

## ***SOCIAL SCIENCES DIVISION***

**SSD-1**

### **COMPARATIVE SOCIO-ECONOMIC AND TECHNICAL IMPACT ANALYSIS OF RICE-MONOCULTURE AND RICE-DUCK FARMING IN THE PHILIPPINES**

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This research investigated the socio-economic aspect of rice-duck farming system. Data were analyzed using t-test and multiple regressions by Cobb-Douglas production function. The rice-duck farming system had higher net return and was more economically and technically efficient than rice-monoculture. There was higher return to labor in rice-duck farming while technical efficiency was measured by  $r^2$  indicating that 36.58% was the level of contribution of the combined inputs that affect crop yield. Seeds and labor largely influence the crop yield. Benefits to farmer were added income, space utilization, waste management and environmental concern. The yield from rice-monoculture was significantly higher ( $p < 0.05$ ) than rice-duck farming, however, the net income was significantly higher for the rice-duck farming ( $p < 0.01$ ). Above findings showed a promising rice-duck farming system in the Philippines as it is technically and economically efficient.

**Keywords:** rice-duck farming system, rice-monoculture, socio economic analysis

SSD-2

**GENERATING PROJECT OUTCOMES THROUGH PARTICIPATORY  
MONITORING AND EVALUATION:  
THE CASE OF CASREN PHILIPPINES**

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Participatory monitoring and evaluation (PME) in which the project implementers with farmer-partners, development workers, local government units, and other stakeholders commit to collaboratively work together in generating project outcomes is important. As used in the Crop-Animal Systems Research Network project in the Philippines (CASREN Philippines), PME was put in place to better account for stakeholders' feedback and project performance. Socio-economic and crop-livestock data were regularly monitored among farmer-partners from project covered areas in Pangasinan. Participatory exchanges through informal interactions, experience sharing and focus group discussions were used along with participatory tools such as spillover maps, season long monitoring form, meta cards, bio-resource flow, technology and benefits ranking and cropping pattern timelines.

The project outcomes generated through PME point to increased technology adoption among farmers in the project sites leading to enhanced crop-livestock productivity. Increased economic benefits were derived as well as positive changes in the acquired knowledge, attitude and practices of farmers and development workers. The stakeholders' active participation in the project policy effort proved fruitful with the shift from position to program-oriented organizational structure in the municipal agriculture offices and providing support structures in institutionalizing CASREN modalities within local governments units.

Participatory monitoring and evaluation was found to be a reflective, action oriented and learning process providing stakeholders with the opportunity to reflect on the project's progress and obstacles; generating outcomes that result in the application of lessons learned and leads to improvements and corrective actions; and helped build capacities of stakeholders enabling them to better understand

their environment and make changes by themselves on those that they have discovered and advocated.

**Keywords:** participatory monitoring and evaluation, participatory tools and techniques, CASREN Philippines, crop-livestock productivity

SSD-3

### ENVIRONMENTAL KNOWLEDGE IN SOUTHERN PHILIPPINES

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Conservation without the necessary knowledge, skills and desire is useless. Surveillance of the levels of knowledge about the environment will subsequently determine how well-equipped the individuals are to cope up with the increasing environmental responsibilities. The study was carried out to summarize the current state of environmental knowledge of adults in various science-related fields in Southern Philippines. Almost all of the respondents were concerned about the current status of our environment and hold themselves responsible for its protection. Paradoxically, their interest in nature and animals ranked a lowly third after health and current events. Twenty multiple choice questions were crafted to determine basic environmental knowledge. It was formatted in such a way that it would have one correct answer, one plausible but incorrect answer, and two nonplausible answers. A high percentage of Mindanaoans (78%) were able to have at least 10 correct answers. There was no significant difference in the responses of men and women in the study, thus eliminating gender disparity in environmental knowledge.

The most significant single factor in the level of environmental knowledge in this study was the respondents' level of education ( $p=0.00020587$ ). Ninety-eight percent of the college graduates passed the literacy exam, while 28% of college students had failing marks. This result suggests that environmental knowledge may be acquired over a lifetime and most probably through the media. The lower environmental literacy of the tertiary students may also imply probable weakness in the current environmental education in our school systems.

The preliminary assessment on the awareness of the locals on simple environmental topics is significantly high indicating that we have an informed citizenry which is very enlightening and hopeful. Organized delivery of

environmental education to this well-informed public would elicit their fullest potential in achieving and maintaining a sustainable environment.

