

LEMBAR
HASIL PENILAIAN SEJAWAT SEBIDANG ATAU PEER REVIEW
KARYA ILMIAH: JURNAL ILMIAH

Judul Jurnal Ilmiah (Artikel) : Kinetic modeling studies of enzymatic purification of glucomannan
 Jumlah Penulis : 5 orang
 Status Pengusul : Penulis pertama/ penulis ke-3/ penulis korespondensi
 Identitas Jurnal Ilmiah :
 a. Nama Jurnal : Chemistry & Chemical Technology
 b. Nomor ISSN : 1996-4196
 c. Volume, nomor, bulan, tahun : Vol. 13, No. 03, pp.384-390, 2019
 d. Penerbit : Lviv Polytechnic National University, Lviv, Ukraina
 e. DOI Artikel : 10.23939/chcht13.03.384
 f. Alamat Web :
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 ARTIKEL : http://science2016.lp.edu.ua/sites/default/files/Full_text_of_%20papers/full_text_947.pdf
 g. Terindeks : Scopus/Scimagojr/SJR=0,245 (2019) dan Q3

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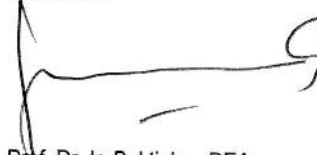
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Reviewer II



Prof. Ir. Didi Dwi Anggoro, M. Eng, PhD
 NIP. 19671114 199303 1 001
 Unit Kerja : Departemen Teknik Kimia FT UNDIP

Semarang, 1 Februari 2021
 Reviewer I



Prof. Dr. Ir. Bakti Jos, DEA
 NIP. 19600501 198603 1 003
 Unit Kerja : Departemen Teknik Kimia FT UNDIP

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2. Ruang lingkup dan kedalaman pembahasan:

Judul artikel ini terkait dengan model kinetika pada pemurnian glukomanan pada tepung porang menggunakan metode hidrolisa enzimatis. Glukomanan hasil pemurnian diamati kadar pati setelah dihidrolisa, gula reduksi yang merupakan hasil hidrolisa dan kadar glukomanan dan dibahas cukup komprehensif. Model kinetik yang digunakan hanya satu model sederhana dan sudah banyak dipakai pada reaksi enzimatis.

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Semarang, 10 Nopember 2020

Reviewer I



Prof. Dr. Ir. Bakti Jos, DEA

NIP. 19600501 198603 1 003

Unit Kerja : Departemen Teknik Kimia FT UNDIP

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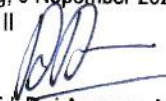
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Reviewer II



