

**LEMBAR**  
**HASIL PENILAIAN SEJAWAT SEBIDANG ATAU PEER REVIEW**  
**KARYA ILMIAH : PROSIDING\***

**Judul Prosiding (Artikel)** : The Influence of Electrode Type on Electrocoagulation Process for Removal of Chromium (VI) Metal in Plating Industrial Wastewater

**Nama Penulis** : Aji Prasetyaningrum, Bakti Jos, Yudhy Dharmawan, Bilal T. Prabowo, Muh. Fathurrazan, Fyrouzabadi

**Jumlah Penulis** : 6 orang

**Status Pengusul** : **Penulis Pertama**

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- a. Nama Prosiding : Journal of Physics: Conference Series
- b. Nomor ISSN : 1742-6596
- c. Volume, Nomor, Bulan, Tahun : Vol. 1025, No. 012126, 2018
- d. Penerbit : IOP Science
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| <b>Nilai Pengusul (60% x nilai total)</b>                         | <b>11,7</b>    | <b>12,3</b> | <b>12,0</b>     |

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**Reviewer 2**

**Prof. Ir. Didi Dwi Anggoro., M. Eng., P.hD**  
NIP. 196711141993031001  
Bidang Ilmu/Unit kerja : Teknik Kimia FT UNDIP

**Reviewer 1**

**Prof. Dr. Moh. Djaeni, S.T., M.Eng**  
NIP. 197102071995121001  
Bidang Ilmu/Unit kerja : Teknik Kimia FT UNDIP

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| d. Kelengkapan unsur dan terbitan/prosiding (30%)                 | 9,0                                                  |                                      | 6,0                        |
| <b>Total = (100%)</b>                                             | <b>30,0</b>                                          |                                      | <b>19,5</b>                |
| <b>Nilai Pengusul = (60% x 19,5) = 11,7</b>                       |                                                      |                                      |                            |

**Catatan Penilaian Artikel oleh Reviewer:**

- **Kelengkapan unsur isi artikel (10%)**  
Kelengkapan unsur artikel tersaji dengan baik, dimana artikel terdiri dari *Title, Abstract, Keyword, Introduction, Materials and Method, Results and Discussion, Conclusion* dan *References*. Artikel ditulis sesuai dengan *Guide for Author*, dimana persamaan, grafik dan tabel juga disitasi dan dibahas.
- **Ruang lingkup dan kedalaman pembahasan (30%)**  
Penelitian ini menampilkan pengaruh jenis elektroda terhadap penurunan kandungan Cr dari limbah. Hasil menunjukkan bahwa elektroda aluminium paling potensial, dibandingkan dengan 2 elektroda lainnya terutama setelah waktu 1.5 jam. Kurang dijelaskan secara lengkap mengapa Aluminium menunjukkan performa yang meningkat, sementara elektroda lainnya sebagai pembanding justru mengalami penurunan performa saat proses dilanjutkan. Secara umum data cukup singkat, sehingga kurang memberikan dampak yang positif terutama untuk pengembangan pengolahan limbah logam berat. Pembahasan dilakukan cukup baik dengan mensitasi beberapa referensi yang relevans.
- **Kecukupan dan kemutakhiran data/informasi dan metodologi (30%)**  
Nilai kebaruan atau novelty artikel ini kurang dimana ada 2 referensi dalam 10 tahun terakhir dari 10 referensi yang ada (20%). Metode yang disajikan dengan tahapan yang jelas dan terstruktur dengan baik. Penjelasan dalam penelitian ini cukup baik dan menjelaskan *reasoning* atau *scientific background* nya. Metodologi terlalu singkat dan perlu dielaborasi dengan deskripsi yang lebih detail.
- **Kelengkapan unsur dan terbitan/prosiding (30%)**  
Penerbit adalah *Journal of Physics: Conference Series*, Vol. 1025, No. 012126, 2018. SJR=0.22 (tahun 2018) dan Hindex = 65. Kualitas terbitan sudah baik untuk kategori jurnal internasional (*conference series*). Paper ini memiliki nilai similaritas artikel berdasarkan Turnitin sebesar 4%.

Semarang,

**Reviewer 1**

**Prof. Dr. Moh. Djaeni, S.T., M.Eng**

NIP. 197102071995121001

Bidang Ilmu/Unit kerja : Teknik Kimia FT UNDIP

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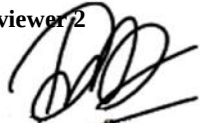
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| d. Kelengkapan unsur dan terbitan/prosiding (30%)                 | 9,0                                                  |                                      | 7,0                        |
| <b>Total = (100%)</b>                                             | <b>30,0</b>                                          |                                      | <b>20,5</b>                |
| <b>Nilai Pengusul = (60% x 20,5) = 12,3</b>                       |                                                      |                                      |                            |

**Catatan Penilaian Artikel oleh Reviewer:**

- **Kelengkapan unsur isi artikel (10%)**  
Unsur isi artikel dituliskan dengan lengkap, sesuai dengan panduan penulisan pada prosiding, yaitu Journal of Physics: Conference Series.
- **Ruang lingkup dan kedalaman pembahasan (30%)**  
Ruang lingkup penelitian sesuai bidang Teknik Kimia, khususnya reaksi elektrokoagulasi. Penelitian ini membahas tentang efisiensi penggunaan beberapa jenis elektroda pada pengolahan limbah elektroplating. Mekanisme reaksi yang terjadi serta pengaruh jenis elektroda terhadap performansi proses tidak dijelaskan dengan baik. Penjelasan dan interpretasi data sangat singkat, sehingga kurang memberikan pemahaman secara menyeluruh terhadap proses. Jumlah sitasi yang tertulis pada pembahasan juga kurang, yaitu 20% dari total sitasi.
- **Kecukupan dan kemutakhiran data/informasi dan metodologi (30%)**  
Latar belakang, metodologi serta hasil penelitian ditulis dengan sistematis. Namun data informasi yang mutakhir pada artikel ini masih kurang. Data data yang ditulis kurang lengkap dan kemutakhiran data masih kurang memberikan pengayaan terhadap kajian yang sudah ada dan belum tampak kebaruan proses.
- **Kelengkapan unsur dan terbitan/prosiding (30%)**  
Nilai similaritas pada artikel cukup rendah, yaitu 4%. Penerbit *Journal of Physics: Conference Series* memiliki kualitas penerbitan cukup baik. Publikasi ini memiliki No ISSN: 1742-6596. Nilai SJR pada tahun 2018 adalah 0.22.

Semarang,

Reviewer 2



**Prof. Ir. Didi Dwi Anggoro, M. Eng., PhD**

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Bidang Ilmu/Unit kerja : Teknik Kimia FT UNDIP



THE MINISTRY OF RESEARCH, TECHNOLOGY AND HIGHER EDUCATION  
THE REPUBLIC OF INDONESIA

**DIPONEGORO UNIVERSITY**  
**FACULTY OF SCIENCE AND MATHEMATICS**



**CERTIFICATE**

Decree of Dean Number : 1440/UN7.5.8/HK/2017

**This is to certify that**

**Aji Prasetyaningrum**

**as**

**PRESENTER**

In the 7<sup>th</sup> International Seminar on New Paradigm and Innovation of Natural Science and Its Application (ISNPINSA-7) held on 17 October 2017 at Grand Candi Hotel Semarang Indonesia

with paper entitled as follows:

**The Influence of Electrode Type on Electrocoagulation Process for Removal Of Chromium Metal in Plating Industrial Wastewater**

**DEAN OF FSM UNDIP**

  
Prof. Dr. Widowati, S.Si, M.Si.  
NIP. 196902141994032002

**7<sup>th</sup> ISNPINSA COMMITTEE,  
CHAIRMAN**

  
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Journal of Physics: Conference Series

Volume 1025, Issue 1, 30 May 2018, Article number 012126

7th International Seminar on New Paradigm and Innovation on Natural Sciences and Its Application, ISNPINSA 2017; Semarang; Indonesia; 17 October 2017 through 17 October 2017; Code 136783

## The influence of electrode type on electrocoagulation process for removal of chromium (VI) metal in plating industrial wastewater (Conference Paper) (Open Access)

Prasetyaningrum, A.<sup>a</sup> ✉, Jos, B.<sup>a</sup>, Dharmawan, Y.<sup>b</sup>, Prabowo, B.T.<sup>a</sup>, Fathurrazan, M.<sup>a</sup>, Fyrouzabadi<sup>a</sup> ✉

<sup>a</sup>Department of Chemical Engineering, Faculty of Engineering, Diponegoro University, Indonesia

<sup>b</sup>Departement of Public Health, Faculty of Public Health, Diponegoro University, Indonesia

### Abstract

View references (10)

Chromium (VI) is one of the major metallic pollutants in plating industrial wastewater. Cr(VI) is one of toxic metal that cause serious threat to human health and the environment because its non-biodegradable. Among the technologies for removing these pollutants, electrocoagulation can be considered as an effective method. This method have some advantages such as less amount of produced sludge and high efficiency in removal of pollutants. This research intended to study the effects of type of electrode on the degree of Cr(VI) removal from wastewater of plating industry using electrocoagulation method. This laboratory research conducted with 3 types of electrode (aluminum, stainless and combination of both electrode). Synthetic chromium wastewater was prepared at the initial concentration of 100 mg L<sup>-1</sup>. The process was conducted at pH 3. The electricity current was setting at 3 Ampere. The variable of time of electrocoagulation at 1 and 2 hours. After performing the process on electrochemical cells, samples analyzed by the UV-Vis spectrophotometer regarding amount of Cr(VI) metals. The results showed that aluminium was the best performance electrode at variable of 2 hours with 26% of reduction of Cr(VI) metal content in plating industrial waste water. © Published under licence by IOP Publishing Ltd.