**Keywords:** environmental knowledge, environmental literacy, environmental education

SSD-4

**FROM *Pailis* to *Pasungko*: NEGOTIATING THE PRESENT,  
ASCERTAINING THE FUTURE  
(INDIGENOUS KNOWLEDGE SYSTEMS AND OPPORTUNITIES FOR  
BIODIVERSITY MANAGEMENT AND CONSERVATION)**

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This study describes the indigenous knowledge systems, the adaptive strategies, and the traditional resource use practices of the Subanun in Mt. Malindang. The study sites included 6 communities located in the province of Misamis Occidental. It benefited from a triangulation of methods and sources: documentary review and secondary data gathering, focus group discussion, key informant interviews and testimonies, and participant and non-participant observation.

Similar to many indigenous peoples in the Philippines, the Subanun have lived with the vicissitudes of their biophysical environment for ages, moving through river systems, across hills and over mountains punctuating the landscape of their ecosystem. Central to their culture is the belief that human beings are stewards of the vast resources. In the utilization of these resources, they observe certain cultural prescriptions and proscriptions. The Subanun indigenous knowledge system (IKS) has undergone transformations that are contextualized in the circumstances – environmental changes, social pressures, market-driven economy and constraints imposed by law – impinging on their interactions with the biophysical environment and various stakeholders.

The traditional practices are a function of the need for survival. Several elements of Subanun IKS exercise regulatory functions in resource use. Among these elements are: *sal-ang*, *pamuhat*, terracing, use of indigenous materials for fertilizer, *paanuton/pasagbutan*, or fallowing. An appreciation of the ways in

which IKS elements prevent over-exploitation or deterioration is essential in biodiversity management and conservation of the ecosystems in the study sites. These IKS elements may synergize with approaches that are based on formal science and modern technology, articulated in various ways that, while assuming a pragmatism that is cognizant of the demands and pressures of the biophysical, socio-economic environment, are also capable of protecting the natural resource base of the environment.

**Keywords:** Indigenous knowledge systems, biodiversity management, biodiversity conservation, regulatory functions of traditional practices, conservational characteristics

SSD-5

### **LIVELIHOOD SECURITY AND ENVIRONMENTAL SUSTAINABILITY IN THE MT. MALINDANG NATURAL PARK**

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The study assesses the socio-economic dimension of environmental sustainability in and around the Mt. Malindang Natural Park (MMNP), a protected area in Misamis Occidental, focusing on community ownership of certain assets – natural, human, physical, financial, and social – which can be utilized to generate livelihood options. It also reviews community awareness, acceptance and compliance of environmental policies, particularly the National Integrated Protected Areas System (NIPAS) Act, in the uplands and lowlands, and the Fisheries Code of 1988, along the coasts. The study was conducted in 12 barangays in six municipalities and one city in Misamis Occidental representing upland, lowland and coastal communities.

The study benefits from a triangulation of information sources and data gathering techniques. It applied quantitative and qualitative research methods to provide a meaningful description of livelihoods, resource utilization, and community response to environmental policy enforcement. Quantitative data were obtained

using sampling techniques; key informant interviews and focus group discussions were primarily employed in the qualitative approach.

The people in communities studied across the landscape are deprived socio-economically. They have limited access to social services; they lack skills and cheap credit sources that provide opportunities for higher income. They grapple with poor infrastructure. People-environment interactions were evident. The first settlements, the coasts, have no mangrove forests and protection of marine biodiversity is a major challenge. The lowlands are dominated by plantation forests, planted to monocrops. The uplands, the last settlement frontier and home to indigenous peoples, still have intact – although fast diminishing – forests, the object of protection by laws. Awareness of environmental laws is low; acceptance and compliance is anchored on the perceived positive impact on livelihood.

Findings have various policy implications but point primarily to the strengthening of the communities' capability to meet the increasing demand for survival as a basic requisite for ensuring environmental sustainability.

