



# 2<sup>nd</sup> ICSAE 2015

International Conference on Sustainable Agriculture and Environment

September 30-October 03, 2015

## Proceedings Book

VOLUME I

Editor  
Mithat DIREK

Konya - 



[www.2ndicsae.org](http://www.2ndicsae.org)

# 2<sup>nd</sup> ICSAE 2015

## International Conference on Sustainable Agriculture and Environment Proceeding Book

© Her hakkı saklıdır. Bu kitabın tamamı yada bir kısmı, yazarlarının izni olmaksızın, elektronik, mekanik, fotokopi yada herhangi bir kayıt sistemi ile çoğaltılamaz, yayınlanamaz, depolanamaz.

Bu kitaptaki bilgilerin her türlü sorumluluğu yazarına aittir.

Editör  
Mithat DİREK

ISBN: 978 - 605 - 9119 - 30 - 6  
Aybil Yayınevi Sertifika No: 31790  
Aybil Basımevi Sertifika No: 31790



[www.aybilonline.com](http://www.aybilonline.com)

Baskı & Cilt:

AYBİL DİJİTAL BASKI REKLAM MÜHENDİSLİK  
TURİZM SANAYİ VE TİCARET LİMİTED ŞİRKETİ  
Ferhuniye Mh. Sultaşah Cd. No:30/A KONYA  
Tel: 0.332 350 21 71 Fax: 0.332 350 71 21

KONYA – EYLÜL 2015

**Honorary Committee**

Prof. Hakkı Gökbel, President, Selcuk University, Konya, Turkey

Prof. Ir. Ahmad Yunus, Director, Graduate Program, Sebelas Maret University, Indonesia

Prof. Dean L. Bresciani, President, North Dakota State University, Fargo, ND, USA

Dr. Masum BURAK, General Director, Ministry of Food Agriculture and Livestock, General Directorate of Agricultural Research and Policies Turkey

Dr. Mahmoud Solh, General Director, ICARDA, Beirut, Lebanon

**Conference Chair**

Dr. Mithat Direk, Agricultural Economy, Selcuk University, Turkey

**Conference Co-Chair**

Dr. Halis Simsek, Agricultural&Biosystems Engineering, North Dakota State University, Fargo, ND, USA

**Organizing Committee (in alphabetical order)**

Dr. Arzu Kan, Rural Development, Selcuk University, Turkey

Dr. Bilal Acar, Irrigation, Selcuk University, Turkey

Dr. Kubilay Baştaş, Plant Protection, Selcuk University, Turkey

Dr. Komariah Kokom, Soil Science, Sebelas Maret University, Indonesia

N. Kursat Akbulut, Veterinarian, Bahri Dagdas International Agricultural Research Institute-Konya-Turkey

Dr. Muhammed Kamil Öden, Selcuk University, Turkey

Dr. Mustafa Kan, Agricultural Economy, Bahri Dagdas International Agricultural Research Institute-Konya-Turkey

Dr. Richard Horsley, Department Head, Plant Science, North Dakota State University, USA

Oktay OKUR, Bahri Dagdas International Agricultural Research Institute-Konya-Turkey

Zafer ARISOY, Agronomist, Bahri Dagdas International Agricultural Research Institute-Konya-Turkey

**Conference Secretary**

Dr. Gul Ülke, Bahri Dagdas International Agricultural Research Institute-Konya-Turkey

Tulay Canatan Yilmaz, Bahri Dagdas International Agricultural Research Institute-Konya-Turkey

### **Scientific Committee** (in alphabetical order)

Dr. Ahmad Muhammed Ahmed, Agribusiness & Applied Economic, Tanta University, Egypt

Dr. Alex Morgounov, CIMMYT Turkey Coordinator, Ankara, Turkey

Dr. Ali Osman SARI, Deputy General Director, Ministry of Food Agriculture and Livestock, General Directorate of Agricultural Research and Policies Turkey

Dr. Amir Khalaf Aziz Al-Darwash, Nutrition&Food Technology, University of Baghdad, Iraq

Dr. Bahri Ozsisli, Food Science, Kahramanmaraş Sütçü İmam University, Turkey

Dr. Bilal Cemek, Agricultural &Biosystems Engineering, Ondokuz Mayıs University, Turkey

Dr. Bonga Zuma, *Goadex* Engineering and Water Science, Rhodes University, South Africa

Dr. Cennet Oğuz, Agricultural Economy, Selcuk University, Turkey

Dr. Cevdet Şeker, Dean, College of Agriculture, Selcuk University, Turkey

Dr. Chaiwat Rongsayamanont, Environmental Management, Prince of Songkla University, Thailand

Dr. Darlina Md. Naim, Biological Sciences, University Sains Malaysia, Penang, Malaysia

Dr. David M. Saxowsky, Agribusiness & Applied Economic, North Dakota State University, USA

Dr. Eakalak Khan, Civil & Environmental Engineering, North Dakota State University, USA

Dr. Elias M. Elias, Plant Science, North Dakota State University, USA

Dr. Felix Arion, University of Agricultural Sciences and Veterinary Medicine, Romania

Dr. Fikretin Şahin, Genetic Engineering, Yeditepe University, Turkey

Dr. Ganesh Bora, Agricultural &Biosystems Engineering, North Dakota State University, USA

Dr. Gary A. Anderson, Agricultural &Biosystems Engineering, South Dakota State University, USA

Dr. Latif Kalin, Forestry and Wildlife Sciences, Auburn University, USA

Dr. M.Musa Ozcan, Vice President, Selcuk University, Turkey

Dr. M. Tariq Javed, Veterinary Medicine, University of Agriculture, Faisalabad, Pakistan

Dr. Mehmet Isleyen, Environmental Engineering, Bursa Technical University, Turkey

