

PAPER • OPEN ACCESS

Preface

To cite this article: 2021 *IOP Conf. Ser.: Earth Environ. Sci.* **672** 011001

View the [article online](#) for updates and enhancements.

You may also like

- [The Result of an Analysis to Determine the Highest International Publication based on Food-Agriculture in Indonesia](#)
A Hakim, P Jumaryatno, A Fauzy et al.
- [Preface](#)
- [Eating on an interconnected planet](#)
Graham K MacDonald



The Electrochemical Society
Advancing solid state & electrochemical science & technology

242nd ECS Meeting

Oct 9 – 13, 2022 • Atlanta, GA, US

Abstract submission deadline: **April 8, 2022**

Connect. Engage. Champion. Empower. Accelerate.

MOVE SCIENCE FORWARD



Submit your abstract



EISSN: 1755-1315

IOP Conference Series

Earth and Environmental Science

The 3rd International Conference on Food and Agriculture (ICoFA)

“Development and Improvement of Sustainable Agricultural Practices Toward Environmental and Global Well-Beings”

XXX

VOLUME XXX – 2020

7 - 8 November 2020
Jember, Indonesia

EDITOR

Dr. Ir. Rosa Tri Hertamawati, M.Si. (Politeknik Negeri Jember, INDONESIA)

The open access journal for conference proceedings
conferenceseries.iop.org/ees

IOP Publishing



The 3rd International Conference on Food and Agriculture (ICoFA)

Introduction of ICoFA 2020

We are honoured to present this collection of articles from the 3rd International Conference on Food and Agriculture (ICoFA), organized by Politeknik Negeri Jember (State Polytechnic of Jember). The conference was held in Jember, Indonesia, from 7 to 8 November 2020 and conducted virtually due to the pandemic of COVID-19. This annual event was intended to provide scientific forum and discussion of applied research on food and agriculture.

The theme of “Development and improvement of sustainable agricultural practices toward environmental and global well-beings”. There was 180 presenters and participants with 162 article submissions encompassing the topics of Agriculture Engineering and Biotechnology, Organic Agriculture, Agroindustry and Agribusiness, Animal Nutrition, Animal Production, Veterinary Science, Food Science and Technology, Food Safety, Food Security and Sovereignty, IT for Agriculture, and Renewable and Novel Energy Sources.

All submitted articles were reviewed and selected based on its scope as well as quality, and there are 105 articles that are selected for IOP Conference Series: Earth and Environmental Science. The list of committee members and reviewers are available in the pdf file.

List of Committee (ICoFA 2020)

List of Committe (ICoFA 2020)

Steering Committee

Associate Professor Toshinari Maeda (Kyushu Institute of Technology, JAPAN)
LH (Leon) de Jonge, Ph.D (Wageningen University and Research, NETHERLAND)
Dr. Lalita Siritattananon (Rajamangala University of Technology Thanyaburi, THAILAND)
Prof. Dr.Sc.Agr. Ir. Suyadi, MS., IPU., Asean Eng. (Brawijaya University, INDONESIA)
Prof. Dr. Indarto, S.TP., DEA (Universitas Jember, INDONESIA)
Dr. Ir. Dadik Pantaya, M.Si. IPU (Politeknik Negeri Jember, INDONESIA)
Dr. Ir. Rosa Tri Hertamawati, M.Si. (Politeknik Negeri Jember, INDONESIA)
Dr. Ir. Nurul Syamsiah, M.P. (Politeknik Negeri Jember, INDONESIA)
Syamsiar Kautsar, S.T., M.T. (Politeknik Negeri Jember, INDONESIA)

Organizing Committee (Politeknik Negeri Jember)

Saiful Anwar, S.TP, MP (Chairman of International Advisory Board)
Dr. Ir. Nanang Dwi Wahyono, MM (Chairman of Organizing Committee)
Prawidya Destarianto, S.Kom, MT (Secretary)
Mery Hadiyah Wati, S.Kom (Financial Treasury Support)
Dwi Putro Sarwo Setyohadi, S.Kom, M.Kom (IT Committee Coordinator)
Khafidurrohman Agustianto, S.Pd. M.Eng (IT Publication Coordinator)
I Gede Wiryawan, S.Kom, M.Kom (IT Publication)

Editor in Chief

Dr. Ir. Rosa Tri Hertamawati, M.Si. (Politeknik Negeri Jember, INDONESIA)

Editor

Associate Professor Toshinari Maeda (Kyushu Institute of Technology, JAPAN)
LH (Leon) de Jonge, Ph.D (Wageningen University and Research, NETHERLAND)
Dr. Lalita Siritattananon (Rajamangala University of Technology Thanyaburi, THAILAND)
Prof. Dr.Sc.Agr. Ir. Suyadi, MS., IPU., Asean Eng. (Brawijaya University, INDONESIA)
Prof. Dr. Indarto, S.TP., DEA (Universitas Jember, INDONESIA)
Dr. Ir. Dadik Pantaya, M.Si. IPU (Politeknik Negeri Jember, INDONESIA)
Dr. Ir. Rosa Tri Hertamawati, M.Si. (Politeknik Negeri Jember, INDONESIA)
Dr. Ir. Nurul Syamsiah, M.P. (Politeknik Negeri Jember, INDONESIA)
Dr. Ir. Ridwan Iskandar, MT (Politeknik Negeri Jember, INDONESIA)
Syamsiar Kautsar, S.T., M.T. (Politeknik Negeri Jember, INDONESIA)
Suluh Nusantoro, S.Pi, M.Sc. (Politeknik Negeri Jember, INDONESIA)
Retno Sari Mahanani, SP. MM. (Politeknik Negeri Jember, INDONESIA)

Peer Review Statement (ICoFA 2020)

Peer Review Statement (ICoFA 2020)

All papers published in this volume of IOP Conference Series: Earth and Environmental Science have been peer reviewed through processes administered by the Editors. Reviews were conducted by expert referees to the professional and scientific standards expected of a proceedings journal published by IOP Publishing.