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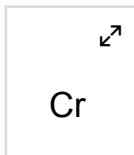
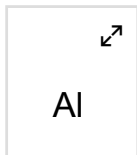
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Electroreduction to remove Cr ( VI ) by foamed iron in alkaline wastewater | 泡沫铁对碱性废水中 Cr ( VI ) 的电还原

Guo, M.-L. , Chen, Q. , Gao, J. (2020) *Journal of Tianjin Polytechnic University*

The Effect of pH and Current Density on Electrocoagulation Process for Degradation of Chromium (VI) in Plating Industrial Wastewater

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# **7th International Seminar on New Paradigm and Innovation on Natural Science and Its Application (ISNPINSA-7)**

Science and Data Science for Sustainable  
Development Goals

Journal of Physics: Conference Series Volume 1025

Semarang, Indonesia  
17 October 2017

Part 1 of 2

**Editors:**

**Budi Warsito  
Sapto Purnomo Putro  
Ali Khumaeni**

ISBN: 978-1-5108-6404-7  
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## PREFACE

The 7th International Seminar on New Paradigm and Innovation on Natural Sciences and Its Application (ISNPINSA-7) is annual conferences organized by Faculty of Sciences and Mathematics (FSM) Diponegoro University and has been successfully conducted since 2011. The aims of ISNPINSA are to facilitate brain storming and state of the art information in field of sciences and mathematics; to increase innovation of technology that can be applied in industries; to contribute in formulating strategy to increase the role of science for community; and to stimulate collaboration between industries, researchers and government to increase community welfare. The theme of 7th ISNPINSA in 2017 is “*Science and Data Science for Sustainable Development Goals*”.

The scope of the field of participants comes from various fields including biology, physics, chemistry, statistics, mathematics, informatics, environment, public health, and relevant fields that contribute to sustainable development. The conference was held in Semarang, Indonesia on October, 17th, 2017. There were three keynote speakers and three invited speaker who came from Japan, Italy, Malaysia, Philipines and Indonesia. The number of participants of this seminar were more than 200 consist of researchers, lecturers, postgraduate and undergraduate students from various universities and after the selection process there are 132 articles selected to be published in the present conference proceeding.

### The Editors

Dr. Budi Warsito

Sapto Purnomo Putro, Ph.D.

Ali Khumaeni, Ph.D.

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| Ismiyarto, S.Si., M.Si., PhD.      | Diponegoro University, Semarang, Indonesia                               |
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# TABLE OF CONTENTS

## PART 1

### MATERIAL PHYSICS

|                                                                                                                                                                                                      |           |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>DYE-SENSITIZED SOLAR CELL SIMULATION PERFORMANCE USING MATLAB .....</b>                                                                                                                           | <b>1</b>  |
| <i>Alvin Muhammad Habieb, Muhammad Irwanto, Ilham Alkian, Fitri Khalimatus Sya'Diyah, Hendri Widiyandari, Vincensius Gunawan</i>                                                                     |           |
| <b>SYNTHESIS OF NICKEL NANOPARTICLES BY PULSE LASER ABLATION METHOD USING ND:YAG LASER .....</b>                                                                                                     | <b>8</b>  |
| <i>Chusnus Shalichah, Ali Khumaeni</i>                                                                                                                                                               |           |
| <b>EMISSION CHARACTERISTICS OF COPPER USING LASER-INDUCED BREAKDOWN SPECTROSCOPY AT LOW PRESSURE .....</b>                                                                                           | <b>12</b> |
| <i>Gali Kurniawan, Fatkhiyatus Sa'Adah, Ali Khumaeni</i>                                                                                                                                             |           |
| <b>SYNTHESIS AND PHOTOCATALYTIC PROPERTY OF ZINC OXIDE (ZNO) FINE PARTICLE USING FLAME SPRAY PYROLYSIS METHOD .....</b>                                                                              | <b>17</b> |
| <i>Hendri Widiyandari, Ngurah Ayu Ketut Umiati, Rizki Dwi Herdianti</i>                                                                                                                              |           |
| <b>SYNTHESIS AND CHARACTERIZATION CARBOXYL FUNCTIONALIZED MULTI-WALLED CARBON NANOTUBES (MWCNT-COOH) AND NH<sub>2</sub> FUNCTIONALIZED MULTI-WALLED CARBON NANOTUBES (MWCNTNH<sub>2</sub>) .....</b> | <b>24</b> |
| <i>S. A. Wulandari, Arifin, Hendri Widiyandari, Agus Subagio</i>                                                                                                                                     |           |

### RADIATION PHYSICS

|                                                                                                                                                          |           |
|----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>APPLICATION OF ASPEN PLUS FOR MUNICIPAL SOLID WASTE PLASMA GASIFICATION SIMULATION: CASE STUDY OF JATIBARANG LANDFILL IN SEMARANG INDONESIA .....</b> | <b>33</b> |
| <i>Ainie Khuriati, Purwanto Purwanto, Haryono Setiyo Huboyo, Suryono Suryono, Ari Bawono Putro</i>                                                       |           |
| <b>RAPID IDENTIFICATION OF MACRO NUTRIENTS IN PHARMACEUTICAL MEDICINE USING LASER-INDUCED PLASMA SPECTROSCOPY .....</b>                                  | <b>40</b> |
| <i>Ali Khumaeni, Heri Sugito, Asep Yoyo Wardaya, Wahyu Setia Budi</i>                                                                                    |           |
| <b>DESIGN OF INTEGRATED POLARIZER FOR DETECTION OF LARD IMPURITIES IN COOKING OIL .....</b>                                                              | <b>45</b> |
| <i>H. Sugito, K. S. Firdausi, N. K. Putri</i>                                                                                                            |           |
| <b>SIMPLE DIRECT OBSERVATION OF POLARIZATION CHANGES OF RAYLEIGH SCATTERING ON SUGAR SOLUTION AT LOW CONCENTRATION .....</b>                             | <b>51</b> |
| <i>K. Sofjan Firdausi, Heri Sugito, Nidia Kharisma Putri</i>                                                                                             |           |
| <b>LASER-INDUCED BREAKDOWN SPECTROSCOPY FOR RAPID DETECTION OF CORROSIVENESS IN CONCRETE .....</b>                                                       | <b>59</b> |
| <i>Nurul Hikmantiyah, Trisna Maulana Shidiq, Ali Khumaeni</i>                                                                                            |           |
| <b>IDENTIFICATION OF NICKEL EMISSION LINES USING ND:YAG LASERINDUCED BREAKDOWN SPECTROSCOPY .....</b>                                                    | <b>64</b> |
| <i>Nurul Istiqomah Nafi'Annisa, Nurul Hikmantiyah, Ali Khumaeni</i>                                                                                      |           |
| <b>LASER-INDUCED BREAKDOWN SPECTROSCOPY FOR IDENTIFICATION AND CHARACTERIZATION OF ALUMINUM .....</b>                                                    | <b>68</b> |
| <i>Oki Dimas Prasetya, Trisna Maulana, Ali Khumaeni</i>                                                                                                  |           |
| <b>TREATMENT OF HOSPITAL WASTE WATER BY OZONE TECHNOLOGY .....</b>                                                                                       | <b>73</b> |
| <i>Rina Indah Dianawati, Nur Endah Wahyuningsih, Muhammad Nur</i>                                                                                        |           |
| <b>RAPID DETECTION OF THE AUTHENTICITY OF SILVER JEWELRY BY LASER INDUCED SHOCKWAVE PLASMA SPECTROSCOPY USING ND:YAG LASER 1064 NM .....</b>             | <b>77</b> |
| <i>R W Septianti, W S Budi, H Sugito, A Khumaeni</i>                                                                                                     |           |
| <b>ELECTROHYDRODYNAMIC (EDH) DRYING OF GINGER SLICES (ZINGIBER OFFICINALE) .....</b>                                                                     | <b>87</b> |
| <i>Sumariyah, Ainie Khuriati, Enny Fachriyah</i>                                                                                                         |           |
| <b>ION WIND GENERATION AND ITS APPLICATION TO DRYING OF WILD GINGER SLICES (CURCUMA XANTHORHIZA) .....</b>                                               | <b>94</b> |
| <i>Sumariyah, Ainie Khuriati, Enny Fachriyah</i>                                                                                                         |           |

|                                                                                                                                                  |            |
|--------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| <b>THE SPEED OF HEAVY METAL CADMIUM SEEPAGE ON "E" AND "F" FIELDS IN RESIDENTIAL AREA AROUND KANAL BANJIR BARAT RIVER OF SEMARANG CITY. ....</b> | <b>100</b> |
| <i>H Danusaputro, R Gernowo, A Setyawan, B Bonita</i>                                                                                            |            |

