

BAB I. PENDAHULUAN

1.1. Latar Belakang

Indonesia merupakan negara agraris dengan mayoritas mata pencarian penduduknya didukung oleh sektor pertanian. Perkebunan adalah salah satu subsektor pertanian yang memiliki peranan sangat besar sebagai penyedia lapangan pekerjaan, ekspor dan pertumbuhan ekonomi. Salah satu hasil produksi terbesar dari perkebunan Indonesia adalah tanaman kelapa sawit. Menurut data Dirjen Perkebunan, (2013) dari tahun ke tahun luas areal dan produksi kelapa sawit di Indonesia mengalami peningkatan yang sangat pesat. Hal tersebut menandakan bahwa Indonesia memiliki prospek yang sangat besar dalam penyediaan produk-produk dari kelapa sawit terbesar di dunia, terutama minyak sawit { ADDIN CSL_CITATION {"citationItems":[{"id":"ITEM-1","itemData":{"DOI":"10.18196/agr.1215","ISSN":"2407814X","abstract":"This study aims to determine the trend of palm oil production, the trend of the value of production, trends of CPO(crude palm oil) export volume, trend value of Indonesian exports, as well as to determine the factors that influence the Indonesian CPO exports and to know the benefits of Indonesia's CPO. The data that used are annual data which were analyzed using regression analysis to estimate the influential factors, the analysis of RCA (Revealed Comparative Advantage) and AR (Acceleration Ratio) were used to determine the comparative advantage of the Indonesian palm oil in international market. The results showed that the trend of Indonesian palm oil production on average was increased, while the trend of the value of production, the export volume trend, and the trend of Indonesian CPO export value also increased from year to year. The high productivity of Indonesian palm oil production allows the State Indonesia's CPO to exports to neighboring countries, such as China, India, and the Netherlands. From the results of research on the factors that influence the CPO exports to China state that the International CPO price, exchange rate, per capita income, population, and the price substitution (soybean). Factors affecting the CPO exports to China were the CPO price International, capita income of, population, and

the price substitution. Factors that affecting CPO exports to Netherland countries were the domestic price, capita income, population, trend, and substitusi price. Analysis to determine the comparative advantage to Indonesian CPO market showed that Indonesian CPORCA value was higher than the value of the RCACPO World wide average, while the World RCA value of 1,06, this showed that the market share of Indonesian CPO superior and capable to compete in international market. The growth of Indonesian CPO export has accelerated and higher than other countries in the World (AR =1,009).", "author": [{"dropping-particle": "", "family": "Alatas", "given": "Andi", "non-dropping-particle": "", "parse-names": false, "suffix": ""}], "container-title": "AGRARIS: Journal of Agribusiness and Rural Development Research", "id": "ITEM-1", "issue": "2", "issued": {"date-parts": [{"2015"}]}, "page": "114-124", "title": "Trend Produksi dan Ekspor Minyak Sawit (CPO) Indonesia", "type": "article-journal", "volume": "1"}, {"uris": ["http://www.mendeley.com/documents/?uuid=9f317b ff-e7be-48ea-804b-4995048e8eff"]}, {"mendeley": {"formattedCitation": "(Alatas, 2015)", "plainTextFormattedCitation": "(Alatas, 2015)", "previouslyFormattedCitation": "(Alatas, 2015)"}, {"properties": {"noteIndex": 0}, {"schema": "https://github.com/citation-style-language/schema/raw/master/csl-citation.json"}}, {"}

Jambi merupakan salah satu provinsi di pulau Sumatera yang mengalami peningkatan luas area perkebunan kelapa sawit terbesar Indonesia, yaitu dari tahun 2011 sebesar 532.293 Ha meningkat menjadi 791.025 Ha pada tahun 2016 dan pada tahun 2021 tercatat memproduksi kelapa sawit sebanyak 2575,10 ribu ton (Direktorat Jendral Perkebunan, 2021). Perkebunan kelapa sawit di Provinsi Jambi menjadi komoditas unggulan dengan tersedianya lahan yang luas serta memiliki surplus terhadap produksi yang dapat memenuhi kebutuhan masyarakat { ADDIN CSL_CITATION {"citationItems": [{"id": "ITEM-1", "itemData": {"DOI": "10.22437/jpe.v17i1.10744", "ISSN": "2085-1960", "abstract": "Penelitian ini berjudul “Strategi Pengembangan Perkebunan Kelapa Sawit di Provinsi Jambi”. Penelitian ini bertujuan untuk mengetahui dan

