The Committee of
International Conference on Sustainable Agriculture for Rural Development 2018
(ICSARD-2018)

CERTIFICATE

Awarded to

Wiludjeng Roessali

as

Presenter

in International Conference on Sustainable Agriculture for Rural Development 2018 (ICSARD 2018) on 23 - 24 October 2018 at Java Heritage Hotel, Purwokerto, Indonesia

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IOP Conference Series: Earth and Environmental Science • *Open Access* • Volume 250, Issue 1 • 5 April 2019 • Article number 012022 • International Conference on Sustainable Agriculture for Rural Development 2018, ICSARD 2018 • Purwokerto • 23 October 2018through 24 October 2018 • Code 147383

Document type
Conference Paper • *Bronze Open Access* • *Green Open Access*

Source type
Conference Proceedings

ISSN
17551307

DOI
10.1088/1755-1315/250/1/012022

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Economic aspects of soybean farming sustainability in Central Java, Indonesia

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Abstract

Imbalances in supply and demand of agricultural commodities results in fluctuations in the prices of these commodities. High price fluctuations will have an impact on farmers ' income and agricultural sustainability. This study aimed to determine the production performance and sustainability of soybean farming in Central Java , Indonesia. Survey studies were conducted in two areas which were purposively selected as the center of soybean production. A descriptive analysis was used to describe the condition of soybean farming sustainability. The results of the study showed that soybean price stability was low, indicating that soybean prices fluctuated with a coefficient of variation of 15.70%. Soybean farming income shows the positive R/C values in Grobogan and Wonogiri, namely 1.18 and 1.15, respectively. The profitability achieved was above the credit interest rate, demonstrating that soybean farming is still feasible. The percentage of the contribution to farm and household incomes is 37.77 and 18.87% respectively. © 2019 Published under licence by IOP Publishing Ltd.

Scopus

Source details

IOP Conference Series: Earth and Environmental Science

Scopus coverage years: from 2010 to Present

ISSN: 1755-1307 E-ISSN: 1755-1315

Subject area: Earth and Planetary Sciences: General Earth and Planetary Sciences | Environmental Science: General Environmental Science

Source type: Conference Proceeding

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To cite this article: 2019 *IOP Conf. Ser.: Earth Environ. Sci.* **250** 011001

IOP Conf. Series: Earth and Environmental Science **250** (2019) 011001 doi:10.1088/1755-1315/250/1/011001

PREFACE

On behalf of the Organizing Committee, I would like to express my sincere gratitude for your contributions and participations in the International Conference on Sustainable Agriculture for Rural Development 2018 (ICSARD 2018) which was held in Purwokerto, Indonesia, 23-24 October 2018.

Agriculture is a vital sector since it provides foods and raw materials related to food for human life. Agriculture gives employment opportunities to a very large proportion of communities. It also has a great significance in global trade as well as foreign exchange resources, which in turn might improve a country's GNP value. Agriculture is at a crossroad. It has to find ways to feed the world while being environmentally, socially and economically sustainable. The International Conference on Sustainable Agriculture for Rural Development 2018 (ICSARD 2018), therefore, was aimed to promote scientific and educational activities towards the advancement of knowledge by improving the theory and practice of various disciplines and areas of sustainable agriculture. This conference addressed the food system activities of processing, distributing and consuming food, as well as food production from crop and livestock; the availability, access, utilization and stability dimensions of agriculture; and the synergies and trade-offs between economic, environmental, health and social objectives and outcomes. The conference became an excellent opportunity for academic researchers, industry professionals, government delegates and students to interact and share their experiences and knowledge on cutting-edge developments in the fields of Agro-technology, Soil Science, Agronomy, Horticulture, Plant Protection, Plant Breeding and Biotechnology, Agroecology, Food Science and Technology, Agricultural and Biosystems Engineering, as well as Socio-economics of Agriculture and Agribusiness.