## **APPLIED PHYSICS**

|                                                                                                                                                          |            |
|----------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| <b>SIMULATION MODEL OF DARRIEUS TURBINE USING SOFTWARE CFD (COMPUTATING FLUID DINAMYC) IN BEDONO VILLAGE OF DEMAK DISTRICT .....</b>                     | <b>105</b> |
| <i>Agus Margiantono, Titik Nurhayati</i>                                                                                                                 |            |
| <b>LITHOLOGY AND CHARACTERISTIC OF LANDSLIDE IN GOMBEL HILL BY 2D GEOELECTRIC RESISTIVITY METHOD USING DIPOLE-DIPOLE CONFIGURATION.....</b>              | <b>110</b> |
| <i>Agus Setyawan, Muhammad Satria Fikri, Jatmiko Endro Suseno, Muhamad Fuad</i>                                                                          |            |
| <b>ULTRASOUND-ASSISTED EXTRACTION OPTIMIZATION OF PHENOLIC COMPOUNDS FROM PSIDIUM GUAJAVA L. USING ARTIFICIAL NEURAL NETWORK-GENETIC ALGORITHM .....</b> | <b>118</b> |
| <i>Annisa Amalia, Suryono Suryono, Jatmiko Endro Suseno, Ratna Kurniawati</i>                                                                            |            |
| <b>ANALYSIS OF THE SEMI-PERMANENT HOUSE IN MERAUKE CITY IN TERMS OF AESTHETIC VALUE IN ARCHITECTURE .....</b>                                            | <b>125</b> |
| <i>Anton Topan, Sari Octavia, Henry Soleman</i>                                                                                                          |            |
| <b>ELECTRO SHIELD SYSTEM APPLICATIONS ON SET GILL NET AS EFFORTS TO PRESERVE SHARK RESOURCES.....</b>                                                    | <b>132</b> |
| <i>Dp Fitri Aristi, H Boesono, K E Prihantoko, D Y Gautama</i>                                                                                           |            |
| <b>HAZARD MITIGATION WITH CLOUD MODEL BASED RAINFALL AND CONVECTIVE DATA.....</b>                                                                        | <b>140</b> |
| <i>R Gernowo, K Adi, T Yulianto, S Seniyatis, A. A Yatunnisa</i>                                                                                         |            |
| <b>DETERMINATION OF THE ULTRASOUND POWER EFFECTS ON FLAVONOID COMPOUNDS FROM PSIDIUM GUAJAVA L. USING ANFIS.....</b>                                     | <b>145</b> |
| <i>Humairoh Ratu Ayu, Suryono Suryono, Jatmiko Endro Suseno, Ratna Kurniawati</i>                                                                        |            |
| <b>AUTOMATIC VEHICLE COUNTING USING BACKGROUND SUBTRACTION METHOD ON GRAY SCALE IMAGES AND MORPHOLOGY OPERATION.....</b>                                 | <b>153</b> |
| <i>K Adi, A P Widodo, C E Widodo, A Pamungkas, A B Putranto</i>                                                                                          |            |
| <b>HOUSEHOLD SCALE OF GREENHOUSE DESIGN IN MERAUKE.....</b>                                                                                              | <b>159</b> |
| <i>Muchlis Alahudin, Indah Widarnati, Ni Luh Sri Suryaningsih</i>                                                                                        |            |
| <b>CONVECTIVE AND MICROPHYSICS PARAMETERIZATION IMPACT ON SIMULATING HEAVY RAINFALL IN SEMARANG (CASE STUDY ON FEBRUARY 12<sup>TH</sup>, 2015).....</b>  | <b>171</b> |
| <i>Nurzaka Faridatussafura, Agie Wandala</i>                                                                                                             |            |
| <b>LANDSLIDE POTENCY AT TRANGKIL, GUNUNG PATI BASED ON THE GROUNDWATER FLOW PATTERN AND THE VALUE OF SAFETY FACTOR.....</b>                              | <b>179</b> |
| <i>Tony Yulianto, Rahmat Gernowo, Sugeng Widada</i>                                                                                                      |            |
| <b>SYSTEM ON CHIP (SOC) WI-FI MICROCONTROLLER FOR MULTISTATION MEASUREMENT OF WATER SURFACE LEVEL USING ULTRASONIC SENSOR .....</b>                      | <b>186</b> |
| <i>Suryono Suryono, Sapto Purnomo Putro, Widowati, Satriyo Adhy</i>                                                                                      |            |
| <b>ANALYSIS OF OPENINGS AND WIDE OF LEAF ON MULTILEAF COLIMATORS USING GAFCHROMIC RTQA2 FILM.....</b>                                                    | <b>192</b> |
| <i>Evi Setiawati, Assyifa Lailla Rachma, M. Hidayatullah</i>                                                                                             |            |

## **ECOLOGY AND BIODIVERSITY**

|                                                                                                                                     |            |
|-------------------------------------------------------------------------------------------------------------------------------------|------------|
| <b>POTENTIAL RE-UTILIZATION OF COMPOSTED MANGROVE LITTERS FOR POND ENVIRONMENT QUALITY IMPROVEMENT .....</b>                        | <b>200</b> |
| <i>Endah Dwi Hastuti, Rini Budi Hastuti, Riche Hariyati</i>                                                                         |            |
| <b>THE ABUNDANCE AND IMPORTANCE VALUE OF TREE IN "SENDANG KALIMAH TOYYIBAH" SURROUNDING AND ITS IMPLICATION TO THE SPRING .....</b> | <b>205</b> |
| <i>Erry Wiryani, Murningsih, Jumari</i>                                                                                             |            |
| <b>THE INVASIVE ALIEN PLANTS THREATENED THE BALANCE OF ECOSYSTEM IN CONSERVATIVE AREA IN ONTOLOE ISLAND, FLORES-INDONESIA .....</b> | <b>213</b> |
| <i>Ignatius Antonius Mboka Segu Wake, Tri Retnaningsih Soeprbowati, Jumari</i>                                                      |            |
| <b>EXTENDED BENEFIT COST ANALYSIS AS AN INSTRUMENT OF ECONOMIC VALUATED IN PETUNGKRIYONO FOREST ECOSYSTEM SERVICES .....</b>        | <b>222</b> |
| <i>Irma Damayanti, Azis Nur Bambang, Tri Retnaningsih Soeprbowati</i>                                                               |            |