Dr. Mehmet Kobya, Environmental Engineering, Gebze Technical University, Turkey

Dr. Mesut KESER, ICARDA Turkey Coordinator, Ankara, Turkey

Dr. Muhammad Ashfaq, Agricultural and Resource Economics, University of Agriculture, Faisalabad, Pakistan

Dr. Muhammad Subhan Qureshi, Dean, Animal Husbandry and Veterinary Science, Agricultural University, Peshawar, Pakistan

Dr. Orhan Ozçatalbaş, Rural Development & Extension, Akdeniz University, Antalya

Dr. Probang Setyono, Environmental-Expert, Sebelas Maret University, Indonesia

Dr. Rabha Bennama, Biology, University of Mostaganem, Algeria

Dr. Rudi Hari Murti, Vice Dean of Academic and Student Affairs, Gadjah Mada University, Indonesia

Dr. Said Wahab, Food Science and Technology, University of Agriculture Peshawar, Pakistan

Dr. Şenay Şimşek, Plant Science, North Dakota State University, USA

Dr. Shafiqur Rahman, Agricultural &Biosystems Engineering, North Dakota State University, USA

Dr. Shazia Shafique, Plant Pathology, University of the Punjab, Pakistan

Dr. Sherin Ahmed Sherif, Economics & Agribusiness, Alexandria University, Egypt

Dr. Sobiya Shafique, Mycology &Plant Pathology, University of the Punjab, Lahore, Pakistan

Dr. Şükrü Dursun, Environmental Engineering, Selcuk University, Turkey

Dr. Sutrisno Hadi Purnomo, Agribusiness, Sebelas Maret University Solo, Indonesia

Dr. Widyatmani Sih Dewi, Agricultural Technology, Sebelas Maret University, Indonesia

Abdallah Likava, Biochemistry, Mtwara, Tanzania

Ahmad Said, Agriculture, Livestock, Fisheries, Pakistan

Haroun Chenchouni, Ecology, University of Tebessa, Algeria

Reza Kamrani, Horticulture Science, Islamic Azad University, Iran

## **Keynote Speakers**

**Prof. Dr. Hüseyin Avni ÖKTEM**

**Nanobiotechnology: Potential Applications in Agriculture & Environmental Sciences**

Konya Food and Agriculture University, Turkey

**Prof. Sreekala G. Bajwa**

**Precision Agriculture at NDSU - Meeting Local Needs and Contributing to Global Food Security**

Department of Agricultural and Biosystems Engineering

North Dakota State University, USA

**Prof. Amir M.H. Ibrahim**

**Breeding Wheat for Sustainable Production Systems**

Texas A&M University, USA

**Prof. Dr. Kenan PEKER**

**Computational Science of Sustainability**

Selcuk University, Konya, TURKEY

**Prof. Dr. Eric Strausse**

**Sustainable Land Management**

School of Planning, Design and Construction

Michigan State University, USA

**Dr. Ronchi Cesare**

**Barilla Sustainable Farming Activities and Milano Protocol**

BARILLA-Italy



## **PREFACE**

Sustainable agriculture is "a way of practicing agriculture which seeks to optimize skills and technology to achieve long-term stability of the agricultural enterprise, environmental protection, and consumer safety. It is achieved through management strategies which help the producer select hybrids and varieties, soil conserving cultural practices, soil fertility programs, crop rotations, weed, pest and disease biological management programs, and strategic use of animal and green manures and use of natural or synthetic inputs in a way that poses no significant hazard to man, animals, or the environment. The system is envisioned in its broadest sense, from the individual farm, to the local ecosystem, and to communities affected by this farming system both locally and globally. The goal of sustainable agriculture is to minimize adverse impacts to the immediate and off-farm environments while providing a sustained level of production and profit. Sound resource conservation is an integral part of the means to achieve sustainable agriculture.

Sustainable agriculture integrates three main goals--environmental health, economic profitability, and social and economic equity. A variety of philosophies, policies and practices have contributed to these goals. People in many different capacities, from farmers to consumers, have shared this vision and contributed to it. Despite the diversity of people and perspectives, the following themes commonly weave through definitions of sustainable agriculture.

Sustainable agriculture presents an opportunity to rethink the importance of family farms and rural communities. Economic development policies are needed that encourage more diversified agricultural production on family farms as a foundation for healthy economies in rural communities. In combination with other strategies, sustainable agriculture practices and policies can help foster community institutions that meet employment, educational, health, cultural and spiritual needs. By helping farmers to adopt practices that reduce chemical use and conserve scarce resources, sustainable agriculture research and education can play a key role in building public support for agricultural land preservation. Educating land use planners and decision-makers about sustainable agriculture is an important priority.

Consumers can play a critical role in creating a sustainable food system. Through their purchases, they send strong messages to producers, retailers and others in the system about what they think is important. Food cost and nutritional quality have always influenced consumer choices. The challenge now is to find strategies that broaden consumer perspectives, so that environmental quality, resource use, and social equity issues are also considered in shopping decisions. At the same time, new policies and institution must be created to enable producers using sustainable practices to market their goods to a wider public.

We are yet a long way from knowing just what methods and systems in diverse locations will really lead to sustainability. In many regions of the country, however, and for many crops, the particular mix of methods that will allow curtailing use of harmful farm chemicals or building crop diversity, while also providing economic success, are not yet clear. The stage is set for challenging not only farm practitioners, but also researchers, educators, and farm industry.

New policies are needed to simultaneously promote environmental health, economic profitability, and social and economic equity. For example, commodity and price support programs could be restructured to allow farmers to realize the full benefits of the productivity gains made possible through alternative practices. Government and land grant university research policies could be modified to emphasize the development of sustainable alternatives. Marketing orders and cosmetic standards could be amended to encourage reduced pesticide use. Coalitions must be created to address these policy concerns at the local, regional, and national level. In addition to strategies for preserving natural resources and changing production practices, sustainable agriculture requires a commitment to changing public policies, economic institutions, and social values. Strategies for change must take into account the complex, reciprocal and ever-changing relationship between agricultural production and the broader society.