ICSARD 2018 was organized by the Faculty of Agriculture, Jenderal Soedirman University, Indonesia. The conference was joined by eight keynote speakers who are leading experts from reputable organizations, i.e. Prof. Dr. Robert Edwin Paull (University of Hawai'i at Manoa), Prof. Dr. Shao Hui Zheng (Saga University, Japan), Dr. Tuyen Chan Kha (Nong Lam University, Vietnam), Prof. Dr. Rindit Pambayun (Sriwijaya University, Indonesia), Prof. Lilik Soetiarso, Ph.D (Gadjah Mada University, Indonesia), Prof. Dr. Ahmad Yunus (Sebelas Maret University, Indonesia), Prof. Loekas Soesanto, Ph.D (Jenderal Soedirman University, Indonesia), and Prof. Totok Agung DH, Ph.D (Jenderal Soedirman University, Indonesia). Participants of this conference came from Sudan, Ecuador, Japan, Malaysia, Thailand, and Indonesia.

As the general chair of this conference, I realize that the success of the conference depends ultimately on the many people who have worked with us in planning and organizing both the technical program and supporting social arrangements. In particular, we thank the Program Chairs for their wise advice and brilliant suggestion on organizing the technical program and also the Scientific Committee for their thorough and timely reviewing of the papers. Recognition should go to the Organizing Committee members who have all worked extremely hard for the details of important aspects of the conference programs and social activities. We would also like to thank our special honorary guests and plenary speakers for their dedication to this event.

I hope that this publication can bring beneficial contributions to the development of knowledge particularly in the field of sustainable agriculture.

Susanto Budi Sulistyo, Ph.D.
Jenderal Soedirman University, Purwokerto, Indonesia
General Chair of ICSARD 2018 Conference Committee
February 2019, Purwokerto, Indonesia

IOP Conf. Series: Earth and Environmental Science **250** (2019) 011002 doi:10.1088/1755-1315/250/1/011002

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Published online: 05 April 2019

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Pollinator diversity and soybean productivity with flowering plant (Crotalaria and Rosella)

Sholahuddin, R Wijayanti, R B Arniputri, Supriyadi and D Widyaningrum

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The utilization of phenol in betel leaf (*piper betle*) as feed to reduce *Aeromonas hydrophylla* infection in dumbo catfish (*Clarias gariepinus*) and gourami (*Ospronemus gouramy* Lac.) fish cultivation

H Soeprapto and P Syarif

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JOURNAL LINKS

Comparison of methodologies for determination total humidity in hard corn (*Zea mays* L.)

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Abstract. The importance of humidity moisture determination for storage and harvesting lies in the quality and safety of raw materials, process control and food preservation. There is research that comparing methodologies with significant differences, but none is applied in to hard corn, so in this paper the following objectives are established: 1) Develop standards of hard corn with seven degrees of humidity to ensure homogeneity. 2) Compare six different methodologies for determining of determination of humidity in the ranges of 10-16%. A homogeneity test was performed using the equation of Gough, 1975 and a statistical (DBCA). After verifying that the batches of corn were homogeneous within and between the bags, we proceeded to compare five methodologies in which where an analysis of variance was applied, followed by a Tukey test at 5%. For the homogeneity results inside and between the covers, the lots were homogeneous. For the results of the comparison of methodologies, significant statistical differences were found in the application of one method over the other, finally then, it was made with regression equations the corrections of the moisture results obtained from the different methodologies in relation to the ISO reference method.

1. Introduction

Corn, also known by the scientific name of *Zea mays* L. comes from the Greek Zeo, which means to live and Mahiz which means grain. It is part of the family of grasses and its origin is attributed to Mexico. It is commercialized throughout the world, the world production is approximately 800 million tons per year and is the most cultivated cereal in the world, due to its relevancy in human and animal food in addition to the production of alcohol and starch [1–4]. In Ecuador was reported a production of approximately 1.4 million tons in a cultivated area of 358 thousand hectares, with an average yield calculated of 400 kg per hectare [5].

