Field in Supanburi Province.

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The study of Ammonia-Nitrogen and Total Phosphate in Water in Rice Paddy Field in Supanburi Province. The 1st study conducted in September 2001 found that the average Ammonia-Nitrogen quantity was 27.99 mg/L and Total Phosphate quantity averaged 0.559 mg/L. The 2nd study conducted in October 2001 showed the average Ammonia-Nitrogen quantity to be 24.57 mg/L and for that of Total Phosphate quantity averaged was 0.079 mg/L. The study of phytoplankton classification revealed that there were 3 divisions, 31 genera and another 5 unknown genera of phytoplankton. The 1st study the total number of phytoplankton was 8,674 unit cell/L. The 2nd study the total of phytoplankton was 1,720 unit cell/L. Moreover, from both studies showed that the quantity of Ammonia-Nitrogen and Total phosphate have a relationship to quantity of phytoplankton significantly. The studies parameter of water quality : EC, temperature, pH and DO have not relationship to quantity of phytoplankton.

Key word : Ammonia-Nitrogen and Total Phosphate

The study of environmental and safety on the area of A Foundry Industry in Khon Kaen.

Province : case study factory one.

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The study of the environment and safety in A Foundry Industry in Khon Kaen Province:case study factory one with ten factors , i.e. The illumination, noise exposure, temperature, total dust, waste water management, solid waste management, chemical management, Ventilation and inspection to folklifts operation.

The result showed that, there are five factors exceed the standard in all sectors, that are temperature (in the range of 22.00 - 31.67 °C), noise exposure (in the range of 64.40 - 88.43 dBA , total dust (not exceed 15 mg/m³). Ventilation is fine, inspection to folk lifts operation is good and ready to be used. The illumination in five sectors did not exceed the standard and the waste water management, solid waste management and chemical management should be improved.

Key word : environmental and safety

The Study of Tree Species Diversity in Phu Por Tumbon Nabon Ampur Kammaung Kalasin Province.

Student : Miss Prapaporn Senadee

Project advisor : Asst. Prof. Samang Homchuen

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A study of tree species diversity in Phu Por Tumbon Nabon, Amphur Kammaung, Kalasin province was conducted from July 2003 to August 2003. The objective of the study were to produce checklist and describe morphological characters. The belt transects method was applied with 10 meters wide and 4,000 meters long around downhill there was 1 belt transect and 1000 meters long along downhill up to top hill. There were 16 belt transects with 250 meters intervals. All kind of trees were collected and identified as well as the description of plants were given. From the study, 88 species, 60 genera in 32 families were found. The dominant species were in Papilionaceae.

Key word : Tree Species Diversity

The Tropical Lowland Forest “The Last Habitat of The Pitta Gurneyi” in Khao Pra-Bang Khram Wildlife sanctuary, Krabi.

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The study of environmental factors both physical and biological, on the habitat of *Pitta gurneyii* on the Bangtiew, nature trail in Khao Pra-Bang Kram Wildlife Sanctuary was conducted between the 25th to 27th of October, 2002. Five randomly selected 10X10 m plots were studied. The study shown that soil characteristics were a bit acidic (pH in average was 5.8). The moisture in the soil was 89.66 % in average. The average temperature in soil was 24.16°C. Light intensity in the small open space in the shade were 483.2 lux and 278 lux respectively. The slope was 6 % in average. The air temperature of the air was 28.80°C in average.

The studied area was a tropical lowland forest, which was 100 m. above sea level. Dominant species of trees were *Hopea avellichii*, *Schiina wallichii*, *Shorea roxburghii*, respectively. The canopy layer was dense and closed. Dominant shrub was *Oroxylum indicum* Verit. The dominant undershrubs were *Salami rumpii*, *Licuala pinosa*, *Oneosperma tigillaria*, *Pandanus* spp, *Alpinia* spp. *Pitta gurneyii* nest in *Salacca rumpii*, *Calamus* spp and *Licuala* spp. The nests were about 0.5-0.8 m. above the ground. Most of the nest were in the trees near the streams.