Critical discussion of the sustainable agriculture concept will and should continue. Understanding will deepen; answers will continue to come. On-going dialog is important for another reason: with more parties, each with its own agenda, jumping into the sustainable agriculture "tent," only a continued focus on the real issues and goals will keep sustainable agriculture from becoming so all-encompassing as to become meaningless.

Finally, it is important to point out that reaching toward the goal of sustainable agriculture is the responsibility of all participants in the system, including farmers, laborers, policymakers, researchers, retailers, and consumers. Each group has its own part to play, its own unique contribution to make to strengthen the sustainable agriculture community.

**Dr. Mithat DIREK**





## Contents

THE CURRENT STRUCTURE OF WHEAT SUPPLY NETWORK AND STAKEHOLDERS' ACTIVITIES IN KONYA.....	1
FOOD INSECURITY IN AFRICA IN TERMS OF CAUSES, EFFECTS AND SOLUTIONS: A CASE STUDY OF NIGERIA .....	6
AN ANALYTICAL STUDY OF SOME DIMENSIONS FOR THE FUTURE VISION OF AGRICULTURAL DEVELOPMENT IN EGYPT .....	12
THE REFLECTIONS OF THE EGYPTIAN AGRICULTURAL AND ECONOMIC POLICIES ON PRODUCTION AND THE FEDDAN COSTS FOR THE WHEAT CROP.....	17
SERICULTURE IN ORGANIC AGRICULTURE AREAS IN TURKEY AND ITS CONTRIBUTION TO SUSTAINABILITY OF SECTOR.....	26
RENEWABLE ENERGY AND RURAL WOMAN .....	34
THE COMPARISON OF PEST MANAGEMENT INFORMATION SYSTEMS AND COMMUNICATION NETWORKS FOR ORGANIC AND CONVENTIONAL HAZELNUT PRODUCERS IN SAMSUN PROVINCE OF TURKEY .....	38
FOOD SECURITY AND FAMILY PLANNING IN OYO STATE, NIGERIA.....	49
ORTAK TARIM POLITIKASI VE GELİŞMELER .....	64
RISK MANAGEMENT STRATEGIES ADOPTION OF FARMING HOUSEHOLDS IN KWARA STATE OF NIGERIA: A PRAGMATIC APPROACH .....	70
CHILDREN EDUCATION AND RURAL DEVOLPMENT IN EGYPT .....	81
THE IMPACT OF CHANGING THE POLITICAL CONDITIONS ON THE EGYPTIAN CONSUMER PATTERN .	88
ENSURING RURAL DEVELOPMENT IN PLACE USING YOUR METHODS OF SUSTAINABLE AGRICULTURE.....	93
DETERMINANTS OF HOUSEHOLD FOOD SECURITY AMONG WOMEN IN SOUTH-EAST AGRICULTURAL ZONE, NIGERIA .....	100
RELATIONSHIP BETWEEN INNOVATION AND SUSTAINABILITY IN FARMS PRODUCING PADDY IN BAFRA DISTRICT OF SAMSUN, TURKEY .....	105
THE ECONOMIC EFFICIENCY OF THE RED MEAT PRODUCTION FARMS IN NUBERIA REGION AT THE NEW LANDS. ....	113
COTTON GROWERS' SATISFACTION WITH PUBLIC AND PRIVATE EXTENSION SERVICES: CASE STUDY OF MUZAFFARGARH DISTRICT OF PAKISTAN.....	119
Environmental Risk Perceptions of Students in Faculty of Agriculture in Turkey.....	127
WATER DEFENSE BEHAVIOR OF EGYPTIAN FARMERS.....	135
SOME INFLUENTIAL FACTORS ON EGYPTIAN FARMERS' KNOWLEDGE ABOUT BIO – FERTILIZERS....	138
TECHNICAL EFFICIENCY OF RICE PRODUCTION IN THE NORTHERN AND ASHANTI REGIONS OF GHANA .....	143
INSTITUTE OF AGRICULTURAL AND FOOD ECONOMICS – NATIONAL RESEARCH INSTITUTE DEPARTMENT OF SOCIAL AND REGIONAL POLICY.....	153