The great demand of the agroindustry, together with the advances of techniques of sowing, mainly in the use of quality seeds, has stimulated that Ecuador has increased in 188% its maize production, which has meant a reduction of the import of approximately 80%. It is also important to consider that the production cost of 1 ton of corn in Ecuador is approximately 900 dollars, which includes the activities of land preparation, seeding, fertilization, agricultural work, harvesting and land rent [6].

Based on the morphological characteristics in Ecuador, 29 maize races are recognized, of which 13 are not cultivated in the Andean regions. The main challenges in the coastal and Amazonian regions to increase yields in the corn crop are nutrient impoverishment, compaction and salinization [7].

IOP Conf. Series: Earth and Environmental Science **250** (2019) 012024 doi:10.1088/1755-1315/250/1/012024

Phenolic acids as plant growth inhibitors from *Tridax procumbens* L.

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Abstract. This study examined inhibitory effects of phenolic acids from *Tridax procumbens* L. on germination and growth of *Raphanus sativus* (radish). Four phenolic acids from this plant, namely benzoic acid, ellagic acid, vanillin, and ferulic acid were identified and quantified from a fraction of ethyl acetate extract by high performance liquid chromatography. These phenolic acids were subjected to germination and growth assays. Vanillin was the major constituents (364.689 µg/mg fraction) of ethyl acetate extract of this plant followed by benzoic, ellagic, and ferulic acids (69.888, 17.589, and 3.590 µg/mg fraction, respectively). In germination and growth assays, benzoic acid presented the most inhibitory effects (IC_{50} of germination = 5.148 mM) on radish germination and growth. This compound decreased root elongation and shoot growth with IC_{50} values of 0.947 mM and 3.452 mM respectively. This study revealed that *T. procumbens* possessed phenolic acids that can be utilized as plant growth inhibitors. Benzoic acid might play a role in the phytotoxicity of this plant. However, further trials on evaluating how this plant releases benzoic acid in soil, and examining the influence on more plants in its vicinity are needed to clarify potential use of this plant in weed control of agricultural practice.

1. Introduction

Tridax procumbens L. is an invasive plant species and belongs to Asteracea family. It is widely spread in more than 80 countries in the world. This plant commonly known as "coat button" or "tridax daisy" (USA) or "gletang" (Indonesia) [1]. *T. procumbens* has been reported to be a weed for more than 30 crops [2]. In some countries, it has been used as a traditional medicine. In India, *T. procumbens* was used for wound healing [3], hepatoprotective [4], anti-inflammatory [5], and antimicrobial agents [6]. In Guatemala and Togo, this plant has been used to treat gastrointestinal disorders, protozoal infections, and liver diseases [7-8].

Primary studies conducted on *T. procumbens* have focused on its pharmaceutical properties. Extracts of this plant showed antioxidant [9], antidiabetic [10], anti-inflammatory [11], and anti-hyperglycemic activities [12]. For pest control, extract of this plant was reported to have vigorous larvicidal activities against *Anopheles subpictus* & *Culex tritaeniorhynchus* [13].

Allelopathic activity of *T. procumbens* has been studied sporadically. The inhibitory effects of this plant on some indicator plants such as *Raniceps ranninus, Sorghum bicolor, Lactuca sativa*, and *Alium cepa* have been reported [14,15], but the identification of allelopathic substances has not been yet

Relationship between chlorophyll content and soil plant analytical development values in two cultivars of fig *(Ficus carica* L.*)* as brassinolide effect at an open field

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Abstract. Relationship between chlorophyll and relative chlorophyll values obtained using soil plant analytical development (SPAD)-502 meter after brassinolide treatment were determined in two varieties of fig *(Fiscus carica* L.*)* at an open field conditions using fresh weight basis. The experiment was arranged as split plot randomized complete block design (SRCBD) with four replications, and each experimental unit containing three plants. A different fig sample was considered as the main plot and brassinolide concentrations as sub-plots. There were four plants as destructive samples observed monthly for each replication. The correlation of SPAD value and the content of chlorophyll a, chlorophyll b and total chlorophyll content were significantly correlated in fig leaves. At IBT variety, the optimal mathematic function for SPAD value and chlorophyll a, chlorophyll b and total chlorophyll were $Y=30.209e^{-0.081x}$ (r=0.6623), $Y=388.42x^{-1.676}$ (r=0.3145), and $Y=29.738e^{-0.072x}$ (r=0.5380) respectively. At MD variety, the optimal function models were $Y=7.4524e^{-0.032x}$ (r=0.5318) for chlorophyll a, $y=-0.0025x^2+0.1268x+0.2896$ (r=0.3407) for chlorophyll b and $Y=-0.0052x^2+0.1961x+3.1882$ (r= 0.5129) for total chlorophyll. All these data proved SPAD-502 can be an effective tool used for rapid and nondestructive estimation of leaf chlorophyll content in fig.