- **Type of peer review: Single-blind / ~~Double-blind~~ / ~~Triple-blind~~ / Open / Other (please describe)**
- **Conference submission management system: online using easy chair**
- **Number of submissions received: 166**
- **Number of submissions sent for review: 140**
- **Number of submissions accepted: 115**
- **Acceptance Rate (Number of Submissions Accepted / Number of Submissions Received X 100): $115/166 \times 100 = 69.3$**
- **Average number of reviews per paper: 3**
- **Total number of reviewers involved: 7**
- **Any additional info on review process: -**
- **Contact person for queries: Dr. Rosa Tri Hertamawati**

Table of Contents (ICoFA 2020)

Table of Contents (ICoFA 2020)

PDF File Names	First Author Surname	Topic Heading	Article Title
001_ICOFA20	Asmono	Agriculture Engineering and Biotechnology	The effect of murashige and skoog (ms) modified medium and several types of auxins on the growth of stevia (stevia rebaudiana bertonii) in vitro
002_ICOFA20	Dewi	Agriculture Engineering and Biotechnology	Selection and evaluation of agronomic character of high temperature tolerant mutant gogo rice (<i>Oryza sativa</i> L) in nursery phase
003_ICOFA20	Kasutjaningati	Agriculture Engineering and Biotechnology	Growth and development of Vanda (<i>Vanda sanderiana</i>) explants in vitro on the effect of extracts of organic matter
004_ICOFA20	Budiati	Agriculture Engineering and Biotechnology	Efficacy of coffee peel extract as natural antimicrobial in coconut oil soap to against <i>staphylococcus aureus</i>
005_ICOFA20	Djamila	Agriculture Engineering and Biotechnology	Scale up and Performance Test of the Rotary Vacuum Dryer Type Batch for Drying Oyster Mushrooms
006_ICOFA20	Nasrudin	Agriculture Engineering and Biotechnology	Application of silica nutrients to improves local rice productivity under saline conditions
007_ICOFA20	Erawati	Agriculture Engineering and Biotechnology	Shoots multiplication of Vanilla (<i>Vanilla planifolia</i>) with benzyl amino purine and kinetin modification
008_ICOFA20	Nuraisyah	Agriculture Engineering and Biotechnology	Physical characterization of coconut fruit (<i>Cocos nucifera</i> L) in the region of Jember regency
009_ICOFA20	Siswadi	Agriculture Engineering and Biotechnology	Vernalization and Benzylamino Purine Treatments on The Generative Growth of Shallots (<i>Allium Cepa</i> Var. <i>Ascalonicum</i> L.) Bauji Variety in The Lowlands
010_ICOFA20	Apriani	Agriculture Engineering and Biotechnology	The effect of land use conversion on landslides risk in protected function areas: case study in samigaluh district, kulon progo regency, yogyakarta, indonesia

011_ICOFA20	Nurhidayah	Agriculture Engineering and Biotechnology	The effect of gamma radiation on the growth of black rice plants generation m1
012_ICOFA20	Rahmawati	Agriculture Engineering and Biotechnology	Yield and seed quality evaluation of several rice (<i>Oryza sativa</i> L.) lines with 'Ciherang' as a comparative variety
013_ICOFA20	Handayati	Agriculture Engineering and Biotechnology	Study on improvement of red chili pepper (<i>Capsicum annum</i> L.) cultivation technology
014_ICOFA20	Sugiyarto	Agriculture Engineering and Biotechnology	The effect of the use of various kinds of biochar and soil nutrients on pakcoy (<i>brassica rapa</i> l.)
015_ICOFA20	Wibowo	Agriculture Engineering and Biotechnology	Evaluation of kalibomo watershed water quality using the storet method
016_ICOFA20	Kurniawan	Agriculture Engineering and Biotechnology	Novel Adaptive Hysteresis Regime and Data Fusion on Crisp Logic in IoT-based Terrarium System for Improving Plant Growth Rate
017_ICOFA20	Iswahyono	Agriculture Engineering and Biotechnology	The design and build of ohmic heated hydro distillation for the essential oil extraction of eucalyptus leaves
018_ICOFA20	Poerwoko	Agriculture Engineering and Biotechnology	Genetic advance on tandem selection of several soybean genotypes
019_ICOFA20	Viandari	Agriculture Engineering and Biotechnology	Rice cultivation on dry land during dry season supported by deep well irrigation and soil amelioration
020_ICOFA20	Tyagita	Agriculture Engineering and Biotechnology	Strength and hardness of the engine mount prototype chopped fiber composite made from rubber compound and fiber ramie (<i>Boehmeria nivea</i>)
021_ICOFA20	Hermanuadi	Agroindustry and Agribusiness	Value added analysis of Cassava "Tape" Supply Chain in Bondowoso Regency
022_ICOFA20	Ambarkahi	Agroindustry and Agribusiness	Synchronization of Perception of Producers and Customers in an Effort to Improve the Quality of Services and Products of Puger Shrimp Paste
023_ICOFA20	Wahyono	Agroindustry and Agribusiness	Analysis up-stream agribusiness and counseling beef cattle development in jember
024_ICOFA20	Hidayanti	Agroindustry and Agribusiness	Added Value of Robusta Coffee Products of "Dwi Tunggal" Farmer Group in Bromo Mountain Slope
025_ICOFA20	Priyadi	Agroindustry and Agribusiness	Smallholder Farmers' Perceptions of Coffee Bean Processing Using The Honey Method

