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Greetings to all of honorary Indonesian Journal of Applied Chemistry (J. Kim. Terap. Indones.) readers!

Deepest gratitude from all of us should be conveyed sincerely to Allah The Highest and Most Merciful whom allowed and blessed the publishing of Indonesian Journal of Applied Chemistry (J. Kim. Terap. Indones.) Volume 20 No.2 June 2018. Whom also allowed and blessed this journal to reach all of readers hands, through a systemic supervision by our respectful reviewers.

Indonesian Journal of Applied Chemistry (J. Kim. Terap. Indones.) is a product of our continuous improvements from the originally called Jurnal Kimia Terapan Indonesia (JKTI). In a way to transform into International Journal, several quality improvements had been conducted including (i) all articles were written in English, (ii) close involvement of International reviewers, (iii) adopting Open Access Journal System in submitting, reviewing and publishing articles, (iv) using compact article template and (v) having a registered e-ISSN to accommodate reaccreditation and global indexing process.

In this edition, several astonishing articles from well-known Indonesian Institutions were served. They are: (i) Mechanical and Barrier Properties of PVP-Carbon Dot Nanocomposite Films (ii) Esterification of Waste Cooking Oil Using Ultrasonic: Kinetic Study (iii) Management of Technology Transfer in the Traditional Tempeh and Tofu Industries (iv) The Renewability Indicator and Cumulative Degree of Perfection for Gamboeng Tea; Part.2, Exergy Calculation of Tea Factory (v) Antibacterial and Antioxidant Activities of Indonesian Ginger (Jahe Emprit) Essential Oil Extracted by Hydrodistillation (vi) The Synthesis of Quinidine Salicylate Ester Compound.

By this letter, editors would be honored to express our gratitude and appreciation to all reviewers for all of their hard work and kind cooperation in reviewing and improving the quality of articles in this journal. And for sure, to all authors in this journal, your trust and willingness in publishing your articles in this journal are highly appreciated.

As the closing remarks, editors always invite all researcher to publish their articles in Indonesian Journal of Chemistry (J. Kim. Terap. Indones.) in order to spread out their findings and knowledge in applied chemistry related field. To be heard and known by all researcher around the world in the same field. Article manuscripts can be submitted from our official website http://kimia.lipi.go.id/inajar/index.php

Your critics and suggestions were very welcome in the way to support our continuous improvement efforts. Our biggest wish is this journal will convey benefits to all honored readers and contribute to chemistry knowledge. Have a good read!

Serpeng, December 2018
Editor in Chief
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Abstract

In this research, carbon dot was synthesized from citric acid and urea through a single step microwave process, and Poly Vinyl Pyrrolidone (PVP) films composited by carbon dot were prepared. The effects of different composition carbon dots on mechanical strength of films and water vapor barrier were evaluated. Highest mechanical yielded composite film were analyzed their thermal stability. Average of carbon dot diameter was found 90.61 nm and polydispersity indices 0.396. Different composition carbon dot exhibit significant improvement in tensile strength and modulus. Water permeability of films variate with the content of carbon dot. The presence of carbon dot had a negligible effect on Tg of film and show melting process.

Keywords:
carbon dot, PVP, composite film

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Abstract

Waste cooking oil (WCO) have great potential as an alternative raw material for producing biodiesel. The literature on the kinetics of the ultrasonic-assisted esterification of WCO in the presence of a phosphoric acid catalyst are rare, and most literature used conventional method. This study aims to determine the optimum condition and the parameters of first and second order kinetics of the WCO esterification which was assisted by an ultrasonic bath. Variables that were used in this study are methanol/oil mole ratio, acid catalyst concentration, and reaction temperature. The highest conversion was 42.08% on the methanol/oil mole ratio of 15:1, a catalyst (phosphoric acid) concentration of 9% wt, and temperature of 50°C within 90 minutes. The reaction time was reduced to three times (minute) compared to the conventional method, and fatty acid was reduced by 42%. Kinetic parameters were calculated with the assumption that the esterification was an irreversible reaction. The reaction rate constant was increasing with temperature. The activation energy of WCO esterification is 42.94 kJ/mol for first-order reaction and 35.30 kJ/mol for second order reaction.

Keywords: Waste Cooking Oil, Biodiesel, Phosphoric Acid, Ultrasonic Esterification, Reaction Kinetic, Activation Energy

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Management of Technology Transfer in the Traditional Tempeh and Tofu Industries