**Keywords:** livelihood security, environmental sustainability, resource utilization, biodiversity conservation, protected area

## SSD-6

### **SOCIAL STRATIFICATION AND ESTIMATION OF THE SCHOOL, RECREATION AND HEALTH CHARACTERISTICS OF WORKING CHILDREN IN THE PHILIPPINES, 1995 AND 2001<sup>1</sup>**

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The Philippines has an estimated 3.7 million child laborers. Past studies show that child labor robs children of their childhood and has tremendous effect on their health and education. The data are from the 1995 and 2001 sample of working children aged 5 to 17 years old of the National Survey on Working Children (NSCW). Using cluster analysis, the study stratified and compare the working children in the 16 regions in the Philippines in 1995 and 2001 on their socio-economic work and work-related schooling, health, and recreational characteristics.. The study has adopted eclectic perspectives (labor market, social responsibility

and child centered) to analyze the problem of child labor with the aim of developing more effective action policies against abuse of children in and through their work. Results show that the longer the child spent time in work, the lower the odds of school attendance. A more interesting finding shows that the nature of relationship of the child to his employer has a significant effect on school attendance. Heavy physical work like those in the agricultural sector increases the probability of the children becoming a school dropout. Except for Metro Manila, Northern Mindanao and Central Luzon, working children in other regions who are not in school is less than 10% in 1995. In 2001, children in these three regions, who are not studying have decreased. School related reasons rather than family related matters are the main reasons for dropping in 1995 and 2001. Free time hours spent for sleeping have increased for all working children in the different regions in 2001 as compared in 1995. In 1995, children who spent more time sleeping have suffered less from illness or injuries while the children in 2001 data who engaged in activities other than sleeping have suffered less injury and illness. In general, it was found that working children are at risk of being affected by parasites and sustaining injuries. Stratifying children by their schooling, health and recreational characteristics reveals that child who works are not always "children at risk" or "children in crisis".

**Keywords:** child labor in the Philippines, social stratification, cluster analyses, health, education, recreation characteristics.

**SSD-7**

### ***DIDANGERS OF ILIGAN CITY***

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Scavengers constitute the dominant fraction of the marginalized population in the Philippines. These are individuals who pick out recyclable elements from mixed waste for its financial value and for personal consumption. Although there are no accurate estimate of the total quantities of materials recovered by waste pickers, the contribution of the recovery of resources to urban economies as well as their role in reducing waste have been often overlooked but cannot be dismissed as unimportant. The scavengers of Iligan City are known as the '*mandidangay*' and the new generation specifically the pediatric scavengers are referred to in a local slang '*didangers*'.

Fifty children (16 girls and 34 boys), of ages four to fourteen, majority of whom are constant street pickers (72%) were interviewed. All were school kids who scavenge for an average of four hours a day, seven days a week. These streetwise youngsters work in groups and sell their collected recyclables to local junk shops. Despite of collective scavenging, harassment was still prevalent particularly from other waste pickers competing for the same recyclables and also for the local residents. Ironically indicators for home environment and socio-economic status showed that these *didangers* do not belong to the poorest of poor for majority of the families of the subjects have their own house with the basic home appliances. However, nutrition-wise, these children were found to be underfed but were not necessarily malnourished. It is quite unfortunate that these *didangers* have been constantly subjected to avoidable work hazards. They lack the necessary protective gear for searching through thrash, though no complaints were reported due to the benefits they can get for scavenging.

A national large-scale study should be conducted in order to properly recognize this neglected sector in order to give them protection and provide other sources of income to liberate the *didangers* from the bondage of waste-picking

**Keywords:** recyclables, waste pickers, scavengers, *mandidangay*, *didangers*

SSD-8

## CHILD PROSTITUTION AS A NEW FORM OF SLAVERY IN MINDANAO

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This paper presents the dismal condition of child labor<sup>2</sup> in two cities of Mindanao based on three separate research outputs employing both quantitative (survey) and qualitative (FGD, key informant interviews, case study) tools. Focused on the sexual exploitation of children as a new mode of slavery, in particular it

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<sup>2</sup>The empirical information about child labor in this paper is based on three studies in Mindanao, namely: "A Situational Analysis of Child Prostitution in Iligan City," a UNICEF-funded project of DOLE Region 12 and Notre Dame University in 1997; "Street Adolescents in Street Gangs in Davao City: A Participatory Action Research," an NGO-initiated participatory action research of the Center for the Care of the Abused Children-TAMBAYAN, Inc. in 2000 with funding support from Save the Children-UK and UNICEF; and "Participatory Action Research on Working Children in Iligan City," of Hope for Change, Inc. City in 2003 with funding assistance from CORDAID-Netherlands.



attempts to integrate the three research findings and to reinterpret the social phenomenon as a continuing challenge tied to development. Two of these three studies are participatory action researches conducted for NGOs purposely to document the condition of working children, to identify appropriate strategies and effective development interventions, as well as to generate needed information as basis for policy advocacy. In the case of Iligan City, the working children from different work clusters included the entertainers euphemistically called "guest relations officers" or GROs. In another study focused on child prostitution, the other names for those children engaged in flesh trade are "akyat-barko" or "dampa." Called "buntog" in Davao City, the same social phenomenon also portrays gender inequality. Notwithstanding the local customers, the clients also include foreigners such as Americans, Japanese, Koreans, Greeks, and many more others.