026_ICOFA20	Harlianingtyas	Agroindustry Agribusiness	and	Modeling of factors affecting the productivity of sugarcane in jember regency
027_ICOFA20	Susilowati	Agroindustry Agribusiness	and	Opportunities and challenges to increase corn export from Gorontalo Province of Indonesia
028_ICOFA20	Wiguna	Agroindustry Agribusiness	and	Marketing Strategy of Sumardi Farm's Goat Milk Business in Senduro District Lumajang Regency
029_ICOFA20	Widyatami	Agroindustry Agribusiness	and	Competitive and Comparative Advantages Analysis of Organic Rice Farming in Sumberjambe Sub-District Jember Regency
030_ICOFA20	Retnowati	Agroindustry Agribusiness	and	Policy Scenario of Sustainable Local Soybean Development in Banyuwangi Regency
031_ICOFA20	Muksin	Agroindustry Agribusiness	and	Analysis of the Sustainable Status of Post Disaster Crop Production in Sigi Regency, Central Sulawesi Province
032_ICOFA20	Yusuf	Agroindustry Agribusiness	and	Adlay (<i>Coix lacryma-jobi</i>), a potential source alternative to wheat flour: A financial feasibility analysis for small scale production
033_ICOFA20	Indriati	Agroindustry Agribusiness	and	Techno-economic analysis on cookies production made from Adlay (<i>Coix lacryma-jobi</i>) flour that supplemented with Moringa (<i>Moringa oleifera</i>) leaves powder
034_ICOFA20	Iskandar	Agroindustry Agribusiness	and	Determination of Leading Commodities and Food Commodities Structure in Sigi Regency of Central Sulawesi Province
035_ICOFA20	Pongoh	Agroindustry Agribusiness	and	Evaluation of Multidimensional Sustainability Status of Vannamei Shrimp Hatchery in Situbondo Regency
036_ICOFA20	Basriwijaya	Agroindustry Agribusiness	and	The Factors affecting Pitalah Duck farmer's income in Rokan Hulu district Riau province
037_ICOFA20	Malika	Agroindustry Agribusiness	and	Rapid Appraisal: A Sustainability Analysis of Dairy Cattle Agribusiness Based on Resources Accessibility
038_ICOFA20	Suryadi	Agroindustry Agribusiness	and	Study of the business sustainability of sheep as leading export commodity in Jember regency
039_ICOFA20	Imam	Animal Nutrition, Animal Production, and Veterinary Science		Effect of banana weevil enriched with β -glucan from <i>Saccharomyces cerevisiae</i> on productivity and abdominal fat of broiler chickens

040_ICOFA20	Rahmasari	Animal Nutrition, Animal Production, and Veterinary Science	Addition of papaya (<i>Carica papaya</i> L.) seed meal on quail production performance
041_ICOFA20	Pantaya	Animal Nutrition, Animal Production, and Veterinary Science	The hematological profile and immune response treated by heat stress on "Gaok" native chickens
042_ICOFA20	Prasetyo	Animal Nutrition, Animal Production, and Veterinary Science	The sensory characteristics of fortified beef sausage with duck eggshell nano-calcium
043_ICOFA20	Hertamawati	Animal Nutrition, Animal Production, and Veterinary Science	Actions of edamame soybean isoflavones in an avian model: the Japanese quail (<i>Cortunix-cortunix japonica</i>)
044_ICOFA20	Awaludin	Animal Nutrition, Animal Production, and Veterinary Science	Herbal anthelmintic: the effectiveness of worm infections control in sheep using urea molasses block containing tobacco (<i>nicotiana tabacum</i>) waste
045_ICOFA20	Kusuma	Animal Nutrition, Animal Production, and Veterinary Science	Identification of Helminth Parasites Diversity on Layer Chicken in Jember District (East Java – Indonesia)
046_ICOFA20	Budiati	Food Safety	Antimicrobial activity of jengkol and petai peel extract to inhibit <i>Listeria monocytogenes</i>
047_ICOFA20	Destarianto	Food Safety	Development of integrated swab chamber for drive thru Covid19 test system
048_ICOFA20	Rindiani	Food Science and Technology	Steamed cake with okra flour substitution as an alternative to snack for a fiber source
049_ICOFA20	Purwaningsih	Food Science and Technology	The effect of temperature variations on koro sword bean flour (<i>canavalia ensiformis</i> l) and the concentration of the addition of koro sword bean flour on cyanide acid (hcn) content and consumer acceptance of fried chicken seasoning flour
050_ICOFA20	Handayani	Food Science and Technology	Characteristics bioactive compound of <i>muntingia calabura</i> kersen leaves in grow up height different (distic area)
051_ICOFA20	Kristanti	Food Science and Technology	The color and texture properties of mushroom chicken nugget with various flour as a filler
052_ICOFA20	Ratri	Food Science and Technology	Effects of time and temperature variations on curcumin contents and antioxidant activity of tamarind-turmeric herbs

