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# PROCEEDINGS

**OF THE INTERNATIONAL CONFERENCE ON  
FOOD SOVEREIGNTY AND SUSTAINABLE AGRICULTURE**

**BUILDING OF FOOD SOVEREIGNTY  
THROUGH A SUSTAINABLE AGRICULTURE**  
Challenges toward Climate Change and  
Global Economic Community

## FOSSA 2017



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**PROCEEDING OF THE INTERNATIONAL CONFERENCE OF FOOD SOVEREIGNTY AND SUSTAINABLE AGRICULTURE (FoSSA 2017) : BUILDING OF FOOD SOVEREIGNTY THROUGH A SUSTAINABLE AGRICULTURE, CHALLENGES TOWARD CLIMATE CHANGE AND GLOBAL ECONOMIC COMMUNITY**

Agriculture Faculty, Jember University, Indonesia

Agriculture Faculty, Jember University, Indonesia  
Agriculture Faculty Building, Tegalboto Campus, Jember, Indonesia  
Email: fossa2017@unej.ac.id  
Website: www.fossa2017.org  
Telp./Fax : (+622331)334054

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Editor : Wen-Chi Huang, Nobutaka Ito, Nick Rose, Isnaini Jalil, Yuli Hariyati,  
Mohammad Rondhi, Tri Handoyo, Hari Purnomo, Didik Pudji Restanto,  
Layout : Sukron Romadhona, Susan Barbara P. SM, Himmatul Khasanah,  
Nurul Pratiwi  
Cover Design : Priyo Sugeng Winarto

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**WELCOMING SPEECH****Rector of University of Jember: Drs. Moh. Hasan, M.Sc., Ph.D.**

One of the numerous challenges we face today to overcome the problem of uncontrolled human population growth is the imbalance between supply and demand for food and energy. These would impact in general to the environment and the quality of life. To respond these global challenges, the development of technologies for food and natural resources aiming to create sustainable agriculture will play a strategic role.

Efforts have been made by many researchers focusing on the development of technologies and management natural resources, which will lead to the application and improvement of agriculture systems to better provide human needs – especially in the context of food security. Producing adequate food becomes a common goal. However, such efforts to achieve food security have mainly focused on large scale corporate farming and industries. This can have regrettable impacts on small scale food producers as well as on the environment.

Hence, food sovereignty, a relatively new concept which refers to the rights of communities to choose their own policies regarding agricultural development and food production, is no less important than food security. Agricultural development therefore no longer exclusively focuses on producing enough amount of food for the human population. It now also aims to provide larger freedom for small producers and farmers.

We believe that achieving sustainable agriculture is essential in order to achieve food sovereignty. In line with the efforts to develop agricultural innovations, University of Jember has established many facilities and research centers, such as the Agrotechnopark and the Center for Development of Advanced Science and Technology (CDAST). Furthermore, University of Jember fully supports this conference as a medium for researchers to share their research results including technological innovations, and to engage research collaborations in the area of agriculture for the quality and welfare of mankind.

Lastly, I would like to give my warmest greeting to all presenters and participants of this conference. I appreciate your commitment for the successfull of this conference. Thank you.

Jember, August 1<sup>st</sup>, 2017

Rector,

**Moh.Hasan**





**Dean of Faculty of Agriculture-University of Jember: Ir. Sigit Soeparjono, MS, Ph.D.**

Assalamualaikum Wr. Wb.

Praise goes to the most merciful God Allah SWT for the blessings of life and knowledge for us to gather in this meaningful occasion.

To start with, I would like to warmly welcome the heads of both Indonesian and foreign universities to the Faculty of Agriculture, University of Jember, Indonesia. It is a great pleasure to have you

with us today.

This event is a reflection of our faculty's commitment to always improve the quality of our education and to accommodate more and more opportunities in academic collaborations. We have been working hard to refine our agricultural research facilities and to offer students increasingly more comprehensive and extensive methods of learning in the world of agriculture.

Today, the development of modern agricultural systems and techniques has brought us many benefits. However, these benefits have often come at a certain costs, such as negative ecological impacts and the decreasing quality of working conditions for farmers. Such negative consequences have made us realize that agriculture must also take into account the preservation of the environment and the rights and welfare of food producers themselves. This is what we know as sustainable agriculture.

Therefore I believe this international conference will be able to present an interesting discussion on the aforementioned topic, with prominent speakers from Indonesia, Australia, Japan, Sri Lanka, Malaysia, Taiwan, and Philippines, giving a contribution to the development of science, and hopefully encouraging more research on this area.

I would also like to congratulate the Faculty of Agriculture, University of Jember as the main host of this international conference, along with four other co-hosts which include Brawijaya University, Andalas University, Warmadewa University and UPN Jatim. May it support efforts to become world-class universities in the near future.

I also wish to thank all the sponsors who have provided financial support for this event, and to everyone else who has helped make this event possible.