|                                                                                                                                                          |            |
|----------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| <b>THE WATER QUALITY AND CULTIVANT ENRICHMENT POTENCY OF POND BASED ON SAPROBIC INDEX AT NORTH COASTAL WATERS OF CENTRAL JAVA, INDONESIA .....</b>       | <b>231</b> |
| <i>Jafron W. Hidayat</i>                                                                                                                                 |            |
| <b>ENVIRONMENTAL QUALITY ASSESSMENT USING MICROALGAE STRUCTURES ADJACENT FISH FARMING AT SETOKO ISLAND, BATAM CITY, KEPULAUN RIAU PROVINCE.....</b>      | <b>239</b> |
| <i>Riche Hariyati, Sapto Putro</i>                                                                                                                       |            |
| <b>WATER QUALITY OF THE GARANG RIVER, SEMARANG, CENTRAL JAVA, INDONESIA BASED ON THE GOVERNMENT REGULATION STANDARD .....</b>                            | <b>244</b> |
| <i>R M D Ujjianti, S Anggoro, A N Bambang, F Purwanti</i>                                                                                                |            |
| <b>RELATIONSHIPS BETWEEN OF SEA URCHINS ABUNDANCE, MACROALGAE AND CORAL CLOSURE ON THE CEMARA KECIL ISLAND .....</b>                                     | <b>252</b> |
| <i>Suryanti Suryanti, Churun Ain, Nurul Latifah</i>                                                                                                      |            |
| <b>COMMUNITY STRUCTURE OF MACROZOOBENTHOS AS BIOINDICATOR OF PEPE RIVER QUALITY, MOJOSONGO BOYOLALI .....</b>                                            | <b>259</b> |
| <i>Udi Tarwotjo, Rully Rahadian, Mochammad Hadi</i>                                                                                                      |            |
| <b>SPATIAL AND TEMPORAL PATTERNS OF MACROZOOBENTHIC COMMUNITY INHABITING SEDIMENTS UNDER TROPICAL FISH FARMING.....</b>                                  | <b>266</b> |
| <i>Abdullah Aufa, Mochamad Hadi, Sapto Purnomo Putro</i>                                                                                                 |            |
| <b>SEQUENTIAL PATTERNS OF ESSENTIAL TRACE ELEMENTS COMPOSITION IN GRACILARIA VERRUCOSA AND ITS GENERATED PRODUCTS .....</b>                              | <b>273</b> |
| <i>Munifatul Izzati, Sri Haryanti, Sarjana Parman</i>                                                                                                    |            |
| <br><b><u>APPLIED BIOLOGY</u></b>                                                                                                                        |            |
| <b>EFFECT OF ETHANOLIC NEEM (AZADIRACHTA INDICA) LEAF EXTRACT AS AN HERB CONTRACEPTIVE ON HEPATO-SOMATIC INDEX OF THE MALE MICE (MUS MUSCULUS) .....</b> | <b>279</b> |
| <i>Agung Janika Sitaswi, Sri Isdadiyanto, Siti Muflichatun Mardiaty</i>                                                                                  |            |
| <b>ALLELOCHEMICAL EFFECT OF AGERATUM CONYZOIDES L. LEAF EXTRACT ON SOYBEAN [GLYCINE MAX (L.) MERR. CV GROBOGAN] GROWTH .....</b>                         | <b>285</b> |
| <i>Dita Kusuma Wardani, Sri Darmanti, Rini Budihastuti</i>                                                                                               |            |
| <b>EFFECT OF WHITE TEA AND XYLITOL ON STRUCTURE AND PROPERTIES OF DEMINERALIZED ENAMEL AND JAWBONE .....</b>                                             | <b>293</b> |
| <i>Ei Auerkari, R Kiranahayu, D Emerita, P Sumariningih, D Sarita, Ms Adiwirya, Aw Suhartono</i>                                                         |            |
| <b>PALATAL RUGAE COMPARISON BETWEEN ETHNIC JAVANESE AND NON-JAVANESE.....</b>                                                                            | <b>301</b> |
| <i>Rs Basman, Ad Puspita, Rt Achmad, Aw Suhartono, Ei Auerkari</i>                                                                                       |            |
| <b>PEGAGAN AND CINNAMON BARK FLOURS AS A FEED SUPPLEMENT FOR QUAIL GROWTH RATE (COTURNIX COTURNIX).....</b>                                              | <b>305</b> |
| <i>Falasifah, Sunarno Sunarno, Muhammad Anwar Djaelani, Rully Rahadian</i>                                                                               |            |
| <b>PRODUCTIVITY AND GROWTH PERFORMANCE OF EDAMAME (GLYCIN MAX L MERRIL) DUE TO THE ADDITION OF SITOKININ.....</b>                                        | <b>314</b> |
| <i>Irma Rohmawati, Maria Ulfah</i>                                                                                                                       |            |
| <b>MOLECULAR DIVERSITY OF LACTIC ACID BACTERIA ON ILEUM BROILER CHICKEN FED BY BRAN AND BRAN FERMENTATION.....</b>                                       | <b>319</b> |
| <i>Laelatul Banyah, Siti Nur Jannah, Isworo Rukmi, Sugiharto</i>                                                                                         |            |
| <b>ADAPTABILITY AND GROWTH PERFORMANCE OF AVICENNIA MARINA SEEDLING WITHIN SILVOFISHERY POND .....</b>                                                   | <b>325</b> |
| <i>Rini Budi Hastuti, Endah Dwi Hastuti</i>                                                                                                              |            |
| <b>CLUSTER ANALYSIS OF DIOSCOREA SPP. BASED ON AMILUM AND TUBER MORPHOLOGY .....</b>                                                                     | <b>330</b> |
| <i>Siti Maqfiroh, Jumari, Murningsih</i>                                                                                                                 |            |
| <b>NIRA ACIDITY AND ANTIOXIDANT ACTIVITY OF PALM SUGAR IN SUMOWONO VILLAGE.....</b>                                                                      | <b>336</b> |
| <i>Sri Winarni, Fahmi Arifan, Rtd. Wisnu Broto, Ariza Fuadi, Lola Alvice</i>                                                                             |            |
| <b>SYSTEMIC INDUCING RESISTANCE AGAINST LATE BLIGHT BY APPLYING ANTAGONIST TRICHODERMA VIRIDE.....</b>                                                   | <b>340</b> |
| <i>Susiana Purwantisari, Achmadi Priyatmojo, Retno Peni Sancayaningsih, Rina Sri Kasiandari, Kadarwati Budihardjo</i>                                    |            |
| <b>THE INFLUENCE OF GRANTING NPK FERTILIZER AND NANOSILIC FERTILIZERS ON THE GROWTH OF GANYONG PLANT (CANNA EDULIS KER.) .....</b>                       | <b>346</b> |
| <i>Yahya Barita, Erma Prihastanti, Sri Haryanti, Agus Subagio, Ngadiwiyana</i>                                                                           |            |

**THE IMPACT OF OZONATED WATER TREATMENT ON GROWTH RATE OF 'SRIKANDI' TILAPIA (OREOSHROMIS AUREUS X NILOTICUS) ..... 356**

*Sapto Putro, Devi Adityarini, R. T. Chiang*

**CLUSTERING OF DIOSCOREA SPP. FROM SEMARANG DISTRICT AND BOYOLALI-INDONESIA BASED ON CHARACTERIZATION STARCH TYPE AND TUBER MORPHOLOGY ..... 364**

*Siti Maqfiroh, Jumari, Murningsih*

**BIOTECHNOLOGY AND MEDICAL**

**EFFECT OF SUPPLEMENTAL FERMEHERBAFIT ON TOTAL BLOOD LIPID AND CHOLESTEROL IN BROILER CHICKENS ..... 370**

*Aan Andri Yano, Ning Iriyanti, Rosidi*

**DETECTION OF TLH AND TDH GENES IN VIBRIO PARAHAEMOLYTICUS INHABITING FARMED WATER ECOSYSTEM USED FOR L. VANNAMEI AQUACULTURE ..... 376**

*Adila Nawan Hasrimi, Anto Budiharjo, Siti Nur Jannah*

**NUTRIENT INTAKE OF DENGUE HEMORRHAGIC FEVER PATIENTS IN SEMARANG CITY ..... 385**

*Agustina Ratri Maharani, Christina Tri Restuti, Erna Sari, Nur Endah Wahyuningsih, Retno Murwani, Mmdeah Hapsari*

**POLYMORPHISM OF CYP1A1 (T6235C) IS NOT A SIGNIFICANT RISK FACTOR OF OSTEOPOROSIS IN POSTMENOPAUSAL INDONESIAN WOMAN ..... 393**

*Ei Auerkari, Lw Budhy, R Kiranahayu, Nz Djamal, Ls Kusdhany, Tbw Rahardjo, Christopher Talbot*

**ESTROGENICITY OF THE ISOFLAVONE GENISTEIN PIGEON PIE SEEDS (CAJANUS CAJAN L. MILL SP.) ON REPRODUCTIVE ORGANS IN RAT ..... 399**

*Cicilia Novi Primiani, Pujati, Hardani*

**THE RELATIONSHIP BETWEEN HEALTHY HYGIENE BEHAVIOR AND DENGUE HAEMORRHAGIC FEVER (DHF) INCIDENCE IN SEMARANG ..... 408**

*M A Mubarak, N E Wahyuningsih, D A Riani, R Putri, A Budiharjo*

**ASSOCIATION OF MTHFR POLYMORPHISM AND PERIODONTITIS' SEVERITY IN INDONESIAN MALES ..... 413**

*E I Auerkari, R Purwandhita, K R Kim, N Djamal, S L C Masulili, D A Suryandari, C Talbot*

**EFFECT OF VCO AND OLIVE OIL ON HDL, LDL, AND CHOLESTEROL LEVEL OF HYPERGLYCEMIC RATTUS RATTUS NORVEGICUS ..... 418**

*Enny Yusuf Wachidah Yuiwanti, Tyas Rini Saraswati, Endang Kusdiyantini*

**DISTRIBUTION OF BLOOD TYPE AMONG DENGUE HEMORRHAGIC FEVER PATIENTS IN SEMARANG CITY ..... 423**

*Erna Sari, Nur Endah Wahyuningsih, Retno Murwani, Julliana Purdianingrum, M. Adib Mubarak, Anto Budiharjo*