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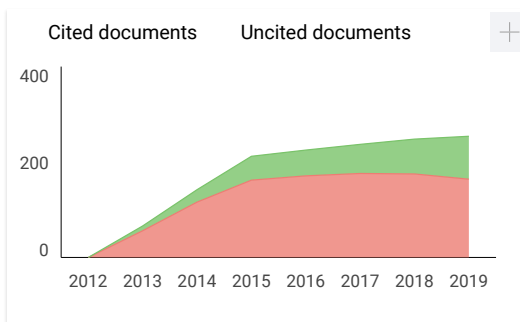
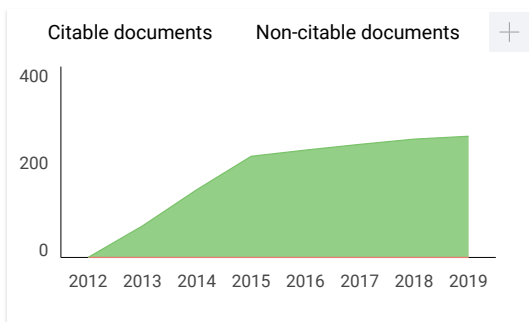
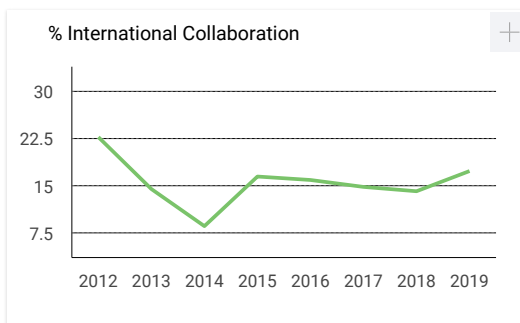
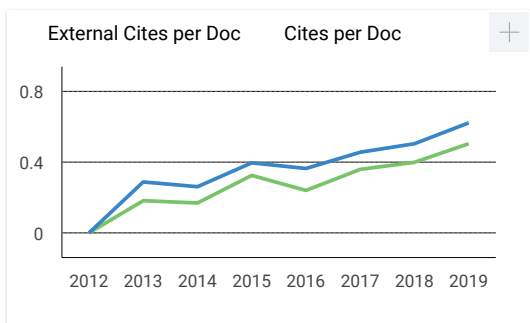
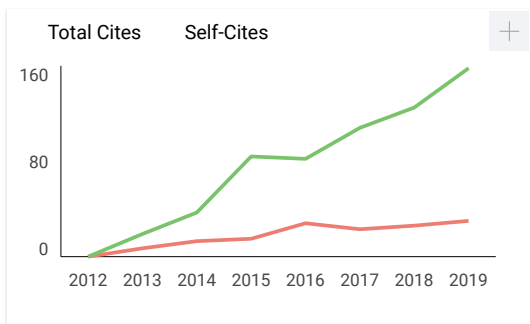
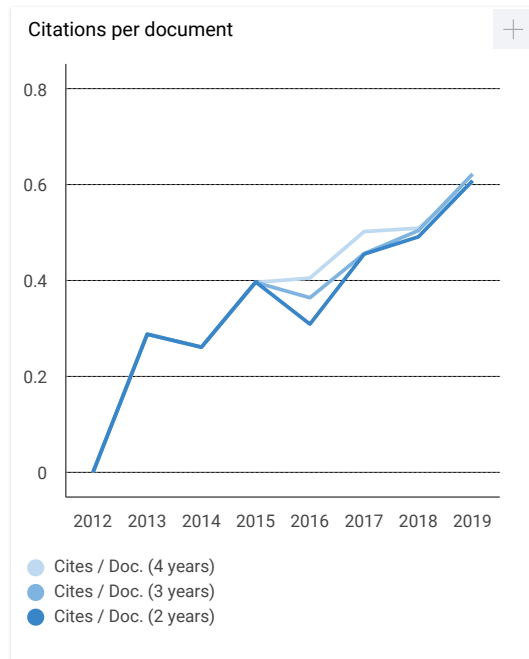
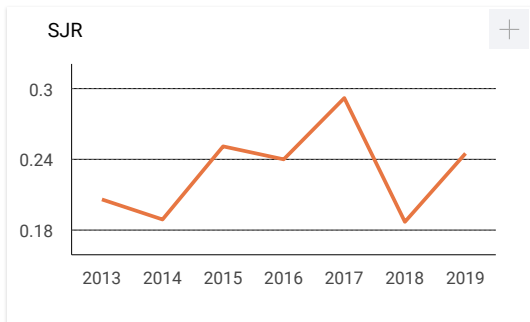
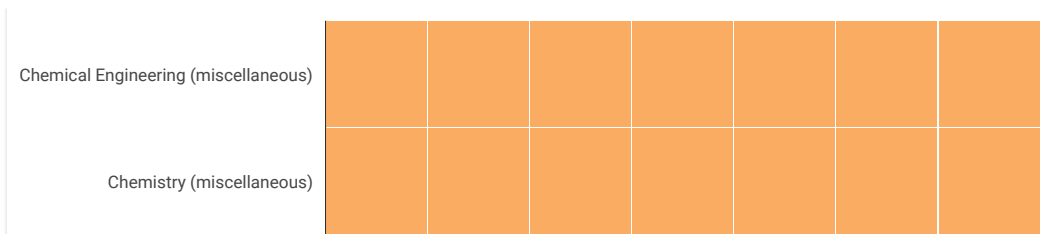
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Укр