Generally, the study revealed that poverty and dysfunctional families were the main reasons that pushed children to join child prostitution in order to earn at an early age. As a strategic response to poverty, work becomes a source of contribution to family income depriving the children the privileges they are supposed to enjoy. To some extent, the community and global situation reinforced the emergence of child labor.

Once again, it must be made lucid that survival, development, protection and participation rights of the children remain rhetoric without the strong political will of both the agency and the structure. Most importantly, sustainable development for children means expanding their choices and creating the conditions for the realization of their resources, potentials and competencies both at the national and international levels.

**Keywords:** child labor/prostitution, poverty, social dysfunctions

**SSD-9**

**SOCIAL ACCEPTABILITY AND MARKETABILITY  
OF WELL-FAMILY MIDWIFE CLINICS (WFMCs)  
IN MUSLIM-DOMINATED AREAS OF MINDANAO**

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This study was mainly conducted as basis for expansion of WFMCs in the

Autonomous Region of Muslim Mindanao (ARMM). Employing a total of 549 respondents, the methodology is a triangulation of the quantitative and qualitative techniques in research. A sample survey was employed with 400 eligible Muslim mother respondents from Marawi (Maranaos), Datu Paglas (Maguindanaoans), Basilan (Yakans) and Jolo (Tausugs). Key informant interviews were also conducted among the 23 religious leaders/scholars. The participants of the focus group discussions were NGO, LGU and community representatives.

Some of the salient findings of the study are as follows: The preferred family planning (FP) method was pills. Permanent methods such as ligation and vasectomy were found unacceptable. The religious leaders expressed preference for natural FP and more than a third were in favor of artificial FP upon medical device whenever the mother child's health is in danger. Availment of health care services shows combination of the modern and traditional health service facilities/personnel. A greater number availed themselves of the services of the traditional health service providers.

On acceptability and marketability of Well-Family Midwife Clinics, the findings showed strong endorsement. The possible major constraints to WFMC expansion are:

- Misconceptions on the notion of FP in Islam
- Low affordability level of Muslim mothers due to poor socioeconomic condition
- Muslim's patronage of traditional health service providers inspite of the presence of the formal health service services
- Unstable peace and order condition in Mindanao

While the challenge of development is to enhance the quality of life, it is imperative to address unmet and urgent needs of Muslim mothers and children to contribute to the general welfare of Muslim communities, as well as to make a difference in the elusive peace and development of Mindanao.

**Keywords:** WFMC expansion, maternal/child health care

**SSD-10**

**WHAT TEENAGERS THINK OF FRIENDSHIPS, ROMANTIC  
RELATIONSHIPS AND SAFETY IN A VIRTUAL WORLD**

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Many young people are actively using the Internet to find information, play games, to meet new people and to make new friends. It is through the internet that many people tend to talk about their lives and to form new relationships with each other. We conducted a survey of 188 student internet users of the university with ages 16-19 to be able to find some of the answers. Results showed 54% of those who use the internet had virtual friends even when they were as young as 10 years old. The ages of virtual friends range from 10 years old although a majority ages 18 and above. Many communicate with their online friends through chat and instant messaging. Of those with virtual friends, 36% had online romantic relationships who liked that they get to meet people outside of the school, are less intimidated by dating someone less often seen, and have less commitment when dating someone less often seen. Those who do not have on-line friends believe that having online boyfriend/s or girlfriend/s is tantamount to cheating. Regarding trust and truthfulness with virtual friends, only 25% agree they like virtual relationships because they can pretend they are someone they are not. Only 6% usually trust what people tell them online. Age, gender, location and names are the common things the respondents lie to online friends they do not know. Likewise, they also believe that the same things are also lied to them by their online friends. A higher percentage (58%) believed it is unsafe meeting virtual friends in person. Friends (27%), school (12%), parents (13%), website (10%), and experience (10%) are the common sources of information how to be safe online. Of all the people they talk to online, 29% were not known before, 30% said they met a few of those, 14% most of those were already known to them and 23% said they met all of them. To those who had virtual relationships, 18% have talked on the phone, 5% met in public, 25% met in private, 19% used a webcam, 9% wrote letters in emails, 9% exchanged pictures, and 15% communicated online. Hobbies, birthday, last name, first name, phone number, email address, favorite book, favorite movie, parent's names, street address, city, province, country, favorite color, what they look like, and name of school are the common information shared to online friends. Only 14% agreed they are closer to

their virtual friends than the friends they see face to face. Fifty-nine (59%) believed it is not easier to be honest in a virtual relationship than in a person-to-person relationship. Only 9% believed it is easier while 29% believed it is easier sometimes. Some of the negative effects revealed in this study include neglect of household chores and irritability. The social redeeming value of the internet however cannot be answered by this study.