YIELD AND PRICE RISK OF COMMONLY GROWN AGRICULTURAL PRODUCTS IN ADANA PROVINCE OF TURKEY .....	160
POLISH INTERNATIONAL TRADE OF HORTICULTURE PRODUCTS WITH TURKEY .....	163
ECOLOGICAL AGRICULTURE IN POLAND .....	168
CURRENT SITUATION IN DAIRY INDUSTRY AND FEED EFFICIENCY OF PROFESSIONAL DAIRY FARMS OF TURKEY .....	175
TARIMIN TÜRKİYE EKONOMİSİNDE YERİ .....	181
USING THE GRAVITY MODEL .....	189
FACTORS AFFECTING EGYPT’S POTATOES EXPORTS IN THE GLOBAL MARKET .....	195
THE REFLECTIONS OF EGYPT’S AGRICULTURAL AND ECONOMIC POLICIES ON PRODUCTION AND FEDDAN COSTS OF WHEAT CROP.....	200
AN ANALYTICAL STUDY for the DEVELOPMENT of CONSUMERS’ EXPENDITURE and CONSUMPTION of ANIMAL PRODUCTS in EGYPT.....	206
COMMUNITY AWARENESS AND ADAPTATION STRATEGY TO THE EFFECT OF CLIMATE CHANGE IN YOBE STATE, NIGERIA.....	213
CLIMATE CHANGE AND THE AGRICULTURAL SECTOR IN TURKEY.....	221
EVALUATION OF THE EFFICIENCY IN OLIVE GROWING FARMS IN TERMS OF INNOVATIVE SUSTAINABILITY (A CASE STUDY OF IZMIR and MANISA) .....	230
RISK PERCEPTION AND MANAGEMENT STRATEGIES IN AGRICULTURAL PRODUCTION: A CASE OF ADANA PROVINCE OF TURKEY .....	237
DEVELOPMENTS OF CITRUS FOREIGN TRADE IN TURKEY .....	245
RISK COMMUNICATION IN FOOD PRODUCTS: CASE OF MILK IN ADANA.....	251
SOME APPLICATIONS OF AUTOMATED DRIP IRRIGATION SYSTEMS IN THE WORLD and TURKEY.....	259
EVALUATION OF THE EFFECT OF SALT STRESS AND EVAPOTRANSPIRATION ON LEEK (ALLIUM PORRUM L.) GROWTH AND YIELD PARAMETERS WITH 3D MODELS.....	268
ASSESSMENT OF SPATIAL DISTRIBUTION OF PRECIPITATION WITH DIFFERENT INTERPOLATION METHODS FOR YEŞILIRMAK CATCHMENT.....	273
AGRICULTURAL WATER USE in TURKEY and WATER FOOTPRINT .....	279
ASSESSMENT OF KONYA GREENHOUSE PROJECTION.....	285
IRRIGATION MANAGEMENT IN A GREENHOUSE BY AN AUTOMATED IRRIGATION SYSTEM AND ITS HARDWARE AND SOFTWARE COMPONENTS .....	289
SAMSUN İLİ İÇİN BITKİ SU TÜKETİMİNİN DETERMINİSTİK MODELLE BELİRLENMESİ.....	296
UTILIZATION OF CELLULOLYTIC ENZYMES TO IMPROVE MILK YIELD, MILK COMPOSITION, BLOOD SERUM PARAMETERS AND THE FEED EFFICIENCY AND ECONOMICAL EVALUATION OF LACTATING GOATS.....	305
ADOPTION AND DIFFUSION OF SILAGE MAKING FROM GRASS IN INTERIOR COAST AREAS OF RIZE	312
A SUSTAINABLE MODEL FOR CONSERVATION AND UTILIZATION OF NATIVE CHICKEN GENOTYPES OF TURKEY .....	320

COMPARATIVE ANTHELMINTIC EFFICACY OF CHLOROFORMIC AND METHANOLIC EXTRACTS OF CORIANDRUM SATIVUM AND IVERMECTIN IN SALT RANGE SHEEP .....	324
BRUCellosis INFECTION IN LOCAL AND EXOTIC CATTLE OF PUNJAB, PAKISTAN .....	329
EFFECTS OF SOME FARM PRACTICES ON MILK PRODUCTION IN DAIRY FARMS OF SAMSUN PROVINCE OF TURKEY .....	333
IMPROVING PHYTATE BOUND PHOSPHORUS BIOAVAILABILITY OF SORGHUM BY BROILERS USING PHYTASE ENZYME.....	337
EFFECT OF CURCUMA ( <i>Curcuma roxb xanthorrhiza</i> ) MEAL AS FEED ADDITIVE IN BROILER RATIONS ON PERFORMANCE AND AN ANTIBODY TITRES AGAINST ND.....	341
EFFECT OF SUBSTITUTION NONI LEAF MEAL ( <i>Morinda citrifolia</i> ) IN THE RATION ON PRODUCTIVITY AND QUALITY QUAIL EGGS.....	346
SPATIAL ANALYSIS OF TEMPERATURE AND HUMIDITY IN BROILER HOUSES HAVING DIFFERENT LITTER MATERIALS .....	353
REPRODUCTIVE PARAMETERS OF BEETAL DOES IN ACCELERATED AND ANNUAL KIDDING SYSTEMS .....	358
THE EFFECT OF TWO FEEDING REGIMENS (PROGRAMS) UPON BROILER GROWTH PERFORMANCE, CARCASS TRAITS AND ECONOMIC INDICATORS.....	364
THE EFFECT OF USING LEVELS OF RED TIGER SHRIMP MEAL IN STARTER BROILER DIET UPON GROWTH PERFORMANCE .....	370
EFFECT OF DAIRY CATTLE BREEDERS' ASSOCIATION (DCBA) MEMBERSHIP ON SUSTAINABILITY OF INNOVATIONS IN SAMSUN PROVINCE OF TURKEY .....	375
SURVEY ON IMPACT OF DAIRY HUB TRAININGS ON LIVELIHOOD OF FARMERS IN PUNJAB DISTRICT SAHIWAL .....	381
UTILIZATION OF CRYOPRESERVED RUMINAL FLUID IN IN VITRO GAS PRODUCTION TECHNIQUE FOR EVALUATING ENERGY AND DIGESTIBILITY VALUES OF FEEDSTUFFS .....	388
DAIRY CATTLE BEHAVIOUR IN DIFFERENT HOUSING SYSTEMS .....	396
ANIMAL DEATH AND ENVIRONMENTAL POLLUTION.....	403
EFFECT OF PROBIOTIC AND UREA ON NUTRITIVE VALUE OF MALVA AND BARLEY SILAGE .....	405
LIVESTOCK WASTE-BASED BIOGAS ENERGY POTENTIAL of TOKAT PROVINCE and POSSIBLE IMPLEMENTATIONS* .....	411
LOW-COST ENVIRONMENT-FRIENDLY WASTE WATER TREATMENT SYSTEMS (CONSTRUCTED WETLANDS) .....	417
EVALUATION OF POLY (ETHYLENE TEREPHTALATE) WASTE CHAR IN EPOXY BASED COMPOSITES ...	425
EQUILIBRIUM AND KINETIC STUDIES ON LEVULINIC ACID ADSORPTION ONTO SUGAR PROCESSING FLY ASH.....	430
REACTIVE EXTRACTION OF FORMIC ACID USING ALAMINE 336 IN SUNFLOWER OIL .....	433
REMOVAL OF TEXTILE DYES FROM AQUEOUS SOLUTIONS USING AN INDUSTRIAL BASED LOW COST ADSORBENT .....	436
SUSTAINABILITY IN KONYA CLOSED BASIN AND WETLANDS .....	439