**AN ANALYSIS OF ANTIOXIDANTS, ORGANOLEPTICS AND HEDONICS WITH VARIATIONS OF BOILING TIME IN JASMINE TEA AND JASMINE ROOT TEA A STUDY ON KALIPRAU, PEMALANG ..... 428**

*Fahmi Arifan, Sri Winarni, Gentur Handoyo, Asri Nurdiana, Afkar Nabila Rahma H, Sri Risdiyanti*

**DETECTION OF NON SPECIFIC TOLL-LIKE RECEPTOR 3 IN THE MARINE AND FRESHWATER FISHES ..... 432**

*Frans Oktavianus Siregar, Hermin Pancasakti Kusumaningrum, Rejeki Siti Ferniah*

**DISTRIBUTION OF STROMAL CELL-DERIVED FACTOR-1 GENETIC POLYMORPHISM IN HEAD AND NECK CANCER PATIENTS OF INDONESIAN POPULATION ..... 440**

*H Sabrina, Y H Midoen, N Soedarsono, N Z Djamal, A W Suhartono, E I Auerkari*

**EFFECTS OF EURYCOMA LONGIFOLIA PROVISION ON BLOOD SUGAR LEVEL, CHOLESTEROLS, AND URIC ACID OF ETAWA CROSSBREED GOAT ..... 446**

*Hurip Pratomo*

**PART 2**

**MOLECULAR DIVERSITY OF LACTIC ACID BACTERIA ON ILEUM AND COECUM BROILER CHICKEN FED BY CHRYSONILIA CRASSA FERMENTATION ..... 455**

*Siti Nur Jannah, Husnul Khotimah, Rejeki Siti Ferniah, Sugiharto*

**ASSOCIATION OF INTERLEUKIN 8 -251 A/T GENE POLYMORPHISM WITH PERIODONTITIS IN INDONESIA ..... 465**

*C Jessica, T T Alwadris, S R Prasetyo, R Puspitawati, E I Auerkari*

**IS STRESS LEVEL RELATED TO DENGUE HEMORRHAGIC FEVER CASES IN SEMARANG? ..... 470**

*Julliana Purdianingrum, Muhammad Adib Mubarak, Rahmah Putri Sunarno, Umni Khairunisa, Nur Endah Wahyuningsih, Retno Murwani, Anto Budiharjo*

|                                                                                                                                                                                                                                      |            |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| <b>KOMBUCHA FERMENTATION TEST USED FOR VARIOUS TYPES OF HERBAL TEAS.....</b>                                                                                                                                                         | <b>474</b> |
| <i>C. Novi Primiani, Pujiati, Mahda Mumtahanah, Waskitho Ardhi</i>                                                                                                                                                                   |            |
| <b>PRODUCTION OF EXTRACELLULAR CHITINASE BEAUVERIA BASSIANA UNDER SUBMERGED FERMENTATION CONDITIONS .....</b>                                                                                                                        | <b>483</b> |
| <i>N E Elawati, S Pujiyanto, E Kusdiyantini</i>                                                                                                                                                                                      |            |
| <b>LIPID PRODUCTION FROM TAPIOCA WASTEWATER BY CULTURE OF SCENEDESMUS SP. WITH SIMULTANEOUS BOD, COD AND NITROGEN REMOVAL.....</b>                                                                                                   | <b>489</b> |
| <i>Romaidi, Muhammad Hasanudin, Khusnul Kholifah, Alik Maulidiyah, Sapto P. Putro, Akira Kikuchi, Toshifumi Sakaguchi</i>                                                                                                            |            |
| <b>THE BACTERIAL DIVERSITY ASSOCIATED WITH BACTERIAL DISEASES ON MUD CRAB (SCYLLA SERRATA FAB.) FROM PEMALANG COAST, INDONESIA .....</b>                                                                                             | <b>495</b> |
| <i>Sarjito, Desrina, Ahc Haditomo, S. Budi Prayitno</i>                                                                                                                                                                              |            |
| <b>THE EFFECT OF ORGANIC QUAIL EGG SUPPLEMENTATION ON THE BLOOD LIPID PROFILE OF WHITE MICE (RATTUS NORVEGICUS L.) DURING THE LACTATION PERIOD .....</b>                                                                             | <b>501</b> |
| <i>Sri Lestari Purba, Tyas Rini Saraswati, Sri Isdadiyanto</i>                                                                                                                                                                       |            |
| <b>APPLICATIONS OF BIOACTIVE MATERIAL FROM SNAKEHEAD FISH (CHANNA STRIATA) FOR REPAIRING OF LEARNING-MEMORY CAPABILITY AND MOTORIC ACTIVITY: A CASE STUDY OF PHYSIOLOGICAL AGING AND AGING-CAUSED OXIDATIVE STRESS IN RATS .....</b> | <b>509</b> |
| <i>Sunarno Sunarno, Siti Muflichatun Mardiaty, Rully Rahadian</i>                                                                                                                                                                    |            |
| <b>IMPACT OF CLIMATE ON THE INCIDENCE OF DENGUE HAEMORRHAGIC FEVER IN SEMARANG CITY .....</b>                                                                                                                                        | <b>515</b> |
| <i>Ummi Khairunisa, Nur Endah Wahyuningsih, Suhartono, Hapsari</i>                                                                                                                                                                   |            |
| <b>EFFECT OF BLOOD ESTROGEN AND PROGESTERONE ON SEVERITY OF MINOR RAS.....</b>                                                                                                                                                       | <b>522</b> |
| <i>S Utami, T W B Rahardjo, A Baziad, T T Alwadris, E I Auerkari</i>                                                                                                                                                                 |            |
| <b>CORRELATION BETWEEN MACROBENTHIC STRUCTURE (BIOTIC) AND WATER-SEDIMENT CHARACTERISTICS (ABIOTIC) ADJACENT AQUACULTURE AREAS AT TEMBELAS ISLAND, INDONESIA.....</b>                                                                | <b>526</b> |
| <i>Jeanny Sharani, Jafron W. Hidayat, Sapto P. Putro</i>                                                                                                                                                                             |            |
| <b>ANTIBACTERIAL ACTIVITY OF LACTIC ACID BACTERIA ISOLATED FROM GASTROINTESTINAL TRACT OF "AYAM KAMPUNG" CHICKEN AGAINST FOOD PATHOGENS .....</b>                                                                                    | <b>534</b> |
| <i>Siti Nur Jannah, Tyas Rini Saraswati, Dwi Handayani, Sri Pujiyanto</i>                                                                                                                                                            |            |
| <b>BIOMONITORING ON INTEGRATED MULTI-THROPIC AQUACULTURE (IMTA) ACTIVITIES USING MACROBENTHIC MOLLUSKS ON TEMBELAS ISLAND, KEPULAUAN RIAU PROVINCE.....</b>                                                                          | <b>541</b> |
| <i>M Abyan Syuja', Sapto P. Putro, Fuad Muhammad</i>                                                                                                                                                                                 |            |
| <b>NANOSILVER MICROALGAE BIOSYNTHESIS: CELL APPEARANCE BASED ON SEM AND EDX METHODS .....</b>                                                                                                                                        | <b>547</b> |
| <i>Hermin Pancasakti Kusumaningrum, Muhammad Zainuri, Indras Marhaendrajaya, Agus Subagio</i>                                                                                                                                        |            |
| <b>A-AMYLASE INHIBITOR ACTIVITY OF ENDOPHYTIC BACTERIA ISOLATED FROM ANNONA MURICATA L.....</b>                                                                                                                                      | <b>556</b> |
| <i>Sri Pujiyanto, Merysa Resdiani, Budi Raharja, Rejeki Siti Ferniah</i>                                                                                                                                                             |            |

## **MATHEMATICS**

|                                                                                                                                                        |            |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| <b>GLOBAL STABILITY FOR LINEAR SYSTEM AND CONTROLLABILITY FOR NONLINEAR SYSTEM IN THE DYNAMICS MODEL OF DIABETICS POPULATION.....</b>                  | <b>563</b> |
| <i>A H Permatasari, R H Tjahjana, T Udjiani</i>                                                                                                        |            |
| <b>CRYSTALLOGRAPHIC TILE .....</b>                                                                                                                     | <b>570</b> |
| <i>Kartono, R Heri Sulistyo Utomo, Sidik S Priyo, Srrm Titi Ujiani</i>                                                                                 |            |
| <b>STABILITY ANALYSIS OF THE PHYTOPLANKTON EFFECT MODEL ON CHANGES IN NITROGEN CONCENTRATION ON INTEGRATED MULTI-TROPHIC AQUACULTURE SYSTEMS .....</b> | <b>575</b> |
| <i>Widowati, S P Putro, Silfiana</i>                                                                                                                   |            |
| <b>ROBUST MODEL PREDICTIVE CONTROL FOR INVENTORY SYSTEM WITH UNCERTAIN DEMAND USING LINEAR MATRIX INEQUALITIES.....</b>                                | <b>582</b> |
| <i>Widowati, R. Heru Tjahjana, Sutrisno, Aditya Saputra</i>                                                                                            |            |