**Keywords:** virtual relationships

**SSD-11**

### **ABUSE IN A ROMANTIC RELATIONSHIP AMONG COLLEGE TEENAGERS**

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Abuse in a relationship can be confusing and frightening and very difficult at any age much more for teenagers who are just beginning to date and develop romantic relationships. It is therefore the major objective of the study to determine if abuse is common among teenagers who are into romantic relationships. The specific objectives of the study were focused on the behavioral characteristics of the partner (boyfriend/girlfriend) and whether the teenager will stay or not in an abusive relationship. College teenagers ages 16-19 years old (Male = 50, Female = 110) who were into romantic relationships were recruited to participate in the study. They were allowed to answer the survey questionnaire consisting of 19 questions about the characteristics of the boyfriend/girlfriend and 8 questions if they will continue to stay in an abusive relationship. Results of the study revealed that males experienced higher frequencies of abuse from their girlfriends than females with their boyfriends. These were attributed to the fact that there were girlfriends/boyfriends who were jealous and possessive (F=74%, M=55%), controlling and bossy (F=46%, M=26%), quick-tempered with a history of fighting (F=24%, M=24%), violent towards the partner and other people (F=24%, M=3%), gives orders and make all the decisions (F=22%, M=17%), check up on them all the time (F=64%, M=54%), refuse to allow them normal contact with their family and friends (F=18%, M=8%), try to humiliate them (F=22%, M=5%), call them names including insults (F=8%, M=4%), accuse them of having no sense of humor (F=4%, M=3%), provocation (F=10%, M=5%), force them to have sex when they do not want to (F=8%, M=1%), use alcohol or drugs and pressure them to do the same

(F=2%, M=0%), pressure them to have unprotected sex (F=6%, M=1%) and like to wrestle 'playfully' resulting to one of them getting hurt (F=8%, M=4%). There were those who threatened to commit suicide if they leave the relationship or do not do what he/she wants (F=16%, M=17%), attempted suicide because they would not do what he/she wanted (8%, M=3%), harassed or threatened them or a former dating partner (F=8%, M=4%), refused to accept the relationship isn't working or is over (F=20%, M=24%). Many studies in the US show that abuse is commonly committed by men to their dates or girlfriends but our study results show the other way around. It seems more women are more prone to abuse their boyfriends as the statistics of this study show. It seems jealousy and being possessive are the major reasons for the higher frequency of abuse committed by women to their boyfriends. It is also very alarming to know from this study that a higher frequency of those who were interviewed would stay in an abusive relationship because they are convinced the bad behavior will stop-because their partner apologizes, gives them gifts, and promises to behave better in future (F=60%, M=40%), they may have been taught to be forgiving or be forgiving by nature (F=72%, M=73%), they may not see the behavior as part of a pattern of abuse (F=34%, M=30%), they may not realize they are not responsible for the behavior (F=38%, M=32%), they love their partner and not want to lose them (F=72%, M=55%), they may fear being left alone with no dating partner (F=44%, M=19%), they know their partner was wrong, but are upset, frightened, and do not know what to do or where to turn (F=46%, M=33%). Abuse whether psychological, emotional, physical, and sexual is bad and it will affect the normal development of young men and women to a healthy relationship. Teenage years are being characterized as a "window of opportunity" to expose young people to healthy relationship development and non-violent conflict resolution. A number of developmental issues in adolescence, such as learning autonomy and control and shifting emotional dependency from parents to peers, make this a particularly important time to provide educational opportunities with respect to non-violent relationships thus schools should provide programs to help young men and women to cope with healthy dating and romantic relationships.

**Keywords:** abusive relationship, young adults

## APPLICATION OF BIOLOGICAL INOCULANTS IN NONI FRUIT WASTE COMPOSTING

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The effect of biological inoculants in composting of noni fruit waste was investigated. For the first phase, three compost activators; *Trichoderma harzianum*, IBF compost activator, and Biosec (Novatech), were tested on a mixture of equal parts noni fruit waste and chicken manure material, with pure noni fruit waste as the PNFW. Weight loss, moisture content, pH and degree of decay were monitored through a period of eight weeks, to evaluate which among the compost activator would be most efficient, mainly basing on high degree of decay and low weight loss. Other parameters were indicators of the condition within the composted material.