KATI ATIKLARIN ÇEVREYE VE SAĞLIĞA ETKİSİ KONUSUNDA BİREYLERİN BİLİNÇ DÜZEYİNİN BELİRLENMESİ ÜZERİNE BİR ARAŞTIRMA (TOKAT IL MERKEZİ ÖRNEĞİ) .....	448
KİMYASAL ATIKLARIN ÇEVRE VE SAĞLIĞA ETKİSİ KONUSUNDA BİREYLERİN BİLİNÇ DÜZEYİNİN BELİRLENMESİ ÜZERİNE BİR ARAŞTIRMA (KARABÜK IL MERKEZİ ÖRNEĞİ) .....	457
TÜRKİYE TARIMINDA JAPON SENDROMU YAŞANIR MI? IS IT POSSIBLE TO HAVE “JAPAN SYNDROME” IN TURKISH AGRICULTURE?.....	464
SÜRDÜRÜLEBİLİR TOPRAK YÖNETİMİ MÜMKÜN MÜ? SUSTAINABLE LAND MANAGEMENT POSSIBLE?.....	467
NEW TECHNOLOGIES TO REDUCE ENVIRONMENTAL IMPACTS OF COAL-FIRED POWER PLANTS .....	473
Environmentally sensitive agricultural manure nutrient management.....	479
A PRELIMINARY SURVEY OF PUBLIC WILLINGNESS AND ACCEPTANCE OF SEGREGATION AND USE OF HUMAN-URINE AS FERTILIZER IN TURKEY.....	484
AIR POLLUTION PROBLEM IN ERZURUM CITY DURING 2014-2015 .....	492
STUDY OF İMPACT AGRİCUTURAL DRAINAGE WATER ON SPİRULİNA CULTİVATİON İN OUARGLA (ALGERİAN BAS SAHARA) .....	500
TÜRKİYE’DE SÜRDÜRÜLEBİLİR KALKINMANIN MEVCUT DURUMU .....	506
CURRENT SITUATION OF SUSTAINABLE DEVELOPMENT IN TURKEY .....	506
THE INVESTIGATION OF SOME OF THE OPERATION PARAMETERS FOR REMOVAL OF COLOR FROM OLIVE MILL WASTEWATER BY ELECTROOXIDAION PROCESS.....	522
THE EFFECT OF STIRRING RATE, SUPPORT ELECTROLYTE TYPE and TEMPERATURE ON COLOR REMOVAL FROM OLIVE MILL WASTEWATER.....	526
DEVELOPMENT OF A PLUG-FLOW BIODIGESTER WITH A SEMI-AUTOMATED MIXING DEVICE FOR HOUSEHOLD USE.....	530
ACUTE TOXICITY DETERMINATION OF ANTIBIOTICS BY LEPIDIUM SATIVUM, DAPHNIA MAGNA AND VIBRIO FISCHERI TOXICITY TEST METHODS.....	534
AN APPLICATION OF GIS TECHNOLOGY AND CLUSTER ANALYSIS TO EVALUATE THE SURFACE SEDIMENT QUALITY: A CASE STUDY OF A LARGE BORATE RESERVE AREA IN CENTRAL ANATOLIA (TURKEY).....	540
ASSESSMENT OF PESTICIDE POLLUTION IN SOIL AND PLANTS FROM CROPLAND IN KONYA .....	547
OCCURRENCE and ECOTOXICOLOGICAL RISK ASSESSMENT of ANALGESICS in WASTEWATER.....	554
COMBINED ANAEROBIC-ADSORPTION PROCESS FOR TREATMENT OF REAL TEXTILE WASTEWATER: COD AND COLOR REMOVAL.....	561
TREATMENT OF REAL TEXTILE WASTEWATER USING ADSORPTION AS POST-TREATMENT FOLLOWED BY ANAEROBIC BIODEGRADATION.....	569
PHYTOREMEDIATION: ALTERNATIVE APPROACH TO CLEAN UP THE ENVIRONMENT.....	577
DETERMINING THE WATER QUALITY OF BROOK MAZMANLI THROUGH PHYSICO-CHEMICAL METHODS .....	584
GLOBAL CLIMATE CHANGE EFFECTS ON ECOLOGY.....	593

## **EFFECT OF CURCUMA (CURCUMA ROXB XANTHORRHIZA) MEAL AS FEED ADDITIVE IN BROILER RATIONS ON PERFORMANCE AND AN ANTIBODY TITRES AGAINST ND**