menganalisis komoditi kelapa sawit di Provinsi Jambi, mengetahui dan menganalisis tingkat spesialisasi dan lokalisasi komoditi kelapa sawit di Provinsi Jambi serta Rekomendasi strategi pengembangan komoditi kelapa sawit di Provinsi Jambi, Pendekatan yang digunakan adalah pendekatan kuantitatif dan kualitatif. Komoditi kelapa sawit berdasarkan luas dan produksi merupakan komoditi unggulan, sedangkan berdasarkan tenaga kerja komoditi kelapa sawit tidak menjadi komoditi unggulan dan berdasarkan hasil perhitungan daya saing komoditi kelapa sawit Provinsi Jambi dibawah rata-rata. Hasil perhitungan LI komoditi kelapa sawit Provinsi Jambi dapat diinterpretasikan bahwa tingkat persebaran komoditi kelapa sawit di Provinsi Jambi penyebaran sektor relatif tidak seimbang dan terkonsentrasi di beberapa tempat tertentu. Hasil perhitungan SI Provinsi Jambi tahun 2013-2017 terdapat spesialisasi komoditi kelapa sawit dan setiap kabupaten memiliki kontribusi positif terhadap perkebunan di Provinsi Jambi. Hasil analisis SWOT komoditi kelapa sawit, maka diperoleh : Kekuatan : Perkebunan kelapa sawit di Provinsi Jambi merupakan komoditas unggulan dimana Provinsi Jambi merupakan salah satu sentra produksi kelapa sawit, tersedianya lahan yang cukup luas karena karakter lahan pertanian provinsi Jambi cocok untuk tanaman perkebunan khususnya kelapa sawit, Provinsi Jambi merupakan provinsi spesialisasi komoditas kelapa sawit dengan lokasi yang cenderung teraglomerasi dan dukungan Pemerintah Provinsi dan Kabupaten dalam bentuk kebijakan dan program.. Kelemahan : tidak optimalnya penyerapan tenaga kerja komoditas perkebunan kelapa sawit, rendahnya produktifitas dari komoditi perkebunan kelapa sawit, rendahnya daya tarik dan daya dukung investasi. Selain itu juga isu deforestasi dan konflik sosial karena terdapat distorsi tata kelola dan implementasi peraturan dan nilai tambah dan diversifikasi produk yang dihasilkan belum optimal masih didominasi minyak sawit mentah dan produk turunan sederhana (Olein dan stearin) dan ekspor minyak sawit masih banyak pada produk hulu. Peluang : Perubahan pangsa produksi 4 (empat) minyak nabati utama dunia, penerapan kebijakan Pemerintah China program B5 dan kemampuan Pemerintah India hanya bisa memenuhi kebutuhannya sebesar 30 persen minyak nabatinya, penetapan kebijakan mandator...

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785-4694-4ace-96aa-c8dd64ae61b0"]},"mendeley":{"formattedCitation":"(Wahyudi,
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Kelapa sawit (*Elaeis guineensis* Jacq.) adalah tanaman industri hasil perkebunan yang menjadi salah satu komoditas utama sebagai penghasil devisa negara dalam pemenuhan perekonomian Indonesia. Kelapa sawit merupakan tanaman penghasil lemak tertinggi dari tanaman lainnya dengan hasil produksi utamanya adalah *crude palm oil* (CPO) dari olahan *mesocarp* (daging buah) yang memiliki kandungan minyak sebesar 45-50% dan *crude palm kernel Oil* (CPKO) dari olahan *kernel* (inti buah) dengan kandungan minyak sebesar 47% {ADDIN CSL_CITATION {"citationItems":[{"id":"ITEM-1","itemData":{"DOI":"10.5667/tang.2014.0004","abstract":"The oil palm (*Elaeis guineensis* Jacq.) has been reported to originate along the gulf of the guinea in West Africa. The various parts of the tree have been used locally and traditionally for various medicinal purposes. Some of these uses have been proved by scientific experiments. Palm oil is extracted from the mesocarp of the fruit and is used traditionally for the treatment of headaches, pains, rheumatism, cardiovascular diseases, arterial thrombosis and an atherosclerosis due to its rich phytonutrients. The leaves are also used for the treatment of cancer, cardiovascular diseases, kidney diseases and wound healing. The sap also has been found to be rich in phytonutrients that can be used to treat various diseases. This review therefore seeks to explore many