## **INFORMATICS**

|                                                                                                                                 |            |
|---------------------------------------------------------------------------------------------------------------------------------|------------|
| <b>MICRORNA EXPRESSION PROFILE SELECTION FOR CANCER STAGING CLASSIFICATION USING BACKPROPAGATION .....</b>                      | <b>589</b> |
| <i>Anjarwati, Adi Wibowo, Satriyo Adhy, Retno Kusumaningrum</i>                                                                 |            |
| <b>HYBRID CLOUD: BRIDGING OF PRIVATE AND PUBLIC CLOUD COMPUTING .....</b>                                                       | <b>596</b> |
| <i>Guruh Aryotejo, Daniel Y Kristiyanto, Mufadhol</i>                                                                           |            |
| <b>LOCATION PRIORITY FOR NON-FORMAL EARLY CHILDHOOD EDUCATION SCHOOL BASED ON PROMETHEE METHOD AND MAP VISUALIZATION.....</b>   | <b>603</b> |
| <i>Hemas Ayu Nurul Handayani, Indra Waspada</i>                                                                                 |            |
| <b>NUMERICAL SIMULATION OF ARTIFICIAL HIP JOINT MOTION BASED ON HUMAN AGE FACTOR .....</b>                                      | <b>610</b> |
| <i>Safarudin Ramdhani, Eko Saputra, J Jamari</i>                                                                                |            |
| <b>SUSTAINABLE DEVELOPMENT GOALS AS THE BASIS OF UNIVERSITY MANAGEMENT TOWARDS GLOBAL COMPETITIVENESS .....</b>                 | <b>615</b> |
| <i>Yos Johan Utama, Ambariyanto Ambariyanto, Muhammad Zainuri, Darsono Darsono, Budi Setyono, Widowati, Sapto Purnomo Putro</i> |            |

## **COMPUTATIONAL STATISTICS**

|                                                                                                                                                             |            |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| <b>CLASSIFICATION OF COMPANY PERFORMANCE USING WEIGHTED PROBABILISTIC NEURAL NETWORK .....</b>                                                              | <b>620</b> |
| <i>Hasbi Yasin, Adi Waridi Basyiruddin Arifin, Budi Warsito</i>                                                                                             |            |
| <b>ROBUST GEOGRAPHICALLY WEIGHTED REGRESSION OF MODELING THE AIR POLLUTER STANDARD INDEX (APSI).....</b>                                                    | <b>628</b> |
| <i>Budi Warsito, Hasbi Yasin, Dwi Ispriyanti, Abdul Hoyyi</i>                                                                                               |            |
| <b>CASCADE FORWARD NEURAL NETWORK FOR TIME SERIES PREDICTION .....</b>                                                                                      | <b>634</b> |
| <i>Budi Warsito, Rukun Santoso, Suparti, Hasbi Yasin</i>                                                                                                    |            |
| <b>BANKRUPTCY PREDICTION BASED ON FINANCIAL RATIOS USING JORDAN RECURRENT NEURAL NETWORKS: A CASE STUDY IN POLISH COMPANIES .....</b>                       | <b>642</b> |
| <i>Lingga Hardinata, Budi Warsito, Suparti</i>                                                                                                              |            |
| <b>GEOGRAPHICALLY WEIGHTED REGRESSION MODEL WITH KERNEL BISQUARE AND TRICUBE WEIGHTED FUNCTION ON POVERTY PERCENTAGE DATA IN CENTRAL JAVA PROVINCE.....</b> | <b>648</b> |
| <i>N F T A Nugroho, I Slamet</i>                                                                                                                            |            |
| <b>APPLICATION OF WAVELET NEURO-FUZZY SYSTEM (WNFS) METHOD FOR STOCK FORECASTING.....</b>                                                                   | <b>653</b> |
| <i>Sri Endah Moelya Artha, Hasbi Yasin, Budi Warsito, Rukun Santoso, Suparti</i>                                                                            |            |
| <b>MIX LOCAL POLYNOMIAL AND SPLINE TRUNCATED: THE DEVELOPMENT OF NONPARAMETRIC REGRESSION MODEL .....</b>                                                   | <b>665</b> |
| <i>Suparti, Alan Prahutama, Rukun Santoso</i>                                                                                                               |            |
| <b>COMPARISON OF ARCH / GARCH MODEL AND ELMAN RECURRENT NEURAL NETWORK ON DATA RETURN OF CLOSING PRICE STOCK .....</b>                                      | <b>672</b> |
| <i>Vania Orva Nur Laily, Budi Warsito, Di Asih I Maruddani</i>                                                                                              |            |
| <b>MODELLING INFLATION IN TRANSPORTATION, COMUNICATION AND FINANCIAL SERVICES USING B-SPLINE TIME SERIES MODEL .....</b>                                    | <b>683</b> |
| <i>Suparti, Alan Prahutama, Rukun Santoso</i>                                                                                                               |            |

## **APPLIED STATISTICS**

|                                                                                                                  |            |
|------------------------------------------------------------------------------------------------------------------|------------|
| <b>VECTOR AUTOREGRESSIVE MODEL APPROACH FOR FORECASTING OUTFLOW CASH IN CENTRAL JAVA.....</b>                    | <b>693</b> |
| <i>Abdul Hoyyi, Tarno, Di Asih I Maruddani, Rita Rahmawati</i>                                                   |            |
| <b>MODELLING INFANT MORTALITY RATE IN CENTRAL JAVA, INDONESIA USE GENERALIZED POISSON REGRESSION METHOD.....</b> | <b>703</b> |
| <i>Alan Prahutama, Sudarno</i>                                                                                   |            |
| <b>SPATIAL DURBIN ERROR MODEL FOR HUMAN DEVELOPMENT INDEX IN PROVINCE OF CENTRAL JAVA.....</b>                   | <b>712</b> |
| <i>A. R. Septiawan, S. S. Handajani, T. S. Martini</i>                                                           |            |