053_ICOFA20	Fibrianto	Food Science and Technology	Just about Right Analysis of coffee leaves tea bitterness and astringency by modifying brewing temperature and time
054_ICOFA20	Subaktilah	Food Science and Technology	Chemical Characteristic of Steamed Pumpkin Brownies Premix Flour
055_ICOFA20	Rosiana	Food Science and Technology	Polyphenol content and antioxidant activity of beverage from dragon fruit peel powder and soy powder
056_ICOFA20	Hidayat	Food Science and Technology	Polyphenol content and antioxidant activity of beverage from dragon fruit peel powder and soy powder
057_ICOFA20	Surahman	Food Science and Technology	Formulation and Production Costs Optimization of Complementary Food for Breast Milk from Red Sorghum Flour (<i>Sorghum bicolor</i> L.), Red Bean Flour (<i>Phaseolus vulgaris</i> L.) and Mungbean Flour (<i>Phaseolus radiatus</i> L.) Using Linear Programming Method
058_ICOFA20	Rahman	Food Science and Technology	The effect of temperature and time of baking to sensory quality of banana-based food bars
059_ICOFA20	Sismina	Food Science and Technology	Effects of active packaging for maintaining quality of "wingko" traditional food in a tropical environment
060_ICOFA20	Herminiati	Food Science and Technology	The estimation of shelf life of instant porridge in the different packaging with method of accelerated shelf life testing of arrhenius model
061_ICOFA20	Ningsih	Food Science and Technology	Sensory characteristics of mille crepes cake from seaweed powder
062_ICOFA20	Ananda	Food Science and Technology	Substitution of fishbone powder in the development of choco chips cookies
063_ICOFA20	Hartati	Food Science and Technology	Physical, chemical and organoleptic quality of sweet potato leaves (<i>Ipomoea batatas</i> L.) ice cream
064_ICOFA20	Nisa	Food Science and Technology	Quality characterization of "wingko" traditional food by applying vacuum packaging in a tropical environment
065_ICOFA20	Santi	Food Science and Technology	Moringa chicken nugget as supplementary food for toddler to prevent stunting
066_ICOFA20	Yudiastuti	Food Science and Technology	The Effect of Ozonation Time and Contact Time of Edamame Washing on Color Changes Using the Continuous Type Ozone Washing Method

067_ICOFA20	Apriliyanti	Food Science and Technology	Antioxidant Activity and Sensory Properties in Packaged Beverages with Melinjo Peel, Mint Leaves, and Stevia Leaves Formulations
068_ICOFA20	Sukasih	Food Science and Technology	The improvement of white pepper quality using ozone application
069_ICOFA20	Kurniawati	Food Science and Technology	The effect of sodium metabisulfite concentration and drying time on the quality of coconut sugar
070_ICOFA20	Suratno	Food Science and Technology	Optimization of making white oyster mushroom with the effect of immersion time and concentration of natrium metabisulphite
071_ICOFA20	Mayasti	Food Science and Technology	Selection of Plantain Cultivars as Raw Material for Ripe Plantain Flour
072_ICOFA20	Yulianti	Food Science and Technology	Physicochemical and gelatinization properties of ethanol-treated sorghum flour
073_ICOFA20	Ardiah	Food Science and Technology	The effect of of cassava variety and fermentation duration on the texture and acceptabiity of cooked-dried growol
074_ICOFA20	Ratri	Food Science and Technology	The Effect of chocolate Drink To Hepatosomatic Index of Diabetes Mellitus Induced Rat
075_ICOFA20	Fitriyah	Food Science and Technology	Functional Analysis of The Bioactive Compound Contents and Antioxidant Activity of Extract Red Rice Beverage
076_ICOFA20	Wibisono	Food Science and Technology	Characterization β -glycosidase of Tempeh from Rejected Edamame Soybean and Determination Method of Extracted Genistein by Conventional and Compared Using of Modern Method
077_ICOFA20	Muzaifa	Food Science and Technology	Utilization of Coffee By-Products as Profitable Foods - A Mini Review
078_ICOFA20	Diono	Food Science and Technology	Extraction and Micronization of β -glucan in One-step Process by Combining Subcritical Water and Supercritical Carbon Dioxide
079_ICOFA20	Iqbal	Food Science and Technology	Analysis of integration dietducate and automated meal planner for nutritional purposes
080_ICOFA20	Damanhuri	Food Security and Sovereignty	Nitrogen and Biodegradator Application to Trigger Ratoon Growth and Production of Rice (<i>Oryza Sativa</i>)
081_ICOFA20	Purwadi	IT for Agriculture	Radio Waves-Based Landslide Mitigation System

082_ICOFA20	Utomo	IT for Agriculture	patial analysis and mapping of landslide prone areas in kemuning lor village, sub-district arjasa, district of jember
083_ICOFA20	Wibowo	IT for Agriculture	The Development of Visualization of The Small and Medium Industry Distribution (IKM) Using A Web-Based Geographic Information System
084_ICOFA20	Riskiawan	IT for Agriculture	On-line monitoring system in greenhouse area for chrysanthemum cultivation based on Raspberry Pi and IoT
085_ICOFA20	Fitri	IT for Agriculture	Application of Backpropagation Method for Quality Sorting Classification System on White Dragon Fruit (<i>Hylocereus undatus</i>)
086_ICOFA20	Lesmana	IT for Agriculture	Visual cueing modulation of cycling speed for training person with stroke in a virtual cycling system
087_ICOFA20	Purnomo	IT for Agriculture	Liquid load optimization of unmanned aerial vehicle for foliar fertilizer
088_ICOFA20	Agustianto	IT for Agriculture	Development of Realtime Surface Modeling Vehicle for Shrimp Ponds (ReSMeV-SP)
089_ICOFA20	Hariono	IT for Agriculture	Development of personal integrated sterilization machine for new normal phase preparation of the 2019-ncov outbreak
090_ICOFA20	Agustianto	IT for Agriculture	Development of automatic temperature and humidity control system in kumbung (oyster mushroom) using fuzzy logic controller
091_ICOFA20	Suastika	Organic Agriculture	The agronomy performance and resistance to brown planthopper on superior rice varieties in Bali Province, Indonesia
092_ICOFA20	Sugiyarto	Organic Agriculture	Exploration of agricultural waste as biochar to increase soil fertility of Udipsammments in Jember District
093_ICOFA20	Riyanto	Organic Agriculture	The Effect of Biological Fertilizer Application on Soil Fertility, Heavy Metals Reduction and Eggplant Yield on the rice field of Bantul Regency
094_ICOFA20	Kasutjjaningati	Organic Agriculture	The production of pak coy (<i>Brassica rapa L</i>) based on cleaner coffee production
095_ICOFA20	Saliem	Organic Agriculture	Supporting organic rice exports: the success story of West Java organic rice exports