Papers

- [Spectrophotometric Determination of Ruthenium Utilizing its Catalytic Activity on Oxidation of Hexacyanoferrate\(II\) by Periodate Ion in Water Samples](#)
Abhishek Srivastava¹, Vivek Sharma¹, Anjali Prajapati¹, Neetu Srivastava², R.M. Naik³
- [Thermodynamic Properties of 2-Methyl-5-arylfuran-3 Carboxylic Acids Chlorine Derivatives in Organic Solvents](#)
Iryna Sobechko¹, Yuri Horak², Volodymyr Dibrivnyi¹, Mykola Obushak², Lubomyr Goshko¹
- [The Synthesis and Theoretical Anti-Tumor Studies of Some New Monoaza-10H-Phenothiazine and 10H-Phenoxazine Heterocycles](#)
Efeturi A. Onoabedje¹, Sunday N. Okafor², Kovo G. Akpomie¹, Uchechukwu C. Okoro¹.
- [Synthesis and Antiplatelet Activites of Some Derivatives of p-Coumaric Acid](#)
Juni Ekowati¹, Nuzul W. Diyah¹, Achmad Syahrani¹
- [The Study of the Interaction Mechanism of Linoleic Acid and 1-Linoleyl-2-Oleoyl-3-Linolenoyl-Glycerol with Fe₃O₄ Nanoparticles](#)
Iryna Tsykhanovska¹, Victoria Evlash², Alexandr Alexandrov¹, Tatyana Gontar¹, Daniil Shmatkov¹
- [Low-Pressure Discharge Plasma Treatment of Aqueous Solutions with Mn, Cr and Fe](#)
Oleksandr Pivovarov¹, Tetiana Derkach², Margarita Skiba¹
- [Kinetics of Os\(VIII\) Catalyzed Oxidation of 2-Pyrrolidine Carboxylic Acid in Alkaline Medium using Sodium Periodate as Oxidant: A Mechanistic Approach](#)
Madhu Gupta¹, Amrita Srivastava¹, Sheila Srivastava², Ashish Verma¹
- [Molecular Modelling of Acridine Oxidation by Peroxyacids](#)
Volodymyr Dutka¹, Yaroslav Kovalskyi¹, Olena Aksimentyeva¹, Nadia Tkachyk¹, Nataliia Oshchapovska¹, Halyna Halechko¹
- [Study of Iodine Oxide Particles at the Air/Sea Interface in the Presence of Surfactants and Humic Acid](#)
Salah Eddine Sbai ^{1, 2}, Bentayeb Farida¹
- [Physico-Chemical and Technological Regularities of Foam Polystyrene Degazation in the Liquid Medium](#)
Volodymyr Moravskyy¹, Volodymyr Levytskyi^{1,2}, Mykhailo Bratychak, Jr.¹, Ulyana Khromyak³, Marta Kuznetsova¹, Nataliia Chopyk¹
- [Receiving Elastoviscous Systems on the Basis of Aqueous Solution of Acetate and Succinimide of Chitosan in the Presence of Polyhydric Alcohols](#)
Roman Lazdin¹, Marina Bazunova¹, Valentina Chernova¹, Angela Shurshina¹, Vadim Zakharov¹, Elena Kulish¹.
- [Epoxy Composites Filled with Natural Calcium Carbonate. 1. Epoxy Composites Obtained in the Presence of Monoperoxy Derivative of Epidian-6 Epoxy Resin](#)
Michael Bratychak¹, Olena Astakhova¹, Olena Shyshchak¹, Olha Zubal¹, Maciej Sienkiewicz², Ostap Ivashkiv¹
- [Removal of Methylene Blue by Adsorption onto Activated Carbons Produced from Agricultural Wastes by Microwave Induced KOH Activation](#)
Ibtissem Kahoul^{1, 2}, Nabil Bougdah¹, Faycal Djazi^{1, 2}, Chahrazed Djilani², Pierre Magri³, Mohamed Salah Medjram^{1, 4}
- [Improvement of Adsorption-Ion-Exchange Processes for Waste and Mine Water Purification](#)
Myroslav Malovanyy¹, Kateryna Petrushka¹, Ihor Petrushka¹
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Ayu Hindayani¹, Oman Zuas¹, , Sujarwo², Fransiska S. H. Krismastuti², Nuryatini¹
- [Kinetic Modeling Studies of Enzymatic Purification of Glucomannan](#)
[Dyah Hesti Wardhani¹, Andri Cahyo Kumoro¹, Azafilmi Hakiim², Nita Aryanti¹, Heri Cahyon¹](#)
- [Determination of the Chemical Composition of the Extract of Apricot Pomace \(Prunus armeniaca L.\)](#)
Victoria Vorobyova¹, Anastasiia Shakun¹, Olena Chygyrynets¹, Margarita Skiba²
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Carla Silva¹, Paulo Rocha¹, Thiago Aversa², Elizabete Lucas^{1, 3}