Key word : Tropical Lowland Forest

Tolerance of *Nymphaea sp.* and *Actinoseripus grossus (L.f.)* Goetgh & D.A. Simpson to Silk Dyeing Wastewater.

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This study was done to compare the tolerance of two aquatic plant species, i.e. *Nymphaea sp.* and *Actinoseripus grossus (L.f.)* Goetgh & D.A. Simpson. First, the plants were acclimatized to silk dyeing wastewater and the new environment for two weeks. Next, the former silk dyeing wastewater was taken out and refilled with silk dyeing wastewater of three concentrations, 25%, 50%, and 100%. Then, the growth rate of the two species was determined by measuring the increase of the central leaf length in terms of percentage and counting the number of new leaves. *Nymphaea sp.* seemed to be intolerant to the silk dyeing wastewater of every concentration. It was badly rotten in two weeks. While the *Actinoseripus grossus(L.f.)* Goetgh & D.A. Simpson in all silk dyeing wastewater concentration was more tolerant. Since the silk dyeing wastewater dried up earlier than anticipated, the growth of the plant could be measured in only two weeks. Therefore, it can be concluded that *Actinoseripus grossus(L.f.)* Goetgh & D.A. Simpson is more tolerant to the silk dyeing wastewater than *Nymphaea sp.*

Key word : Tolerance, *Nymphaea sp.*, *Actinoseripus grossus*

Tolerance *Eichhornia crassipes*(Mart.)Solms and *Typha angustifolia* Linn. Silk Dyeing Wastewater.

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The study was done to compare the tolerance of two aquatic plants species i.e. *Eichhornia crassipes* (Mart.) Solms and *Typha angustifolia* Linn. First, plant these two aquatic plants in the tank in order to let them recover and adapt themselves to the new environment for two weeks. Then, take the former water out of the tank and refill with silk dyeing wastewater of three concentrations; 100% , 50% , and 25% in each tank. After that, measure the growth rate of the 2 species by measuring the length of the central leaf and counting the number of new leaves. Due to the fact that the wastewater had dried up within 2 weeks, therefore the growth of the plant was measured in only two weeks. It was found that both plant species could tolerate every concentration of silk dyeing wastewater. *Typha angustifolia* Linn was more tolerant to the wastewater than *Eichhornia crassipes* (Mart.) Solms as it could be seen that percentages of central leaf length increase and number of new leaves occurred of *Typha angustifolia* Linn were higher.

Key word : Tolerance, *Eichhornia crassipes*, *Typha angustifolia*

Wastewater Characteristic from Inlet Chamber of Wastewater Treatment System of Faculty of Medicine Khon Kaen University.

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The studies of wastewater properties from inlet chamber of wastewater treatment of Faculty of Medicine Khon Kaen University. Parameters studied were pH, Suspended solid(SS), Total dissolved solid(TDS), Biological oxygen demand (BOD), Chemical oxygen demand (COD), Ammonia nitrogen (NH₃-N), Total phosphorus and Grease and Oil. The result were as follow

pH ranged between 6.42-6.89 with the average of 6.66. Suspended solid ranged between 75.33-100.00 mg/l with the average of 85.83 mg/l. Total dissolved solid ranged between 233.33-310.67 mg/l with the average of 260.33 mg/l. Biological oxygen demand ranged between 47.87-66.27 mg/l with the average of 56.90 mg/l accepted by Building Effluents Standards and Surface Water Quality Standard defined to be less than 20 mg/l. Chemical oxygen demand ranged between 152.99-316.36 mg/l with the average of 229.85 mg/l. Ammonia nitrogen ranged between 12.83-16.66 mg/l with the average of 14.64 mg/l. Total phosphorus ranged between 4.88-6.00 mg/l with the average of 5.19 mg/l. Grease and Oil ranged between 2.53-5.40 mg/l at the average of 4.51 mg/l.

Parameters accepted by Building Effluents Standards of Pollution Control Department are pH and TDS. Those unaccepted are SS BOD and NH₃-N.

Parameters accepted by Surface Water Quality Standard of Pollution Control Department are pH and Grease and Oil. This unaccepted is BOD.

Key word : Wastewater treatment