of the uses of the oil palm using the various parts of the oil palm.", "author": [{"dropping-particle": "", "family": "Owoyele", "given": "Bamidele Victor", "non-dropping-particle": "", "parse-names": false, "suffix": ""}, {"dropping-particle": "", "family": "Owolabi", "given": "Gbenga Opeyemi", "non-dropping-particle": "", "parse-names": false, "suffix": ""}], "container-title": "Tang [Humanitas Medicine]", "id": "ITEM-1", "issue": "3", "issued": {"date-parts": [{"2014"}]}, "page": "16.1-16.8", "title": "Traditional oil palm (*Elaeis guineensis* jacq.) and its medicinal uses: A review", "type": "article-journal", "volume": "4", "uris": ["http://www.mendeley.com/documents/?uuid=5f85d52e-0ca0-4195-b445-eeee0775566b"]], "mendeley": {"formattedCitation": "(Owoyele & Owolabi, 2014)", "plainTextFormattedCitation": "(Owoyele & Owolabi, 2014)", "previouslyFormattedCitation": "(Owoyele & Owolabi, 2014)"}, "properties": {"noteIndex": 0, "schema": "https://github.com/citation-style-language/schema/raw/master/csl-citation.json"} } . Sejak tahun 2006, Indonesia berhasil menjadi negara dengan produsen minyak sawit terbesar di dunia. Tahun 2016, Indonesia berhasil menunggui Malaysia dengan angka ekspor produksi CPO mencapai 53,4% dari total CPO dunia, sedangkan Malaysia memiliki pangsa CPO sebesar 32% { ADDIN CSL_CITATION {"citationItems": [{"id": "ITEM-1", "itemData": {"abstract": "The purpose of this study is to analyze (1) whether oil palm plantations are the main drivers of deforestation in Indonesia; and (2) how does the Indonesian palm oil industry contribute to sustainable development both economically, socially and ecologically. Oil palm plantations are Indonesia's strategic industries. Since 2000, the Indonesian palm oil industry has grown rapidly and has influenced the dynamics of competition among vegetable oils including the form of black campaigns and accusations as drivers of deforestation in Indonesia. The research methodology is empirical descriptive research, which are: (1) to analyze the history of deforestation in logging era in Indonesia and related to the development of oil palm plantation and (2) to analyze the linkage of Indonesian oil palm plantation development with economic, social and ecological aspect. In the period 1950-2013, conversion of forests into non-forests is quite high ie 98.8 million hectares. However,

the area of oil palm plantation Indonesia only increased from 0.1 million hectares (1950) to 10.4 million hectares (2013). Based on satellite data (Gunarso, et al., 2012) revealed that the origins of Indonesian oil palm plantations are mostly from degraded land, and only 3.4 percent are converted from primary forest. This proves that oil palm plantations as the main drivers of deforestation in Indonesia are not true. In the economic aspect, the palm oil industry contributes in generating foreign exchange, regional development and successfully creating farmers into middle income. In the social aspect, the oil industry plays a role in rural development and poverty reduction and equitable economic development, and improves income and development inequalities. In the ecological aspect, oil palm plantations contribute to sustainable development through its role in absorbing CO₂ and generating O₂, and increasing land biomass. Oil palm plantations also reduce greenhouse gas emissions", "author": [{"dropping-particle": "", "family": "Ismai", "given": "", "non-dropping-particle": "", "parse-names": false, "suffix": ""}], "container-title": "Jurnal Ilmu Ilmu Sosial Indonesia", "id": "ITEM-1", "issue": "1", "issued": {"date-parts": [{"2017"}]}, "page": "81-94", "title": "Perkebunan Kelapa Sawit Indonesia Dalam Perspektif Pembangunan Berkelanjutan", "type": "article-journal", "volume": "43"}, {"uris": ["http://www.mendeley.com/documents/?uuid=4efea59e-0268-40ce-b93f-121e616a685c"]}], "mendeley": {"formattedCitation": "(Ismai, 2017)", "manualFormatting": "(Purba J.H.V & Sipayung.T., 2017)", "plainTextFormattedCitation": "(Ismai, 2017)", "previouslyFormattedCitation": "(Ismai, 2017)", "properties": {"noteIndex": 0}, "schema": "https://github.com/citation-style-language/schema/raw/master/csl-citation.json"}. Demikian halnya dalam pemasaran minyak nabati dunia, minyak sawit juga mengungguli minyak kedelai sejak tahun 2004 { ADDIN CSL_CITATION {"citationItems": [{"id": "ITEM-1", "itemData": {"ISSN": "2830-4430", "abstract": "Palm oil has an important role to play in improving the country's foreign exchange. The largest selling point in palm oil is palm kernel oil (PKO), this palm kernel oil processing process involves a mixture of kernels and shells that will later be separated. This research aims to design the