IBF compost activator (IBF) showed to be the most efficient compost activator and was selected for the second phase based on the observed degree of decay and weight loss in 8 weeks. During the end of the period, IBF compost activator (IBF) obtained the highest degree of decay of 70% among all the treatments and second to the lowest to the PNFW in weight loss of 61.35%. Other parameters indicate that the conditions in all the composted materials after the third week are aerobic and favorable for the microorganisms.

The second phase employed the IBF compost activator in varying ratios of noni fruit waste to chicken manure mixed of raw material. Same parameters with phase one was monitored for a period of seven weeks, and in addition, finished composts were analyzed for CN ratio, carbon, nitrogen, phosphorus, potassium, copper, iron, manganese, and zinc.

Considering lesser weight loss and higher degree of decay, a ratio of 1:3 noni fruit waste to chicken manure was found to be the most efficient mix, obtaining the lowest weight loss of 21.03% on the average, and the highest degree of decay, of 72.84% on the average among all the treatments.

Taking into consideration the macro components of different mixes, PNFW showed highest Carbon and Nitrogen content of 46.34% and 3.11% respectively. All the treatments excluding PNFW exhibited high Phosphorus content of 5.02, 4.63, and 5.2567 for A (3:1 noni to chicken manure mix), B (1:1), and C (1:3) respectively. Greatest potassium content among treatments is exhibited by B (1:1) and C (1:3) of values 5.2733 and 5.55 percent respectively.

**Keywords:** noni, fruit waste, compost

**COLOR AND COD REMOVAL FROM A SIMULATED TEXTILE  
WASTEWATER CONTAINING DIRECT COPPER BLUE 2B DYE  
USING FENTON'S PROCESS**

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The textile industry generates millions of gallons of wastewater after disperse dyeing and 15 to 20 gallons per pound is generated for direct and reactive dyeing, including postscouring and rinsing processes. Failure to treat these discharges will harm the environment, more specifically the aquatic life which will eventually lead to a disturbance in the biodiversity.

The oxidation of a simulated textile wastewater containing Direct Copper Blue 2B dye was studied using the Fenton's process. The effect of hydrogen peroxide (5 ml, 10 ml, 15 ml, 20 ml, 25 ml), iron catalyst (1 ml, 2 ml, 3 ml, 4 ml, 5 ml) and simulated textile wastewater concentration (3000 ppm, 4000 ppm, 5000 ppm, 6000 ppm, 7000 ppm) on the color and COD removal was investigated. The highest COD level obtained was 69.83 ppm and the average pH values ranged from 7.0–8.5. Percent COD removal was observed to increase as the volume of  $H_2O_2$  was increased and as the simulated textile wastewater concentration was decreased. Highest percentage COD removal (99.59%) was seen in the ratio 1:25:25 (ml iron catalyst : ml  $H_2O_2$  : ml simulated textile wastewater) at 3000 ppm. Color was observed to completely decolorize the simulated textile wastewater. A possible degradation mechanism of Direct Copper Blue 2B dye was proposed. The Fenton process was found to be effective in removing color and COD from the simulated textile wastewater containing Direct Copper Blue 2B dye.

**Keywords:** color, COD, textile, wastewater, dye, degradation, hydrogen peroxide

**PRODUCTION OF VIRGIN COCONUT OIL BY MICROBIAL  
DEMULSIFICATION OF COCONUT (*Cocos nucifera* Linn.) MILK**

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The production of virgin coconut oil by microbial demulsification was investigated. An inoculant prepared by the Foods and Specialty Products Laboratory of the National Institute of Molecular Biology and Biotechnology (BIOTECH) was added to the coconut milk mixture. The reaction time and effects of different pH levels (4.5, 5.5 and 6.5), inoculant concentration (2, 6, and 10mL/L), and volume ratio of coconut water and distilled water (0:1, 0.5:0.5 and 1:0) on oil yield, were evaluated.

The addition of inoculant was effective at about neutral. The addition of coconut water increased the oil yield. The quality of virgin coconut oil obtained met the standards. The virgin coconut oil has a sweet, coconut smell, clear and transparent oil. It had 0.10% moisture and volatile matter content, 0.08% free fatty acid and trace amounts of peroxides.

**Keywords:** virgin coconut oil, coconut, microbial demulsification