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THERMODYNAMIC PROPERTIES OF 2-METHYL-5-ARYLFURAN-3-CARBOXYLIC ACIDS CHLORINE DERIVATIVES IN ORGANIC SOLVENTS

*Iryna Sobechko^{1, *}, Yuri Horak², Volodymyr Dibrivnyi¹,
Mykola Obushak², Lubomyr Goshko¹*

<https://doi.org/10.23939/chcht13.03.280>

Abstract. The temperature dependences of the solubility of 2-methyl-5-(2-chloro-5-trifluoromethylphenyl)-furan-3-carboxylic acid and 2-methyl-5-(2,5-dichlorophenyl)-furan-3-carboxylic acid in acetonitrile, dimethyl ketone, isopropanol and ethyl acetate have been experimentally determined. The enthalpies of fusion of the investigated substances, as well as their enthalpies and entropies of mixing at 298 K have been calculated. The dependence of the saturated solution concentration on the values of enthalpy and entropy of solubility at 298 K has been determined. The compensating effect of mixing the investigated acids with all solvents containing the carbonyl group has been established.

Keywords: enthalpy, entropy of solubility, mixing, melting, 2-methyl-5-(2-chloro-5-trifluoromethylphenyl)-furan-3-carboxylic acid, 2-methyl-5-(2,5-dichlorophenyl)-furan-3-carboxylic acid.

1. Introduction

Functionalized aryl derivatives of five-membered heterocycles belong to a class of substances that attract researchers' attention from the standpoint of studying their valuable properties and various modifications of their structure. In particular, the compounds with an arylfuran fragment have become widely used as the modifying agents in the synthesis of polymeric materials [1, 2] and biologically active compounds, since they exhibit a wide spectrum of biological activity [3] and are less toxic than those containing only a functionalized fragment of furan [4]. The compounds with this fragment have begun to be used in therapeutic practice for the treatment of neurodegenerative diseases [5], the treatment of genetic

diseases [6], the creation of drugs for the treatment of tobacco dependence in order to reduce the need for nicotine and remove abstinence symptoms [7] and in the treatment of HIV-1 infection as a component of antiretroviral therapy [8]. It should be noted that polymeric materials with arylfuran fragments are also biologically active [9]. The chitosan polymers modified with chlorine- and nitro-containing arylfurans showed significantly higher antimicrobial activity than unmodified chitosans [10, 11]. Thus, the search for promising reactions involving arylfuran fragments and the need for a deeper understanding of their biochemical functions requires the study of their thermodynamic properties. Naturally, the scientific researches appeared in which thermodynamic properties of individual organic compounds with an arylfuran fragment were examined. The determined values may contribute to solve practical problems concerning the optimization processes of their synthesis and purification. Since most reactions occur in solutions, the optimization of synthesis and purification of compounds with an arylfuran fragment is impossible without the determination of thermodynamic parameters of solubility. Some works regarding the thermodynamic properties of compounds with arylfuran fragment have appeared in recent years [12-17]. The presented work is the continuation of the previous research. Its purpose is to study the thermodynamic properties of 2-methyl-5-(2-chloro-5-trifluoromethylphenyl)-furan-3-carboxylic acid and 2-methyl-5-(2,5-dichlorophenyl)-furan-3-carboxylic acid solubility in organic solvents of different polarity.