|                                                                                                                                                                              |            |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| <b>MULTILEVEL MODELS APPROACH ON LONGITUDINAL STUDIES FOR DISEASE DATA .....</b>                                                                                             | <b>718</b> |
| <i>Bertho Tantular, I Gede Nyoman Mindra Jaya, Zulhanif</i>                                                                                                                  |            |
| <b>STATE SPACE MODEL APPROACH FOR FORECASTING THE USE OF ELECTRICAL ENERGY (A CASE STUDY ON: PT. PLN (PERSERO) DISTRICT OF KROYA) .....</b>                                  | <b>723</b> |
| <i>Devi Kurniati, Abdul Hoyyi, Tatik Widiarihi</i>                                                                                                                           |            |
| <b>TIME VARYING DEFAULT BARRIER AS AN AGREEMENT RULES ON BOND CONTRACT .....</b>                                                                                             | <b>729</b> |
| <i>Di Asih I Maruddani, Diah Safitri, Abdul Hoyyi</i>                                                                                                                        |            |
| <b>CLASSIFICATION ACCURACY ON THE FAMILY PLANNING PARTICIPATION STATUS USING KERNEL DISCRIMINANT ANALYSIS .....</b>                                                          | <b>734</b> |
| <i>Dian Kurniawan, Suparti, Sugito</i>                                                                                                                                       |            |
| <b>MODELLING SPACE OF SPREAD DENGUE HEMORRHAGIC FEVER (DHF) IN CENTRAL JAVA USE SPATIAL DURBIN MODEL .....</b>                                                               | <b>741</b> |
| <i>Dwi Ispriyanti, Alan Prahutama, Arkadina Pn Taryono</i>                                                                                                                   |            |
| <b>A STUDY COMPARISON OF TWO SYSTEM MODEL PERFORMANCE IN ESTIMATED LIFTED INDEX OVER INDONESIA.....</b>                                                                      | <b>750</b> |
| <i>Juliana Tri Lestari, Agie Wandala</i>                                                                                                                                     |            |
| <b>CREDIT SCORING ANALYSIS USING WEIGHTED K NEAREST NEIGHBOR.....</b>                                                                                                        | <b>757</b> |
| <i>M A Mukid, T Widiarihi, A Rusgiyono, A Prahutama</i>                                                                                                                      |            |
| <b>THE DETECTION OF FINANCIAL CRISIS USING COMBINATION OF VOLATILITY AND MARKOV SWITCHING MODELS BASED ON REAL OUTPUT, DOMESTIC CREDIT PER GDP, AND ICI INDICATORS .....</b> | <b>764</b> |
| <i>Sugiyanto, Etik Zukhronah, Meganisa Setianingrum</i>                                                                                                                      |            |
| <b>COMPARATIVE STUDIES ON THE SALT CONTENT OF WHITE BREAD AND WHOLEMEAL BREAD .....</b>                                                                                      | <b>770</b> |
| <i>Rachmad Adi Riyanto, Rezzy Eko Caraka</i>                                                                                                                                 |            |
| <b>POSTAL AND TRADE NETWORK DATA WITHIN ASEAN COUNTRIES AND BEYOND .....</b>                                                                                                 | <b>776</b> |
| <i>Rezzy Eko Caraka, Putu Mahardika Adi Saputra, Nurrohman Wijaya, Muhammad Mujiya Ulkhaq, Muhammad Subair</i>                                                               |            |
| <b>DETECTION METHOD OF FINANCIAL CRISIS IN INDONESIA USING MSGARCH MODELS BASED ON BANKING CONDITION INDICATORS .....</b>                                                    | <b>784</b> |
| <i>Sugiyanto, E Zukhronah, S P Sari</i>                                                                                                                                      |            |
| <b>GSTARI MODEL OF BPR ASSETS IN WEST JAVA, CENTRAL JAVA, AND EAST JAVA .....</b>                                                                                            | <b>791</b> |
| <i>Susi Susanti, Sri Sulistijowati Handajani, Diari Indriati</i>                                                                                                             |            |
| <b>MODELLING OF CAYENNE PRODUCTION IN CENTRAL JAVA USING ARIMA-GARCH .....</b>                                                                                               | <b>798</b> |
| <i>Tarno, Sudarno, Dwi Ispriyanti, Suparti</i>                                                                                                                               |            |
| <b>THE COX PROPORTIONAL HAZARD MODEL ON DURATION OF BIRTH PROCESS.....</b>                                                                                                   | <b>805</b> |
| <i>Triastuti Wuryandari, Sri Haryatmi Kartiko, Danardono</i>                                                                                                                 |            |
| <b>MODELING STOCK PRICES IN A PORTFOLIO USING MULTIDIMENSIONAL GEOMETRIC BROWNIAN MOTION .....</b>                                                                           | <b>812</b> |
| <i>Di Asih I Maruddani, Trimono</i>                                                                                                                                          |            |
| <b>THE MODEL OF FLOOD CONTROL USING SERVQUAL METHOD AND IMPORTANCE PERFORMANCE ANALYSIS IN SURAKARTA CITY – INDONESIA .....</b>                                              | <b>822</b> |
| <i>V. Titi Purwantini, Yusuf Sutanto</i>                                                                                                                                     |            |
| <b>CREDIT SCORING ANALYSIS USING KERNEL DISCRIMINANT.....</b>                                                                                                                | <b>833</b> |
| <i>T Widiarihi, M A Mukid, Mustafid</i>                                                                                                                                      |            |
| <b>QUEUE THEORY FOR TRIANGULAR AND WEIBULL ARRIVAL DISTRIBUTION MODELS (CASE STUDY OF BANYUMANIK TOLL).....</b>                                                              | <b>839</b> |
| <i>Sugito, Rita Rahmawati, Jenesia Kusuma Wardhani</i>                                                                                                                       |            |

## **CHEMISTRY**

|                                                                                                                                                 |            |
|-------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| <b>THE INFLUENCE OF ELECTRODE TYPE ON ELECTROCOAGULATION PROCESS FOR REMOVAL OF CHROMIUM (VI) METAL IN PLATING INDUSTRIAL WASTEWATER .....</b>  | <b>847</b> |
| <i>Aji Prasetyaningrum, Bakti Jos, Yudhy Dharmawan, Bilal T. Prabowo, Muh. Fathurrazan, Fyrouzabadi</i>                                         |            |
| <b>RESERVOIR AND SOURCE ROCK IDENTIFICATION BASED ON GEOLOGICAL, GEOPHYSICS AND PETROPHYSICS ANALYSIS STUDY CASE: SOUTH SUMATRA BASIN .....</b> | <b>852</b> |
| <i>Hiska Anggit Maulana, Abdul Haris</i>                                                                                                        |            |
| <b>APPLICATION OF INORGANIC FERTILIZER WITH NANOCHISIL AND NANOSILICA ON BLACK CORN PLANT GROWTH (ZEA MAYS L.) .....</b>                        | <b>858</b> |
| <i>Lolita Dewi Pertaminaingsih, Erma Prihastanti, Sarjana Parman, Agus Subagio, Ngadiwiyana</i>                                                 |            |

|                                                                                                                     |            |
|---------------------------------------------------------------------------------------------------------------------|------------|
| <b>SYNTHESIS OF SILICON CARBIDE FIBER AS SEMICONDUCTOR SUBSTRATE FOR BETAVOLTAIC CELL .....</b>                     | <b>867</b> |
| <i>Masripah, Agustino Zulys, Jan Setiawan</i>                                                                       |            |
| <b>TOTAL FLAVONOID CONTENT AND FORMULATION ANTIOXIDANT CREAM STEM OF JATROPHA MULTIFIDA L.....</b>                  | <b>874</b> |
| <i>Yuvianti Dwi Franyoto, Lia Kusmita, Mutmainah, Riega Demma Angrena</i>                                           |            |
| <b>AMMONIUM REMOVAL EFFICIENCY IN FIXED BED REACTOR AND SUSPENDED GROWTH REACTOR USING ECOTRU INOCULATION .....</b> | <b>880</b> |
| <i>Rusyda Syahidah, Sudarno, Badrus Zaman</i>                                                                       |            |
| <b>ANTIOXIDANT ACTIVITY FROM ENCAPSULATED CINNAMALDEHYDE-CHITOSAN .....</b>                                         | <b>884</b> |
| <i>Bonita Ariestiani, Purbowatingrum, Ngadiwiyana, Ismiyarto, Enny Fachriyah, Khikmah Nurani</i>                    |            |
| <b>SULFONATED POLYSTYRENE AND ITS CHARACTERIZATION AS A MATERIAL OF ELECTROLYTE POLYMER.....</b>                    | <b>888</b> |
| <i>Ngadiwiyana, Ismiyarto, Gunawan, Rs Purbowatiningrum, N. B. A. Prasetya, T. D. Kusworo, H. Susanto</i>           |            |
| <b>CHARACTERISTICS IN BOILER CHARCOAL WASTES USING WOODS AND TEMPERATURE .....</b>                                  | <b>895</b> |
| <i>Rita Dwi Ratnani, Februana Hutavia Purbacaraka, Indah Hartati, Imam Syafaat</i>                                  |            |
| <b>ZEOLITE/MAGNETITE COMPOSITES AS CATALYSTS ON THE SYNTHESIS OF METHYL ESTERS (MES) FROM COOKING OIL.....</b>      | <b>906</b> |
| <i>Sriatun, Adi Darmawan, Sriyanti, Wuri Cahyani, Hendri Widyandari</i>                                             |            |
| <b>Author Index</b>                                                                                                 |            |

## The influence of electrode type on electrocoagulation process for removal of chromium (VI) metal in plating industrial wastewater

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**Abstract.** Chromium (VI) is one of the major metallic pollutants in plating industrial wastewater. Cr(VI) is one of toxic metal that cause serious threat to human health and the environment because its non-biodegradable. Among the technologies for removing these pollutants, electrocoagulation can be considered as an effective method. This method have some advantages such as less amount of produced sludge and high efficiency in removal of pollutants. This research intended to study the effects of type of electrode on the degree of Cr(VI) removal from wastewater of plating industry using electrocoagulation method. This laboratory research conducted with 3 types of electrode (aluminum, stainless and combination of both electrode). Synthetic chromium wastewater was prepared at the initial concentration of 100 mg L<sup>-1</sup>. The process was conducted at pH 3. The electricity current was setting at 3 Ampere. The variable of time of electrocoagulation at 1 and 2 hours. After performing the process on electrochemical cells, samples analyzed by the UV-Vis spectrophotometer regarding amount of Cr(VI) metals. The results showed that aluminium was the best performance electrode at variable of 2 hours with 26% of reduction of Cr(VI) metal content in plating industrial waste water.