**Tengku Eduard Azwar Sinar and Tuty Maria Wardiny** <sup>21</sup>

edsinar@gmail.com

### **ABSTRACT**

With the increasing public awareness of Indonesian in healthy nutrition, it is resulted in demand for animal products that are healthy and free of antibiotic residues also increased. One natural feed additive used as a substitute for antibiotic synthesis is Curcuma Roxb xanthorrhiza, which is often used by humans to increase of appetite and cure various diseases. Balitro (2008) states that ginger meal contains: 94.14% dry material, 53% starch, 9.04% fat, 9.88% protein, 2.26% fiber, essential oil 5.97%, 2% curcumin and 1.58 % xanthorizol. This content can work to improve kidney and anti-inflammatory. Another benefit of this plant rhizomes increase of appetite, anti-cholesterol, anti-inflammatory, anemia, anti-oxidants, cancer prevention, and anti-microba. The aim of this research is to determine the influence of the ginger in broiler diets to the performance, the percentage of the carcass, and abdominal fat. A Completely Randomized Design was used to analyze the data. Two hundred DOC were divided into 4 treatment groups with 5 replications and 10 DOC in each replication. Four treatment diets were control diet with 0% of curcuma meal (R0); 1% of curcuma meal (R1), 2% of curcuma meal (R2), and 3% of curcuma meal (R3). The parameters observed were feed consumption, gain of body weight, feed conversion, percentage of carcass, abdominal fat and ability as a antibody titre against ND. The results of research showed that feed consumption, gain of body weight, carcass percentage, and abdominal fat of broilers were significantly different ( $p < 0.05$ ) for all treatment diets. Feed conversion and an antibody titres against ND did not show significantly different for all treatments. This research shows that 1% of meal curcuma in diet gave the best results of the chicken's broiler compared with other dietary treatment, Because the gain of body weight and percentage of the carcass are a higher and feed conversion is low but has not been able to reduce fat abdomen. In fact, the level of 2% and 3% of curcuma meal in diet can reduce fat in the abdomen.

**Keywords :** broiler, carcass, Curcuma xanthorrhiza Roxb, fat abdomen

### **INTRODUCTION**

Recently, public awareness of healthy nutrition has increased in Indonesia. This has led to increased demand for healthy animal products healthy and free of antibiotic residues. Along with the weakening of the Indonesian currency against foreign currencies, the price of feed ingredients, that mainly imported, are also increased. This situation makes the price of animal feed also increased, so it makes the farmer to think and look for new alternatives in the natural feed additive by utilizing local resources that exist in farm area. This is in line with the ban on the use of antibiotics began in 1987, due to the emergence of antibiotic resistance cases (Salyers, 1999; Spring, 1999).

Therefore, various ways had been conducted to find a new alternative antibiotics that can maintained health status, appearance and production of livestock without any additional burden to consumer and environment. Essential oils, organic acids, and phytogetic compounds such as isoflavones are among the known important antibiotic alternatives which demonstrated to enhance production of gastric secretions and reduce pathogenic bacteria (Wenk, 2000).

One alternative that can be used is curcuma (*Curcuma roxb xanthorrhiza*) which has been frequently used by humans to improve appetite and cure various diseases. This rhizome contains 48 to 59.64% starch, 1.6 to 2.2% from 1.48 to 1.63% curcumin and essential oils and is believed to improve kidney function and anti-inflammatory (Sidik, et al., 1995) . Another benefit of the rhizome of this plant is to increases appetite, anti-cholesterol, anti-inflammatory, anemia, anti-oxidants, cancer prevention, and anti-microbial. This study aims to determine the effect of curcuma (*Curcuma Roxb xanthorrhiza*) as a natural feed additive in broiler rations on performance, carcass percentage and abdominal fat content.

### **MATERIALS AND METHODS**

#### **Location and Time**

The study was conducted in the village of Balai Penelitian Ternak, Ciawi, Bogor.

---

<sup>21</sup> Writers are Lecturer at Faculty of Matematics and Science Universitas Terbuka, Indonesia. Email: eduard.ut.ac.id and tuty@ut.ac.id

## Experimental design

The experimental design used in this research was completely randomized design (CRD) with four treatments and five replications. There was 10 (ten) broiler for each repetition. So there was 200 broilers used in this study. The ingredients that are used in the ration were corn, soybean meal, coconut meal, rice bran, fish meal, coconut oil, CaCO<sub>3</sub>, premix, methionin, lysine and starbio. The ration was based on the National Research Council/NRC (1994), and was formulated so that the ration of each treatment could meet the needs of broiler chickens. Ration prepared with 24% protein content and energy 3200kal / kg isoprotein and isocalori. Rations and water were given ad libitum.

The treatment in this study were four types of rations. Four types of treatments were: R0 (control diet, without any addition of curcuma), R1 (1% of curcuma meal), R2 (2% of curcuma meal) and R3 (3% of curcuma meal). Variables measured in this study were body weight (g/chick), feed intake (g/chick), feed conversion, carcass percentage, abdominal fat content and antibody titres against ND.

Body weights were weighed once a week at the end of the week. The ration consumption was calculated from the amount of ration consumed subtract by the amount of ration left each day in a week. Feed conversion was measured of an animal's efficiency in converting feed mass into body weight. Abdominal fat contents were taken at the end of the study by taking all the fat around chicken abdomen. Carcass percentage is calculated carcass weight (without heads, feet, and feathers) divided by the live weight and the multiplied by 100%.

Agglutination inhibition test (HI-test) was used to measure the high titre antibodies contained in the serum to describe the level of chicken immunity after being vaccinated with ND vaccine.

Data were analyzed statistically using analysis of variance (ANOVA) and if it shows a marked influence continued with Duncan test (Steel and Torrie, 1993).

## Curcuma Meal Making

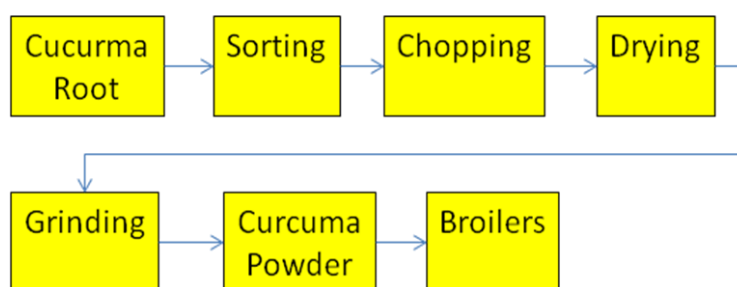


Figure 1. Process of Curcuma Meal

## RESULTS AND DISCUSSION

### Broiler Performances

The effect of curcuma meal in ration on feed consumption, weight gain and feed conversion of broilers can be seen in Table 1.

Table 1. Feed consumption, weight gain and feed conversion.