2. Experimental

2.1. Materials

2-Methyl-5-(2-chloro-5-trifluoromethylphenyl)-furan-3-carboxylic acid (I) and 2-methyl-5-(2,5-dichlorophenyl)-furan-3-carboxylic acid (II) were synthesized according to Scheme 1 by two stages:

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SPECTROPHOTOMETRIC DETERMINATION OF RUTHENIUM UTILIZING ITS CATALYTIC ACTIVITY ON OXIDATION OF HEXACYANOFERRATE(II) BY PERIODATE ION IN WATER SAMPLES

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Abstract. The catalytic effect of ruthenium chloride on the outer sphere electron transfer of hexacyanoferrate(II) by periodate ion in aqueous alkaline medium has been effectively employed to determine ruthenium(III) at micro level. The optimum reaction condition has been established and fixed time procedure is adopted. A linear relationship between changes in absorbance and added Ru(III) concentration has been utilized for the trace level determination of Ru(III). The results reveal that the addition of interfering ions (up to 71 times higher concentration of Ru) does not have significant effect on the catalytic activity of Ru(III) on oxidation of hexacyanoferrate(II) by periodate ion. Polyaminocarboxylates (HEDTA, EDTA and IDA) suppress its catalytic power to maximum, if tolerance limit is more than 14.29 times. Due to the reproducibility, stability and selectivity, this method can also be quantitatively applied in different types of water samples for determination of ruthenium(III) at micro level.

Keywords: kinetics, mechanism, hexacyanoferrate(II), periodate, ruthenium(III).

1. Introduction

Ruthenium, a noble metal, is found in crustal materials at very low concentration (few ppb) [1], whereas meteorites and chondrite contain much higher percentage of ruthenium [2]. However, ruthenium compounds are highly toxic and carcinogenic, different studies have been reported for materials containing ruthenium complexes in electronic, electrochemical and electrical industries [1, 2]. The

complexes of ruthenium have found applications in pharmaceutical industries in the detection and determination of protein, antibiotic, chloramphenicol, and cefprozil [3-5]. Ruthenium along with its complexes exhibits excellent catalytic property in both alkaline and acidic medium for the reactions having environmental and commercial applications [6-18]. To fight against the deadly disease of cancer a number of ruthenium bearing complexes have been prepared and their antitumor properties are tested [19-21]. The life span of hosts bearing tumor increases by the intake of certain ruthenium compounds in spite of low cytotoxicity of ruthenium agents. Due to high catalytic activity of ruthenium, alloys of ruthenium are used as catalyst in fuel cells. Pt-Ru bimetallic alloy show the highest activity for the methanol oxidation reaction in methanol fuel cells [22]. Nanoparticles of Ru-Pt have also been used as an effective catalyst for carbon monoxide – tolerant fuel cell [23]. Thus, the potential application of ruthenium and its complexes in various areas, especially in pharmacology [24] and metallurgy [25] has made a challenge to develop a rapid, selective, simple and inexpensive method for the determination of ruthenium in different type of samples at trace level. The catalytic and inhibition properties have been extensively used for the growth and development of analytical methods for the trace level determination of different elements and compounds. The processes for the ruthenium determination viz. spectrophotometry, cyclic voltametry, atomic absorption spectrophotometry, mass spectrometry, HPLC, atomic absorption spectrometry, and X-ray fluorescence, have been used by investigators. Despite of good sensitivity and selectivity most of these methods are complicated, time consuming and require expensive chemicals. Therefore, the catalytic kinetic methods (CKMs) employing spectrophotometric monitoring (SPM) under pseudo condition still remain a popular method for achieving ruthenium(III) estimation at trace level [26-38]. A comparison of known CKMs along with reaction condition, types of sample and dynamic range of detection (DRD) are summarized in Table 1 [28, 29, 32-38].