1. Introduction

Chlorophyll is a main material for photosynthesis, found in plants, algae, and bacteria that gives them their green color and it also enables them to absorb the light for photosynthesis. The contents of chlorophyll reflect leaf photosynthesis ability and plant health condition [1, 2, 3, 4]. Traditional way to measure chlorophyll content usually need to extract leaf tissue with organic solvents such as acetone, ethanol, N, N-dimethyl formamide [5, 6, 7, 8]. Although this laboratory analysis method is relatively accurate, however, extraction is laborious, destructive, time-consuming, and expensive [1, 4]. In the meantime, significant pigment losses may occur during the extraction and dilution and resulted a high variability [9].

SPAD-502 chlorophyll meter (Minolta Inc, USA) is easy to use, non-destructive, and hand-held spectral device, portable diagnostic tool that measures the greenness or the relative chlorophyll content of leaves [10, 11, 12, 13, 14]. By measuring the leaf transmittance in two wave bands (400-500 nm and 600-700 nm, this device quantifies the relative amount of chlorophyll with a reading in arbitrary unit (SPAD-502 Chlorophyll Index) that is proportional to the leaf chlorophyll concentration [15, 16], which provides a substantial saving in time, space, resources and suitable for small plot areas.

The effect of lactic acid bacteria-containing calf starter on Holstein calf performance

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Abstract. Newborn calve has an undeveloped rumen and tend to easily diarrhea caused by *Escherichia coli* from environment and cause death. Feeding calf starter (CS) contains probiotic after birth can promote rumen development and suppress *E. coli*. This experiment aimed to evaluate the effect of different feeding calf starter on Friesian Holstein (FH) calf performance. The treatments were the use of different calf starter, namely calf starter from farmer (CS-F) and calf starter contains fermented cabbage waste (CS-L). The materials were CS contains fermented waste cabbage, CS from farmer and 30 FH calves aged 7-14 days and 41.14 ± 3.28 kg initial body weight. Calf starters were fed twice per day after giving milk, forage and water given *ad libitum*. The parameters measured were feed intake, feces consistency and daily gain. The data were analyzed with t- test. The result indicated that there were no different (P>0.05) on feed intake and average daily gain, but CS contains fermented waste cabbage produced better feces consistency than CS from farmer (P<0.05). Feeding calf starter with addition of fermented cabbage waste produced good calve performance.

1. Introduction

Rumen is the main stomach for ruminants that develop optimally at the age of 2-6 weeks depend on feeding as soon as after birth. Solid feed consisting of calf starter (CS) and fiber sources can be given to calves starting at 1 week to accelerate rumen development [1]. The nutritional requirements for calves after birth to weaning are sourced from 40% of solid feed and 60% of milk [2]. Calf starter added with 5% molasses given to FH calves aged 2-6 weeks can accelerate rumen development [3]. One indicator of rumen development is the presence of microbes which ferment feed in the rumen, because at birth the rumen is sterile [1]. The rumen microbes come from the environment both from feed and milk given during maintenance after birth. The most dominant microbes in the rumen are bacteria. One method to accelerate the development of rumen microbes is by providing feed contains source of lactic acid bacteria.

Lactic acid bacteria can affect the pH of the rumen, by accelerating the growth of lactate-utilizing bacteria in the rumen [4]. Lactate-utilizing bacteria can reduce the production of lactic acid accumulated