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Abstract

The objective of this research is to study the technology management in the context of tempeh processing and equipment based on stainless steels 304 food grade, to study management of technology transfer of the changes a filter cotton cloth bag with a manual rotary filter in the traditional tofu industry and to run an education skill training program on process and equipment in the tempeh production. The benefit of this research is to create a new business of tempeh for all people and to give policy factor in the improvement of a manual cotton cloth bag filter in the tofu industry. The method used is an operation management of production planning of preparation of Rhizopus sp inoculum, preparation of soybean as a raw material, process and equipment of a wet peeling method, a fluidized bed reactor, a sterilization tank and an artificial incubator for tempeh incubation and to run a vertical technology transfer of a manual rotary filter based on techno metric approaches. Education skill training program of 60 people in rural areas was done for tempeh production. The research results can be shown that the utilization of Rhizopus oligoporus and Rhizopus oryzae inoculum for tempeh production can be accepted by the 60 panelists and a local market needs. The improvement and utilization of tempeh processing and equipment based on material of construction of stainless steels 304 and aluminum illustrate that white mold can grow well at the fermentation time of 16 hours and put it at the open air for 8-10 hours to obtain fresh pure tempeh. Fermentation time of 16 hours for the white mold growth is faster than fermentation time of the traditional tempeh industry. Pure tempeh can be used for the preparation of first generation for a meal, second generation of tempeh flour and the third generation of pure tempeh for functional foods. Education skill training for creating competency and abilities was attended for 60 participants and some of them can create new business of diversification of tempeh production in rural areas. Management of transfer technology of a manual rotary filter in the separation of soybean slurry can act as a basic policy for the traditional tofu industry to provide a big rotary filter according to the desired capacity. Time operation of a manual rotary filter of 25 minutes with an efficiency of 66.36% is better than a manual cotton cloth bag filter of 36 minutes with an efficiency of 62.62 %, respectively.

Keywords: Rhizopus sp inoculum, soybean, tempeh, tofu, rotary filter, technology transfer.

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# The Renewability Indicator and Cumulative Degree of Perfection for Gamboeng Tea; Part.2, Exergy Calculation of Tea Factory

Teuku Beuna Bardant\(^1\), Muthia Syafika Haq\(^2\), Arief Ameir Rahman Setiawan\(^1\), Sugeng Harianto\(^2\), Joko Waluyo\(^1\), Adhi Irianto Mastur\(^2\), Annisa Dieni Lestari\(^1\), Sujarwo\(^1\) and Edi Iswanto Wiloso\(^1\)

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## Abstract

Renewability Indicator (RI) and Cumulative Degree of Perfection (CDP) were used to observe sustainability of Gamboeng Tea. The assessment then compared with black tea process in Black Sea Region in Turkey from the previous study. Calculation of exergy for Gamboeng fresh tea leaf had already described in Part.1. Since the main process for both production was drying, then tropical humid climate in Gamboeng is the main challenge to increase efficiency, and thus, renewability. This second part described the significant improvement of renewability had applied in Gamboeng by using wood pellet in rotary pannier. Further recommended improvement were by installing better humidity detector and connected to the process control so the process can adapt the ambient change which the relative humidity can be varied from 65% and up to 92%.

## Keywords:

- Exergy analysis
- Climatological impact
- green tea
- drying.
Antibacterial and Antioxidant Activities of Indonesian Ginger (Jahe Emprit) Essential Oil Extracted by Hydrodistillation

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Abstract

The rhizome of ginger is commonly used as a spice, food, beverage as well as medicine. Plant essential oils including from ginger have been widely used for food preservation, pharmaceutical, and alternative medicines. Currently, there is a growing interest of consumer for natural sources such as essential oils for natural antibacterial and antioxidant. Jahe emprit (Zingiber officinale var. Amarum) is one of Indonesian ginger variety used to obtain ginger essential oil. The objective of the current study was to investigate the effect of solvent to feed (SF) ratio in hydrodistillation process on yield, chemicals content, antibacterial and antioxidant activities of ginger essential oils from jahe emprit. SF ratio used in this study is 10:0.7, 10:1.7, 10:2.7. Chemicals content was conducted using GCMS analysis. Antibacterial assay was conducted using the disc diffusion method against Escherichia coli and Staphylococcus aureus. The antioxidant assay was conducted using 1,1-Diphenyl-2-picryl-hydrazyl (DPPH) free radical scavenging assay. The results show that the highest essential oil yield was obtained from SF ratio 10:1.7 which gave a yield of 3.7%. GCMS analysis shows that camphene was always the major compound present in those 3 SF ratio, although the amount present differed. Besides, four other major compounds present were varied. The antibacterial assay using 1% concentration showed ginger oil obtained from SF 10:0.7: and 10:2.7 have the same activities for S. aureus, whereas SF ratio 10:1.7 has the lowest activities. However, for E. coli, all SF ratio gave the same results. For antioxidant activities at 1000 ppm concentration, the highest activity was obtained from SF ratio 10:2.7.

Keywords:
Zingiber officinale var. Amarum, hydrodistillation, antibacterial, antioxidant.

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The Synthesis of Quinidine Salicylate Ester Compound

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Abstract
Quinidine is an optical isomer of quinine extracted from the bark of the chicona tree and similar plant species. PT SIL Lembang isolated quinidine from Chicona ledgereria. The purpose of this study was to obtain quinidine salicylate ester through esterification reaction. In this study, the synthesis of a quinidine ester compound by esterification reaction was conducted. Esterification reaction was conducted by using dicyclohexyl carbodi imide (DCC) activator and dimethyl amino pyridine (DMAP) catalyst with one carboxylic acid namely salicylate acid producing new compound namely quinidine salicylate. Subsequent Quinidine salicylate was obtained in the form of oil with 97% yield. The compound obtained from the synthesis was then identified using Thin Layer Chromatography continue analyzed using with Spectrophotometer, LC-ESI-MS spectroscopy. Results show that the target compound has been successfully synthesized.

Keywords: Quinidine, Salicylate, Esterification.