Treatments	Feed Consumption	Weight Gain	Feed Conversion
R0	1460.54 <sup>a</sup> ± 61.01	833.40 <sup>a</sup> ± 36.46	1.75 <sup>ab</sup> ± 0.08
R1	1452.74 <sup>a</sup> ± 66.11	850.02 <sup>a</sup> ± 61.52	1.71 <sup>a</sup> ± 0.07
R2	1385.93 <sup>a</sup> ± 73.20	763.69 <sup>b</sup> ± 44.82	1.82 <sup>b</sup> ± 0.03
R3	1252.42 <sup>b</sup> ± 90.01	701.44 <sup>c</sup> ± 16.15	1.78 <sup>ab</sup> ± 0.09

Note:

- Superscripts within column indicate significant differences (P < 0.05)
- Description: R0 = control diet; R1 = 1% of curcuma meal; R2 = 1% of curcuma meal; R3 = 1% of curcuma meal

The average feed consumption of broiler during research for all treatments were ranged between 1460.54 -1252.42 g /chick. Results of analysis of variance showed that the feed intake ( $P < 0.05$ ) was significantly influenced by the provision of curcuma in the ration. From Table 1, it can be seen that the provision of 1% curcuma in the ration can increase feed intake. However, with the increasing of curcuma in the ration, feed consumption became decreases. This was in accordance with research by Sinurat, A.P (2009) which moderate doses of curcuma in ration produced a higher weight gain compared to control ration. The decreasing of feed intake was caused by a bitter taste and pungent smell of curcuma so it decreased the palatability of ration.

As presented in Table 1, the highest weight gain was found in broilers with ration R1 (1% of curcuma meal), while the lowest weight gain was in broiler with ration R3 (3% of curcuma meal). Statistical analysis showed that curcuma treatments had significantly ( $P < 0.05$ ) impact in weight gain of broilers. This was due to a decrease in palatability by increasing the level of curcuma in ration. It is known that the factors that influence body weight is consumption of nutrients, digestibility of nutrients, and the quality of the ration.

Feed conversion is a measure of efficiency in the use of the ration. The lower the value is the more efficient use of feed conversion ration, because lesser feed required to produce weight gain in a given period of time. The average feed conversion of broiler chickens during research on all treatments was ranged from 1.71 to 1.82. Results of analysis of variance showed that there were significant differences ( $P < 0.05$ ) among treatments. Broilers that were subjected to R1 (1% of curcuma meal) had a better feed conversion (1.71) compared other treatments (1.75 to 1.82). So it can be concluded that the R1 had the most efficient use of ration compared to control ration and other treatments.

#### Carcass Percentage

The effect of curcuma meal to the carcass percentage can be seen in Table 2.

Table 2. Effect of curcuma meal on carcass percentage

Treatments	Carcass Percentage
R0	60.51 <sup>ab</sup> ± 0.88
R1	62.66 <sup>b</sup> ± 2.01
R2	62.33 <sup>b</sup> ± 1.73
R3	58.40 <sup>a</sup> ± 3.30

Note:

- Superscripts within column indicate significant differences ( $P < 0.05$ )
- Description: R0 = control diet; R1 = 1% of curcuma meal; R2 = 1% of curcuma meal; R3 = 1% of curcuma meal

The mean of broiler carcass percentage on all treatments was ranged 58.40 - 62.66%. Results of analysis of variance showed that the carcass percentage was significantly ( $P < 0.05$ ) influenced by the provision curcuma in the ration. From Table 1 and 2, it showed that the provision of 1% of curcuma meal in the ration increased feed consumption and resulted in a higher weight gain and a higher carcass percentage. However, along with feed consumption, the increasing of curcuma level in the ration has decreased the of carcass percentage. This might be caused by the decrease in feed consumption was resulting in lower weight gain, and resulting in lowering carcass percentage. This was consistent with research Amaefule et al. (2006) which showed that the pattern of differences in the percentage of carcasses in accordance with the differences in body weight and weight gain, so the higher the weight, the greater the percentage of carcasses.

Carcass percentage obtained in this study remained within normal limits for broiler since in this study broilers were reared only until the age of 5 weeks and rations were prepared with no antibiotics. Leeson and Summers (2001) states that broiler carcass percentage at the age of six weeks was ranged between 64.7-71.2%. So if the study reared the broilers until the age of six weeks, it was possible the carcass percentage produced in the normal range.

#### Abdominal Fat Content

The effects of curcuma meal to the abdominal fat content can be seen in Table 3.

Table 3. Effect of curcuma meal on abdominal fat

Treatments	Abdominal Fat
R0	10.90 <sup>ab</sup> ± 3.14
R1	13.40 <sup>b</sup> ± 3.20
R2	8.70 <sup>a</sup> ± 3.13
R3	8.70 <sup>a</sup> ± 3.86

Note:

- Superscripts within column indicate significant differences (P < 0.05)
- Description: R0 = control diet; R1 = 1% of curcuma meal; R2 = 1% of curcuma meal; R3 = 1% of curcuma meal

Abdominal fat content of broilers during research on all treatments were ranged from 8.70 g - 13.40 g. Results of analysis of variance showed that abdominal fat content was significantly (P < 0.05) influenced by the provision curcuma in the ration. From Table 3, it can be seen that the provision curcuma in the diet had not been able to decrease abdominal fat content when compared to the control diet. This was similar to the results by Puastuti, W (1997) which states that supplementation of curcuma up to 1% had no effect on serum cholesterol and eggs cholesterol. This was a possibility of curcuminoid levels contained in curcuma is still too small to stimulate bile to produce anti-oxidant.

Antibody titres against ND

Effect on antibody against New Castle Disease (ND) (geometric mean of titre / GMT) for all treatments can be seen in Table 4.