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STUDY OF IODINE OXIDE PARTICLES AT THE AIR/SEA INTERFACE
IN THE PRESENCE OF SURFACTANTS AND HUMIC ACID*Salah Eddine Sbai*^{1, 2, *}, *Bentayeb Farida*¹<https://doi.org/10.23939/chcht13.03.341>

Abstract. In the present study, the formation procedure of iodine oxide particle (IOP) has been investigated in the presence of surfactants (nonanoic and stearic acids NA-SA) and humic acid (HA). It was established that iodine oxide which was mixed with the organic compounds (HA, NA and SA), and then irradiated with a xenon lamp leads to the formation of IOP. The evolution of formed particles number was followed by a scanning mobility particle sizer. Results obtained show that the number of particles decreases strongly in the presence of HA, NA and SA, this behavior is explained by the formation of organoiodine compounds.

Keywords: photochemistry, surfactants, iodine, particle, organoiodine.

1. Introduction

Photochemistry at the air/sea interface of halogens affects the chemical composition of the troposphere. Atmospheric chemistry of halogens is dominated by reactions between gas and aqueous phases species on ocean surfaces and marine aerosols [1]. It influences the oxidation capacity of the atmosphere by removing the great variety of organic and inorganic species, which are emitted by natural and anthropogenic sources, this occurs by the catalytic destruction of ozone and reactions with the important radical species (in particular the hydroxyl OH) which control the oxidation chemistry [2, 3]. The reactivity of iodine in the atmosphere and at sea level leads to the production of nanoparticles of iodine oxide (IOP). The production process of IOP involves the recombination reactions of the radicals IO and OIO to form oxides which then spontaneously condense forming particles [4, 5]. In the presence of moisture, these particles develop into clouds condensation nuclei (CCN), which

would have an impact on the radiative balance of the atmosphere and therefore on the climate [6-11].

Some studies [12, 13] indicate the presence of a significant fraction of iodine soluble in marine aerosol in an organic form. The reaction mechanism between the dissolved organic matter (DOM) and the species aqueous HIO (hypoidic acid), which would recycle I⁻ in aerosols and also increase the release of I₂ in the gaseous phase and at the air/sea interface has already been studied [14]. This mechanism is highly dependent on pH. Humic acid (HA) is a diverse group of multifunctional organic compounds that are soluble in water at pH values above 4. It contains chromophores that participate in photosensitized chemical reactions in the presence of organic surfactants such as nonanouique acid (NA). The adsorption of the soluble reagents, such as O₃ and H₂O₂, of the gas phase on the aerosol surfaces will potentially lead to the oxidation of I⁻ directly to the aerosol of the seawater [15]. The release of these species into the atmosphere allows the recycling of iodine to iodine I⁻ and iodine monoxide IO, which reacts actively with ozone and leads to the formation of iodine oxide particles (IOP) [16, 17]. The iodine oxide species IO₃⁻ is converted by a photochemical reaction with HA to the aqueous ionic form (I⁻); this reaction is also showing the binding of the iodinated species to the humic acid, which influences the formation of marine particles. The spectroscopic analysis of iodate reactions with a number of compounds substituted with functional groups identified with structures of HA, were used to identify the chemical pathways and major species involved in the formation of non-volatile organic species containing iodine [15]. The reaction mechanism is likely to occur in the fixation of iodate on the HA and was, first of all, the absorption of visible light by the organic chromophores of HA, which leads to the generation of the solvated electrons, which are then captured by the iodate ion IO₃⁻, which is considered as the species of the most active iodine in the formation of particles in the atmosphere. It is reduced to HOI which will produce the molecular iodine I₂ which reduces the number of IOP [15]. Iodate is accumulated in the marine aerosol by the adsorption of the species I₂O₃, I₂O₄ and I₂O₅ of the gas phase [18]. Most of the active chemistry of iodine in the gas phase takes place in the first 30 meters of the boundary

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