096_ICOFA20	Erdiansyah	Organic Agriculture	Utilization of javanese ginseng and citronella for insect diversity in pace village, Jember regency
097_ICOFA20	Erdiansyah	Organic Agriculture	Virulence of Spodoptera Litura Nuclear Polyhedrosis Virus (SLNPV) with kaolin as carrier material on spodoptera litura and tetragonula laeviceps on soybean
098_ICOFA20	Kusparwanti	Organic Agriculture	Dose treatment of legume compost with the number of plants per planting hole for land efficiency and increasing sweet corn production
099_ICOFA20	Firmansyah	Organic Agriculture	Toxicity of Sphagneticola trilobata extracts against Spodoptera litura larva
100_ICOFA20	Guntara	Organic Agriculture	Growth and yield of pagoda (Brassica narinosa L) with concentration and watering interval of fermented rabbit urine on hydroponic system
101_ICOFA20	Sukri	Organic Agriculture	The increasing fertility of sandy soil and chili production through the application of organic fertilizers, zeolite and cane blotong
102_ICOFA20	Udin	Renewable and Novel Energy Sources	Emission Characteristics and Fuel Consumption of Biodiesel Obtained from Fish Canning Industry Waste in Agriculture Diesel Engine
103_ICOFA20	Rachmanita	Renewable and Novel Energy Sources	Experimental investigations on the performance of thermoelectric generator as energy conversion system
104_ICOFA20	Biyanto	Renewable and Novel Energy Sources	Stuck Pipe Optimization Using Duellist Algorithm
105_ICOFA20	Biyanto	Renewable and Novel Energy Sources	Optimization of energy efficiency in natural gas liquefaction process using plantwide control method

Optimization of making white oyster mushroom with the effect of immersion time and concentration of natrium metabisulphite

by Budi Hariono

Submission date: 10-Jan-2022 11:23PM (UTC+0700)

Submission ID: 1739649368

File name: Suratno_2021_IOP_Conf._Ser._Earth_Environ._Sci._672_012070.docx (47.62K)

Word count: 2160

Character count: 11581

PAPER • OPEN ACCESS

4 Optimization of making white oyster mushroom with the effect of immersion time and concentration of natrium metabisulphite

3 To cite this article: Suratno *et al* 2021 *IOP Conf. Ser.: Earth Environ. Sci.* **672** 012070

View the [article online](#) for updates and enhancements.

You may also like

- 7 - [Potential Use of Backyard for Oyster Mushroom \(*Pleurotus Ostreatus*\) Cultivation to Increase Family Income; Studies on Break-Event Point Analysis](#) M Sayuti, Cindenia Puspasari, Khairul Anshar et al.
- 5 - [Evaluation of the proximate quality of the combination of Tuna \(*Thunnus albacares*\) and white oyster mushroom \(*Pleurotus ostreatus*\) nuggets](#) H S Yufidasari, A A Prihanto, R Nurdiani et al.
- 8 - [Development of sauce production technology based on cultivated oyster mushrooms \(*Pleurotus ostreatus* \(Jacq.\) P. Kumm\)](#) A A Drii, L N Rozhdestvenskaya and A N Sapozhnikov

Optimization of making white oyster mushroom with the effect of immersion time and concentration of natrium metabisulphite

Suratno¹, M F Kurnianto², S Bachri², B Hariono² and A Brilliantina^{2*}

¹Department of Agriculture Production, Politeknik Negeri Jember, Mastrip Street PO BOX 164 Jember, Indonesia

²Department of Agriculture Technology, Politeknik Negeri Jember, Mastrip Street PO BOX 164 Jember, Indonesia

*aulia_b@polije.ac.id

Abstract. White oyster mushroom is a plant that is processed into a variety of food. It damages the shelf life of white oyster mushrooms itself after being harvested. The white oyster mushroom has high water content, so necessary to extend its shelf life. The objectives of the study were 1) To decide the effect of different soaking time and sodium metabisulfite concentration on the quality of the flour. 2) Knowing the best treatment between soaking time and different Sodium metabisulfite concentrations on flour making. The method used in this research is an experimental research method with a randomized block design (RBD) using two factors. The first aspect was the immersion time of 5, 10, and 15 minutes. The second aspect is the concentration of sodium metabisulfite as much as 0 ppm, 200 ppm, 400 ppm, and 600 ppm, then the drying process is carried out at 45°C, 55°C, and 65°C. The results of data analysis got the best treatment at a concentration of 600 ppm of sodium metabisulfite with a long soaking time of 10 minutes at a temperature of 55°C protein, the protein content of 1.25%, water content of 4.1% with the whiteness of 83.49.

1. Introduction

The mushroom commodity is one of the six commodities that have high nutritional value and high economic value. According to [2], Six regional superior vegetable commodities able to compete in both domestic and international markets, one mushroom with an average production of 77.94 tonnes/ha. Based on data [2] consumption of mushrooms per year (kg/capita/year) in Indonesia in 2018 is 0.177 kg/capita/year. White oyster mushroom is widely cultivated by farmers in Indonesia because of its adaptive nature to environmental changes and high productivity. But harvested white oyster mushrooms are easily damaged due to their high water content of 86.6% [7].