**Keywords:** type of electrode, electrocoagulation, chromium metal, plating industry

### 1. Introduction

Chromium waste Cr(VI) is a type of heavy metal that is harmful to humans as well as to the environment. Cr(VI) is also more easily absorbed in the human body, especially the digestive tract in humans [1]. In chrome electroplating industry, Cr(VI) was one of heavy metal coating besides of nickel, and copper. There have been many attempts to reduce chrome waste which one of them is with electrocoagulation technology. Electrocoagulation utilizes ion exchange at the anode to trigger oxidation-reduction reactions on chrome and plate waste to form flocs which can then be physically treated to purify of them. Electrocoagulation is an effective and quick method for treating water or wastewater containing dissolved salts or toxic metal compounds. The ion exchange mechanism by anode plates is used in electrocoagulation, there was no chemical added to the water to cause coagulation, and the volume of produced sludge is less compared to most other common treatment methods [2].



# The impact of ozonated water treatment on growth rate of 'Srikandi' tilapia (*Oreochromis Aureus* X *Niloticus*)

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**Abstract** The impact of ozonized water treatment on 'Srikandi' tilapia was assessed using ozone reactor with an airflow velocity of 1 L/min at a voltage of 1 kV which leads to that the dissolved oxygen (DO) content increases from 1.0 mg/L to 1.5 mg/L. The ozonized water treatment was divided into five groups based on the length of treatment period (minutes) as group I (10 minutes), group II (20 minutes), group III (30 minutes), group IV (40 minutes) and group V (50 minutes) as reference case. The fish growth rate was measured in terms of length and weight per seven days for 30 days. The result indicated that the fastest growth rate of 'Srikandi' tilapia occurred at the group III (length growth 1.5 cm, weight growth 1.5 g in 30 days). The fastest Specific Growth Rate (SGR) of the fish occurred at the group II (0.0001) and the fastest Relative Growth Rate (RGR) of the fish occurs at the group III (0.0001). The oxygen content, temperature, salinity to match the growth of Tilapia 'Srikandi' are vital elements in Tilapia farming management. These results are considered to be useful to increase the production rate of 'Srikandi' tilapia farming.

## 1. Introduction

Salt water pond fish farming in coastal areas has following advantages than the corresponding fresh water pond fish farming: (i) high tolerance of salinity up to 30 ppt with survival rate > 90%, (ii) rapid growth can reach 100 grams in three months with salinity pressure, (iii) high protein content as a food source of animal protein, (iv) high content of omega-3 reach > 100 mg/g meat and omega-6 reach > 100 mg/g of meats, (v) fatty acids has a better meat taste and chewy meat texture and can grow up in polyculture system [1]. Aquaculture can be defined as human efforts to increase the water productivity through aquatic farming of aquatic biotas. Aquaculture is a breeding activity to gain benefits via reproduction, growth and aquatic organism quality increase. In line with the increase demand of seafood production around the world, a productive aquaculture is urgently needed to produce organisms in controlled environment and subsequently to gain profit [2].

Tilapia is cultivated in fresh water commodity in hatchery and enlargement because of it benefits that can be compared with some fresh water fishes: especially in rapid growth, easy to breed, easy in maintenance process and high adaptation in environment changes [3]. Tilapia habitat originates in fresh water of rivers, lakes, stanks and swamps but can tolerate in large salinity (euryhaline) so that it can live in brackish water and salt water of ocean. The fish tolerant availability of salinity is 0-30 ppt.



## Association of MTHFR polymorphism and periodontitis' severity in Indonesian males

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**Abstract.** Periodontitis is an oral disease with a complex etiology and pathogenesis, but with a suspected contribution by genetic factors. This study aimed to assess the association of polymorphism in *MTHFR* (*methylene tetrahydrofolate reductase*, C677T) gene and the severity of periodontitis in Indonesian males. Severity of periodontitis was classified as mild, moderate or severe for 100 consenting, 25 to 60 years old male Indonesians. Using PCR amplification for DNA extracted from blood serum samples, the variation at the SNP polymorphism of the *MTHFR* (C677T) gene was evaluated by using RFLP, cutting by the restriction enzyme *Hinf*I and subjecting the fragments to electrophoresis on agarose gel. Chi-square testing was mainly used for statistical assessment of the results. The CC genotype (wild type) of the tested polymorphism was the most common variant (78%) and TT (mutant) genotype relatively rare (2%), so that C-allele appeared in 88% of the cases and T-allele in 12% of the cases. The results suggest that there is no significant association between *MTHFR* C677T polymorphism and the severity of periodontitis in the tested Indonesian males.

**Keywords:** periodontitis, MTHFR, polymorphism

### 1. Introduction

Periodontal disease is one of the most common and widely spread human diseases. Periodontal disease has been associated with chronic systemic disorders [1], such as diabetes mellitus [2], osteoporosis [3], cardiovascular disease [4], and stroke [5]. As a result, men and women aged 25-74 years with periodontitis appear to have an increased risk of death from systemic disease [4]. Almost all adults have suffered from gingivitis, periodontitis, or both [6].

A study of Albander and Rams (2002) suggested that Asian populations have highest prevalence rates of periodontal disease cases in the world [7]. The results of a national survey (SKRT 2004) suggest that 39% of Indonesian population is suffering from dental and oral disease [6].

Periodontitis is a disease with unknown exact etiology, but the etiology is believed to be multifactorial. In addition to bacterial pathogens and other environmental factors (poor habits,



## Lipid production from tapioca wastewater by culture of *Scenedesmus sp.* with simultaneous BOD, COD and nitrogen removal

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**Abstract.** The use of microalgae to produce biodiesel or possibly remove nutrients from industrial wastewater has gained important attention during recent years due to their photosynthetic rate and its versatile nature to grow in various wastewater systems. In this study, a microalgae, *Scenedesmus sp.*, was cultured to enhance the lipid production and nutrients removal from tapioca wastewater sample. To assess lipid production, *Scenedesmus sp.* was cultured in different concentration of tapioca wastewater sample (from 0 to 100 %), and nutrient removal including BOD, COD, NH<sub>4</sub>, NO<sub>2</sub>, NO<sub>3</sub> level by *Scenedesmus sp.* was assessed in 100% of tapioca wastewater culture. After 8 days of culture, it was found out that 50% of tapioca wastewater sample resulted in highest concentration of lipid content than that of the other concentrations. The level of environment indicator as nutrient removal such as BOD, COD, NH<sub>4</sub>, NO<sub>2</sub>, NO<sub>3</sub> were also decreased up to 74%, 72%, 95%, 91%, and 91%, respectively. The pH condition changed from initial condition acidic (pH: 4) to neutral or basic condition (pH: 7-8) as recommended in wastewater treatment system. This research provided a novel approach and achieved efficient simultaneous lipid production and nutrients removal from tapioca wastewater sample by *Scenedesmus*'s culture system.

**Keyword:** *Scenedesmus sp.*, tapioca wastewater, lipid production

### 1. Introduction

The energy crisis is one of the most important problems faced by all people over the world in the 21st century. The highest consumption of fossil fuels has result in greenhouse effect and causes global climate change [1,2]. One of a type of renewable energy is microalgae biomass-based biofuel, which is considered as one of the most potent substitutes for fossil fuel [2]. However, to increase the production of microalgae biomass, several strategies should be developed, such as modification of culture medium and environmental factors. Hence, one of promising strategies is using wastewater sample as





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## **ACCEPTANCE LETTER**

Dear Mr./Mrs./Ms. Aji Prasetyaningrum,

We are please to inform you that your paper based on your abstract below:

***THE INFLUENCE OF ELECTRODE TYPE ON ELECTROCOAGULATION PROCESS FOR  
REMOVAL OF CHROMIUM METAL IN PLATING INDUSTRIAL WASTEWATER***

Has been accepted by the 7<sup>th</sup> International Seminar on New Paradigm and Innovation of Natural Sciences and Its Application (ISNPINSA) organized by the Faculty of Sciences and Mathematics Diponegoro University.

We hereby invite you to attend the 7<sup>th</sup> International Seminar on New Paradigm and Innovation of Natural Sciences and Its Application (ISNPINSA) which is held in Grand Candi Hotel, Jl. Sisingamangaraja No. 16 Semarang Indonesia, on October 17, 2017:

Speaker : Mr. /Mrs./Ms. Aji Prasetyaningrum  
Presentation : Oral Presentation  
Title : THE INFLUENCE OF ELECTRODE TYPE ON ELECTROCOAGULATION  
PROCESS FOR REMOVAL OF CHROMIUM METAL IN PLATING  
INDUSTRIAL WASTEWATER

We are looking forward to hearing from you.

Semarang, September 12, 2017

With Warmest Regards,  
On Behalf of The 7<sup>th</sup> ISNPINSA Committee  
Chairman

  
**ISNPiNSA**  
Dr. Budi Warsito, M.Si



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