Finally, I would like to convey a warmest welcome to all the distinguished guests and participants of this international conference. We are truly grateful for your presence today. May we have a fruitful discussion and may we all gain new and valuable knowledge.

Wassalamuallaikum Wr. Wb.

Jember, August 1<sup>st</sup> 2017.

Dean,

**Sigit Soeparjono**



### Message from Chairman: Prof. Dr. Ir. Yuli Hariyati, MS

Assalamualaikum Wr. Wb.

Ladies and gentlemen ...

First of all, I would like to expressed my gratitude to all of you .. for being present and participate in this FoSSA 2017 International Conference. This conference addresses all experts in food sovereignty from many different countries with the main theme of : **“Building of**

#### **Food Sovereignty through a Sustainable Agriculture: Challenge of Climate Change and Global Economic Community”.**

Lately, the concept of food-sovereignty and sustainable agriculture are still very attractive among government-officers ... activist ... academician and also grassroot-elements.

Food sovereignty is defined as the right of every person ... every society ... and every country in the world ... to determine its own food policy by prioritizing local food products for their own needs, and forbidding the practice of food trade by means of dumping.

In principle .... each country has their own right to determine and control its own food-production, distribution and consumption systems ... in accordance with local ecological, social, economic, and cultural conditions, as well as its own sovereignty.. no intervention of others.

Food Sovereignty term was first introduced by the international peasant organization La Via Campesina at the World Food Summit (WFS), in November 1996 in Rome, Italy.

Moreover.. Food Sovereignty has even been declared by 400 delegates of farmer organizations, indigenous-peoples, fishermen, NGOs, social activists, academician and researchers from 60 countries at the World Forum on Food Sovereignty in Havana ... September 2001.

Therefore ... currently ... collective bargaining for food sovereignty is a global issue.

FoSSA 2017 International Conference activities will cover four main activities, namely :

- FoSSA2017 International Seminar
- FoSSA Meeting and SAFE Workshop
- FoSSA Cultural-Event
- Bromo Tengger FoSSA-FieldTrip

The seminar covers 5 sub-topics ...

- (1) Food Sovereignty dimensions in sustainable agriculture production systems, current situation, challenges and opportunities;
- (2) Recent advances on the climate change information and mitigation systems in agriculture and its practical implications on small-scale mixed-farming operations;
- (3) Sustainable agriculture production system on food, strategic-products and energy diversifications: policies and lesson learnt;
- (4) Fostering / Building a global action for cooperation and policy development towards sustainable agriculture;
- (5) The local resources utilization and the local-wisdom on sustainable agricultural production systems : with special emphasis on the global economic community.

At this moment ... we are now 258 participants from Myanmar, Japan, Thailand, Sri Lanka, Germany, VietNam, Bhutan, UK, Phillipine, Australia, Korea, Malaysia, and Indonesia... 205 oral presentations and 28 poster presentations and other would be performed..

FoSSA2017 seminar will present 15 speakers ... this morning we have Dr. Nur Masripatin (Director of PPI) ... Dr. Nick Rose (Executive Director of SUSTAIN: The Australian Food Network) ..... and also 13 speakers from Japan, Taiwan, Malaysia, Philippines, Sri Lanka, Australia, and Indonesia.



We would like to thank to The Directorate General of PPI, PTPN X, BRIA-Germany, and The Research Institute – University of Jember for sponsorships.

And also to UPN University .. Warmadewa University ... and Andalas University ... and The Asia-Pacific SAFE Network .. for collaborative-hosting this FoSSA2017 Conference..

Wassalamualaikum WRB

Jember, August 1<sup>st</sup>, 2017

Chairperson of FoSSA International Conference

Yuli Hariyati



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## BIOPESTICIDE MADE FROM RICE STRAW

Wiwiek Sri Wahyuni and Moh. Hoesain

Faculty of Agriculture, Jember University, Jl. Kalimantan 37 Jember

email: [wiwiekwahyuni@gmail.com](mailto:wiwiekwahyuni@gmail.com)

### Abstract

Rice straw is found abundantly in rice fields because the average straw produced from rice field area is 1.4 times the amount of its harvest. If the straw is composted, the yield of compost is 60%. This compost was made as a biopestisida after added with bacterium *Pseudomonas putida* H10. Beside of this, it also acted as biofertilizer because it was rich in nutrient content. When rice crops were sprayed three times with this biopesticide, the plants were resistance to rice blast and neck rot disease (*Piricularia oryzae*) and brown planthopper that attacked the area at that time, and increased the growth. This was indicated by the more number of tillers, more greener leaves, panicles were grown earlier, so that were harvested five days earlier than that plants not sprayed with biopesticide. This biopestisida was also tested on tomato plants in order to control *Fusarium* wilt disease. It was sprayed in the earlier growth, the flowering and fruiting periods. It was turn out that this tomatoes were resistance to *Fusarium* wilt, thrips and leaf-eating pheasants (*Spodoptera litura*), also growing much better and more dense fruits.