Changes in the quality of oyster mushrooms include wilting, browning, softness, and taste changes. In Indonesia, commercial food mushroom preservation has not been widely practiced in supermarkets, they store mushrooms at chill temperatures of 15-20°C. At this temperature, the mushrooms can only survive (still fit for consumption) for 3-5 days, even though they have been packed with polyethylene plastic [1], so, necessary to take measures to extend the shelf life of oyster mushrooms after harvest. According to [14] through their research, they can handle oyster mushrooms into powder or flour, which aims to extend the shelf life of oyster mushrooms with higher use-value. One of the important steps to making oyster mushroom flour is drying. This stage aims to reduce the water content of the material, so it can inhibit microbial growth and unwanted reactions. The oyster mushrooms convert into flour causes



a browning reaction. The enzymatic browning reaction is a reaction that occurs between the polyphenol oxidase and peroxidase enzymes with polyphenols that form quinones polymerized to produce a brown color. Enzymatic browning affects not only the display but also the taste and nutrition of food [5].

The way to deactivate polyphenol oxidase can be done based on the mechanism of the browning reaction, for example, through the removal of oxygen a reactant in the browning reaction, denaturation of enzyme proteins, protecting interactions with copper prosthetic groups, and interactions with phenolic compounds or quinones [8]. One compound used in deactivating polyphenol oxidase is sulfite. Sulfites are strong inhibitors effective in inhibiting browning and have long been used in the food industry. But excessive use is prohibited by WHO because it will have a negative impact, on people with asthma [12]. The purpose of this study was to decide the optimal transform of making oyster mushroom flour, based on temperature and sodium metabisulfite soaking, and how much flour we can get.

2. Materials and tools

The main raw material used in this research is a fresh white oyster mushroom (*Pleurotus ostreatus*) harvested from one of the oyster mushroom entrepreneurs in the Jember Regency. Other materials used are citric acid, sulfite, water, distilled water, and chemicals for analysis. The tools used in this study were ovens, sieves, trays, mixers, knives, spoons, measuring cups, scales, desiccators, porcelain plates, trays, and other equipment.

3. Research methods

We conducted this research at the Food Processing Laboratory and Food Analysis Laboratory of the State Polytechnic of Jember, from June to August 2020. We divide the research into two stages, namely preliminary research, and main research. We arranged the preliminary research factorial with a randomized block design (RBD) with two factors and three replications. The first factor is immersion time with three levels, namely 5, 10, and 15 minutes. The second factor is the concentration of Na-metabisulfite with a level of 0 ppm; 200 ppm; 400 ppm and 600 ppm. Then dried using an oven dryer with a temperature of 55°C for 8 hours.

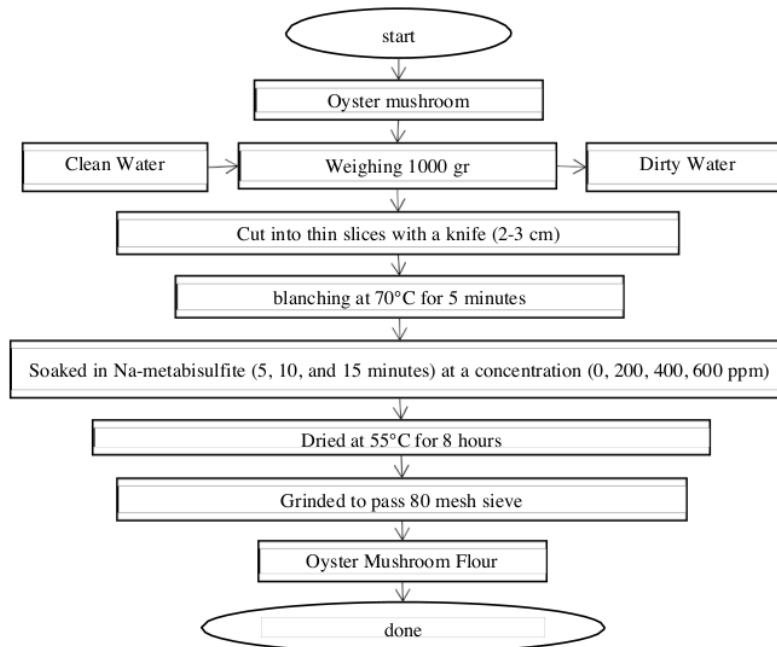


Figure 1. Flow chart of making white oyster mushroom flour

19

4. Results and discussion

The results of the analysis of water content in flour oyster mushrooms showed that the highest water content in the drying's control temperature of 45 ° C, with water content, reaches 7, 8% (Fig 2). The lowest water content was the treatment of 600 ppm sodium metabisulfite immersion and drying at 55 ° C, which was 3.9%. This may be because of the white oyster mushroom in the treatment experiencing a decrease in volume, while the white oyster mushroom in the control has a fixed volume. When reacted with water, sodium metabisulfite releases heat. This is supported by [9], which states that the water content in the control has a higher value than the water content in the treatment with a combination of temperature and immersion time.

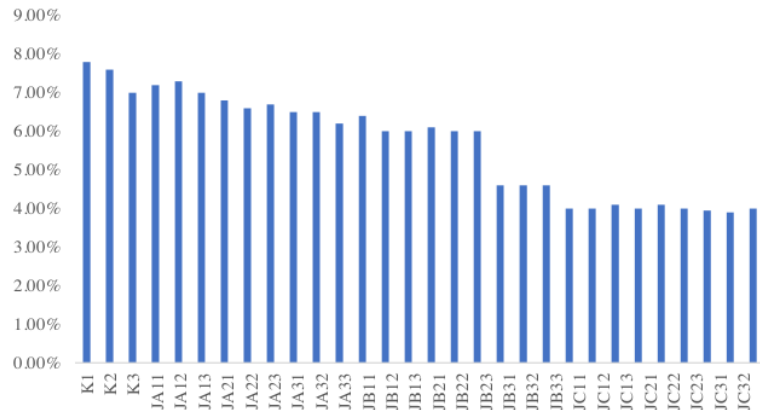


Figure 2. water content in flour oyster mushrooms

The hypothesis test used Minitab data analysis with the results of the time and the concentration per immersion, and differences in temperature affect the moisture content of the oyster mushroom flour. As proposed by [11] stated that the ability of the material to release water will be greater with the increasing temperature of the drying air used and the longer the drying transform, so that the resulting water content is lower. This is still under the opinion of [6], that the higher the temperature of the drying air, the greater the heat carried by air so that the more water is evaporated from the surface of the material being dried.