Table 4. ND Antibody Titre

Treatments	ND Antibody Titre (Log2)
R0	3.85
R1	3.60
R2	5.55
R3	4.90

Note:

- Description: R0 = control diet; R1 = 1% of curcuma meal; R2 = 1% of curcuma meal; R3 = 1% of curcuma meal

The above results indicated that curcuma meal as a feed additive in feed did not give a significant impact, however, ration containing 2% and 3% of curcuma meal had a high antibody titre values compared to control ration. Based on these results, a dose of turmeric had not been able to stimulate antibodies to rise significantly. According to Butcher and Miles (1995), antibodies will reach its peak in week 2 to 3 post-vaccination.

So the level of curcuma meal has not been able to activate the lymphoid follicle in Bursa Fabricus, which function to produce lymphocytes that will be differentiate into B cells which produce antibodies. Therefore, an increase in the number of active lymphoid follicles will be able to increase the production of antibodies (Tizard, 1988; Baratawidjaja, 1996)

## CONCLUSION

Provision 1% of curcuma meal in the ration had the best result to performance of broiler. It gave high weight gain, high carcass percentage and low feed conversion.

However, curcuma meal provision had not been able to decreased abdominal fat content of broilers. Higher decreased in abdominal fat content occurred in 2 and 3% level of curcuma meal in broiler rations but it had bad impact in the performance of broiler.

Further research needs to be done with the highest dose of curcuma meal is 1% to see its impact in immunity of broilers.



## REFERENCES

- Amaefule, K.U, et.al. 2006. The effect of treated rice milling waste on performance, nutrient restriction, carcass and organ characteristics of finisher broiler. *Int. J. Poultry Sci.* 5(1);51-54.
- Awang, IPR., Chulan U. and Ahmad FBH. Curcumin for up grading skin colour. *Nutrition Abstracts and Reviews.* CAB International p. 544.
- Balai Penelitian Tanaman Obat dan Aromatik. 2008. *Budidaya Temulawak (Curcuma xanthorrhiza Roxb).* Pusat Penelitian dan Pengembangan Perkebunan. Badan Penelitian dan Pengembangan Pertanian. Bogor
- Baratawidjaja, K.G. 1996. *Imunologi dasar.* Edisi ke-3. Fakultas Kedokteran Universitas Indonesia, Jakarta.
- Butcher, D.G dan Miles R.D. 1995. *The Avian Immune System.* Cooperative Extension Service, Institute of Food and Agriculture Sciences, University of Florida. [Http://edis.ifas.ufl.edu/BODY\\_VM016](http://edis.ifas.ufl.edu/BODY_VM016)
- Leeson, S and Summers, J.D. *Animal Breeding* 3rd Edition. Guelph Ontario. Canada
- National Research Council (NRC). 1994. *Nutrient Requirement of Poultry.* Ed ke-9. Washington, DC: National Academy Press.
- Nurdjanah, N. 1986. Pengolahan dan Perbaikan Mutu Hasil Temulawak. Di dalam: *Temu Usaha dan Temu Tugas Komoditi Rempah dan Obat.* Direktorat Jenderal Perkebunan. Balai Penelitian dan Pengembangan Pertanian, Pemerintah at I Jateng. Semarang.
- Ozaki, Y. and Liang, DB. 1988. Chologagic action the essential oils obtained from *Curcuma xanthorrhiza* Roxb. *Shoyaku zasshi* 24(4):257-263.
- Puastuti, W. 1997. *Suplementasi Temulawak (Curcuma xanthorrhiza Roxb) dalam Ransum Sebagai Upaya Untuk Menurunkan Kadar Kolesterol Telur.* Tesis. Program Pascasarjana Institut Pertanian Bogor.
- Purseglove, JW., Brown EG., Green CL. And Robbins SRJ. 1981. *Spices.* Vol 2 Longman. London and New York.
- Salyers, A.A. (1999) How are human and animal ecosystems interconnected? Pages 33-38 in *Agriculture's Role in Managing Antimicrobial Resistance.* Oct. 24-26, Toronto, ON.
- Sidik, MW, Moelyono dan Muhtadi A. 1995. *Temulawak, Curcuma xanthorrhiza Roxb.* Seri Pustaka Tanaman Obat. Yayasan Pengembangan Obat dan Bahan alam. Phyto Medica.
- Sinurat, A.P., dkk. 2008. The Utilization of turmeric and curcuma xanthorrhiza as feed additive for broilers. *JITV* 14(2): 90-96.
- Soebiantora, W. 1985. Penelitian Pendahuluan tentang Hepatotoksitas *Rhizoma curcumae javanica* (Temulawak) pada ayam. *Laporan Penelitian.* Universitas Brawijaya, Malang. Hal. 1-13.
- Spring, P., 1999. Mannanooligosaccharides as an alternative to antibiotic use in Europe. *Zootech. Int.*, 22: 38-41.
- Steel, RGD dan Torrie JH. 1995. *Prinsip dan Prosedur Statistika-Suatu Pendekatan Biometrik.* Ed Ke-2. Cetakan Keempat. Jakarta: PT.Gramedia Pustaka Utama.
- Sunaryo, H., Ediyanto, SP., Djatmiko, W. Dan Fuad AH. 1985. Pengaruh pemberian kurkuminoid (*Curcuma domestica* Val) terhadap kadar kolesterol HDL serum tikus putih (*Rattus nevergious*). *Proseding Simposium Nasional Temulawak.* Lembaga Penelitian Universitas Padjadjaran.
- Tizard I., 1988. *Pengantar Immunologi Veteriner.* Edisi Kedua. Partodiredjo M, (penerjemah). Airlangga University Press, Surabaya.
- Wenk, C., 2000: Recent advances in animal feed additives such as metabolic modifiers, antimicrobial agents, probiotics, enzymes and highly available minerals. *Review. Asian Aust. J. Anim. Sci.* 13, 86-95.