**Keywords:** rice straw, compost, biopesticide, biofertilizer

### BACKGROUND

Rice straw is found abundantly in rice fields because the average straw produced from rice field area is 1.4 times the amount of its harvest. If the straw is composted, the yield of compost is 60%. This compost content a lot of microbes, that can induce systemic acquired resistance to plant disease when spray on the plant. In example, rice become resistance to blast and neck rot disease and brown planthopper (Wahyuni et al, 2013).

Beside of this, it also acted as biofertilizer because it was rich in nutrient content. It has C/N Rasio 21, C-Organik 35,11%, Nitrogen (N) 1,86%, Fosfor ( $P_2O_5$ ) 0,21%, Kalium ( $K_2O$ ) 5,35%, Kalsium (Ca) 4,2%, Magnesium (Mg) 0,5%, copper (Cu). 20 ppm, Mangan (Mn) 684 ppm, Zeng (Zn) 144 ppm. Each ton of straw compost has nutrient content which equal to 41 kg urea, 6 kg SP36, and 89 kg KCl or equal to a total of 136 kg NPK. For compost produced from one hectare of land (5.04 tons) equivalent to 206.64 kg of urea, 30.24 kg SP36, and 448.56 kg of KCL (<http://jabar.litbang.pertanian.go.id>). This amount is enough to be returned to the paddy fields as fertilizer and can save the cost of purchasing fertilizer.

Penggunaan biopestisida di Rambipuji masih bertahan sampai saat ini karena produksi padi makin meningkat dan tahan terhadap

## METHODS

### Biopesticide production

Rice straw was cut into small pieces, added with  $\frac{1}{2}$  v/v water and one cup EM4, mixed then composted to one -one and half months. The mature compost was indicated with a brown-black color, fine particle grains, crumbs (Fig.1). This compost was extracted with  $\frac{2}{3}$  v/v water, stirred until well mixed, then extracted with centrifuge at 1000-2000 rpm for one-two minutes to separate the coarse part with the smooth one. The extract was strained again with a fine strainer in order to get smoother particles, so it would not clog the sprayer nozzle(Fig. 2A, B). The strained water compost was put into the mixer tank after added with *Pseudomonas putida* H10. The mixer was rotated for 30-60 minutes /day, for about one week, and it was ready to use as biopesticide (Fig. 2 C).



Rice straw was cut into small pieces



Figure 1. The small rice straw pieces was added with  $\frac{1}{2}$ x v/v water and one cup EM4, mixed together then composted for about 1 to 1,5 month. The mature compost indicated by a brown-black color, fine particle grains, crumbs (Wahyuni et al, 2013, Wahyuni and Hoesain, 2016a).





Figure 2. The mature compost was extracted with water then A. The mixture of composts was extracted with water then was centrifuged at 1000-2000 rpm to separate the coarse compost with the smooth particles, and B. Filtrate was strained with fine strain cloth to produce very fine particles of compost, so it will not clog the nozzle sprayer (Wahyuni *et al.* 2016b). C. The strained water compost was put into the mixer tank after added with *Pseudomonas putida* H10. The mixer was rotated for 30-60 minutes / day, for one week then ready to use as biopesticide (Wahyuni *et al.* 2013).

#### Application on plants

Before used, the water compost extract was diluted 15-20x with water. It sprayed three times on plants, at the earlier growth, at the flowering period and the last in the early period of fruit formation. On rice field was observed the attack of brown planthopper, and blast and neckrot disease which at that time attacked many rice fields. For tomato plant was observed whether or not the infected Fusarium wilt disease.

### RESULTS AND DISCUSSION

After spraying with the biopesticide, the growth of rice plants was apparently different from that which is not sprayed (Fig. 3). Rice leaves was more greener, the number of saplings becomes more, panicles are formed earlier, and rice production is also increased and harvested 5 days early. Rice crops are more resistant to brown plant hopper attack and blast disease. On the eve of the harvest arrived, there are rice fields that attacked by planthopper because the plants around that do not want to use biopesticide is already under attack first. However, it is still possible to harvest 1/3 of the normal harvest.



Figure 3. Rice field with the same cultivar and the same plant ages. A. No sprayed and B. Sprayed with biopesticide showed a better growth and more resistance to brown and blast and neckrot (Wahyuni et al, 2013).

For tomato plants field, the soil was infested with Fusarium wilt disease. After the soil and plants were sprayed with biopesticides, the plants became resistant to infection. The growth was much better, flowers (Fig. 4) and fruits more dense, because this biopesticide also act as biofertilizer.



Figure 4. Tomatoes were sprayed 3x became more resistant to Fusarium wilt disease, thrips and leaf-eaters (*Spodoptera litura*), and B. Better growth and more dense fruits.

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