The protein content of oyster mushroom flour produced based on pretreatment ranged from 16.05 - 17.65%. Analysis of variance showed that treatment early significant effect on levels of protein. Protein is an important food substance for the body because it functions as a building block for body tissues and a regulatory agent. The small intestine wall will absorb protein in food consumed by humans in the form of amino acids [15]. Immersion in sodium bisulfite will suppress nonenzymatic browning reactions which can cause protein damage because the secondary amino acids bind to reducing sugar so that the protein content will decrease.

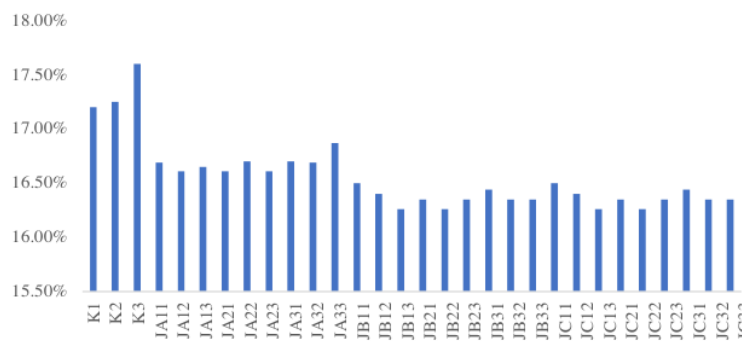


Figure 3. Protein content in flour oyster mushrooms

The whiteness of the oyster mushroom flour produced based on pretreatment ranged from 60.71 to 83.49%. Analysis of variance showed that the pretreatment had a significant effect on the degree of vaginal discharge, where the immersion of sodium metabisulfite with a higher concentration made the

mushroom flour lighter. In addition, the longer the soaking time and the higher the concentration of sodium metabisulfite, the whiter the mushroom flour will be. The addition of sodium metabisulfite must be under the standards applied by BPOM No. 36 2013, namely not to exceed 200mg-1 gr / kg for food products. If it exceeds the largest limit causes an allergic reaction. The addition of the sodium metabisulfite solution will resolve the brown color in the flour recommended for food products. The higher the sodium metabisulfite concentration, the higher the whiteness value. According to [10], apart from being a preservative, sulfites can interact with carbonyl groups. The result will bind to the Melanoids, preventing brown color. According to [4], sodium metabisulfite apart from being an anti-microorganism is also used in a variety of foodstuffs to inhibit non-enzymatic browning, inhibits another enzymatic browning which is catalyzed by enzymes, and as an antioxidant and reducing agent.

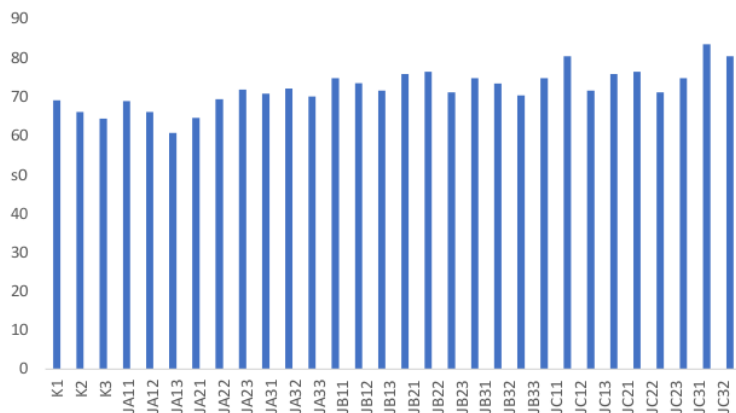


Figure 4. The Whiteness in flour oyster mushrooms

The yield of oyster mushroom flour produced based on pretreatment ranged from 6.3 to 8.7%. Analysis of variance showed that the pretreatment had a significant effect on the yield value, where the immersion treatment of sodium metabisulfite with a higher concentration made the mushroom flourless. According to [13], the low yield value is for weight loss due to water loss due to heating. The heating process makes membrane cells more permeable so that the movement of water is not hampered and water is more easily excreted when drying.

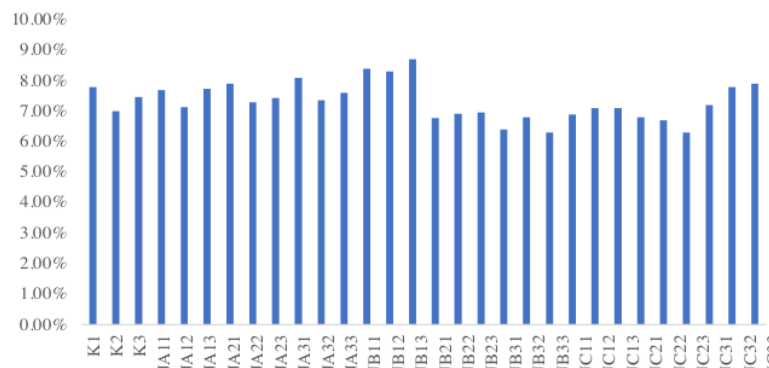


Figure 5. Yield in flour oyster mushrooms

sDetermination of the best oyster mushroom flour is done by considering the parameters that affect the oyster mushroom flour. The water content of the oyster mushroom flour in this study has met the SNI standard of quality I, which is less than 10%, the whiteness of the oyster mushroom flour is taken from the treatment with the highest whiteness and the protein content of the oyster mushroom flour is not too different from the treatment that produces protein content. Oyster mushroom flour with a value range of 16.26% to 17.60%. Of all these treatments concluded that oyster mushrooms flour best with 600 ppm sodium metabisulfite soaking for 15 minutes at a temperature of 55° C.

5. Conclusion

Effect of long immersion time and the concentration of sodium metabisulfite relatively significant effect on the levels of water, levels of the protein, and whiteness of flour oyster mushrooms. Flour quality oyster mushrooms, the best in the treatment of immersion sodium metabisulfite 600 ppm for 15 minutes at a temperature of 55° C.

Acknowledgements

This paper is dedicated to kemenristekdikti. This paper is part of the 2020 Higher Education grant applied research.

References

- [1] Ardiansyah et al, 2014 *Jurnal Teknologi Industri dan Hasil Pertanian*.vol **19** : 2.
- [2] BPS 2018 *Statistik Tanaman Sayuran dan Buah-buahan Semusim Indonesia 2018* (Badan Pusat Statistik. Jakarta)
- [3] BPS 2018 *Statistik Konsumsi Pangan Tahun 2018* (Badan Pusat Statistik. Jakarta)
- [4] Buckle, K. E 2010 *Food Science* (Jakarta: Penerbit Universitas Indonesia (UIPress))18 Tahun 2012 Tentang Pangan 18(9) 1689-1699) <https://doi.org/10.1017/CBO9781107415324.004>
- [5]Cortez-Vega, W. R., Becerra-Prado, A. M., Soares, J. M., and Fonscca, G. G 2008 *International Journal of Agricultural Research*, **3** (3), 196-201.
- [6] Desrosier, N.W 1988 *Teknologi Pengawetan Pangan* (Penerjemah M. Muljohardjo. UI-Press. Jakarta)
- [7] Djarijah N.M. dan Djarijah A.S 2001 *Budidaya Jamur Tiram* (Yogyakarta: Kanisius)
- [8] Mesquita, V. L. V. and Queiroz, C 2013 *Enzymatic browning*, *Biochemistry of Foods*, 3rd Ed (Editor Eskin, N. A. M. and Shahidi, F., Academic Press, Amsterdam, 387-418)
- [9] Lisa, Maya 2013 *Jurnal Keteknik Pertanian Tropis dan Biosistem* Vol. **3** No. 3, Oktober 2013, 270-279.

- [10] Syarief, R. dan A. Irawati 1988 *Pengetahuan Bahan untuk Industri Pertanian* (Medyatama Sarana Perkasa. Jakarta)
- [11] Taib, G., G. Said & S. Wiraatmadja 1987 *Operasi Pengeringan Pada Pengolahan Hasil Pertanian* (Jakarta, Mediyatama Sarana Perkasa)
- [12] Tan, T. C., Cheng, L. H., Bhat, R., Rusul, G., and Easa, A. M 2015 *International Food Research Journal*, **22** (2), 631-637.
- [13] Widya, Deasy 2003 *Proses Produksi dan Karakteristik Tepung Bi}i Mangga Jenis Arumanis (Mangifera indica L.)* (Skripsi. IPB. Bogor)
- [14] Widyastuti, N. dan Istini, S 2004 *Jurnal Ilmu Kefarmasian Indonesia* IV :1-4.
- [15] Winarno, F. G 1997 *Kimia Pangan dan Gizi* (Gramedia. Jakarta)

Optimization of making white oyster mushroom with the effect of immersion time and concentration of natrium metabisulphite

ORIGINALITY REPORT

18%

SIMILARITY INDEX

15%

INTERNET SOURCES

6%

PUBLICATIONS

4%

STUDENT PAPERS

PRIMARY SOURCES

1	repository.uhamka.ac.id Internet Source	2%
2	es.scribd.com Internet Source	2%
3	www.researchgate.net Internet Source	2%
4	Antonio dos Reis de Faria Neto, Cristina Sayuri Fukugauchi, Marcelo dos Santos Pereira. "Using design of experiments in the evaluation of the microstructural characterization parameters with the LePera reagent in a multiphase steel", Materials Research Express, 2021 Publication	1%
5	china.iopscience.iop.org Internet Source	1%
6	jurnal.usu.ac.id Internet Source	1%

7	repository.unimal.ac.id Internet Source	1 %
8	toc.proceedings.com Internet Source	1 %
9	conference.polije.ac.id Internet Source	1 %
10	www.grafiati.com Internet Source	1 %
11	FARES, A.. "Adjusting Temperature and Salinity Effects on Single Capacitance Sensors", Pedosphere, 200910 Publication	1 %
12	publikasi.polije.ac.id Internet Source	1 %
13	Patrick Ngirabakunzi Irakiza, Géant Basimine Chuma, Tresor Zongwe Lyoba, Marcelin Aganze Mweze et al. "Fortification with mushroom flour (<i>Pleurotus ostreatus</i> (Jacq.) P. Kumm) and substitution of wheat flour by cassava flour in bread-making: Nutritional and technical implications in eastern DR Congo", Agriculture & Food Security, 2021 Publication	<1 %
14	pertambangan.fst.uinjkt.ac.id Internet Source	<1 %

repository.unpas.ac.id

15 Internet Source <1 %

16 repository.ub.ac.id Internet Source <1 %

17 eprints.umsida.ac.id Internet Source <1 %

18 jurnal.fp.unila.ac.id Internet Source <1 %

19 www.scribd.com Internet Source <1 %

Exclude quotes Off

Exclude matches Off

Exclude bibliography On