build and produce a prototype kernel separator from its shell by using a saline solution to minimize excess costs and able to separate the kernel and shell >80%. Methods carried out in this study include designing, manufacturing and testing. After that, prototype kernel separator with palm shell using salt solution with tool dimensions on container length 53 cm, width 40 cm, height 42 cm, water receiver body length 22 cm, width 16 cm, height 28. The kernel separator with palm shell using this saline solution is able to separate the kernel and shell mixture by 82%.

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Buah simpan memiliki istilah buah yang sudah dipanen namun tidak langsung dilakukan penanganan lebih lanjut dalam kondisi tertentu. Pada penelitian ini penulis menggunakan sampel buah kelapa sawit yang disimpan dalam gudang selama 3 hari untuk memperoleh mutu seperti buah restan. Buah restan memiliki kandungan asam lemak bebas dan kadar air yang tinggi akibat pertumbuhan mikroba yang semakin aktif dan aktivitas enzim lipase { ADDIN CSL_CITATION {"citationItems":[{"id":"ITEM-1", "itemData":{"DOI":"10.1016/j.aaspro.2014.11.024", "ISSN":"22107843", "abstract":"The bulkiness of the fresh fruit bunches (FFB) cause ineffectiveness of heat

distribution into the inner layers of the fruits and simultaneously led to poor palm oil quality. Thus, this research was conducted to determine the effect of storage time of chopped FFB on the palm oil quality and stripping efficiency. The FFB was chopped using a fabricated chopper blade and stored for 30min to 120min. The results showed that the FFA, moisture content, DOBI and carotene content were ranged $1.19\% - 2.21 \pm 0.394\%$, $0.175 - 0.411 \pm 0.097\%$, $2.74 - 0.85 \pm 0.746$ and $430.402 - 326.081 \pm 0.768\text{ppm}$ respectively. The chopped FFB also had better stripping efficiency compared to unchopped FFB.

,"author":{"dropping-particle":"","family":"Ali","given":"Fatin Syakirah","non-dropping-particle":"","parse-names":false,"suffix":""},{dropping-particle":"","family":"Shamsudin","given":"Rosnah","non-dropping-particle":"","parse-names":false,"suffix":""},{dropping-particle":"","family":"Yunus","given":"Robiah","non-dropping-particle":"","parse-names":false,"suffix":""}], "container-title":"Agriculture and Agricultural Science Procedia", "id":"ITEM-1", "issued":{"date-parts":[["2014"]]}, "page":"165-172", "publisher":"Elsevier Srl", "title":"The Effect of Storage Time of Chopped Oil Palm Fruit Bunches on the Palm Oil Quality", "type":"article-journal", "volume":"2"}, "uris":["http://www.mendeley.com/documents/?uuid=f74d9951-0f21-4472-83ab-e35a05846789"]], "mendeley":{"formattedCitation":"(Ali et al., 2014)", "manualFormatting":"(Ali dkk., 2014)", "plainTextFormattedCitation":"(Ali et al., 2014)", "previouslyFormattedCitation":"(Ali et al., 2014)"}, "properties":{"noteIndex":0}, "schema":"https://github.com/citation-style-language/schema/raw/master/csl-citation.json"} } . Mikroba penghasil enzim lipase pada buah kelapa sawit seperti bakteri *Bacillus spp* & bakteri *Pseudomonas spp* dapat berasal dari lingkungan, tanah, air serta permukaan buah itu sendiri (Warsito, F.M., 2021). Menurut {ADDIN CSL_CITATION {"citationItems":[{"id":"ITEM-1", "itemData":{"ISBN":"0815921772", "ISSN":"1833-3850", "PMID":"25246403", "abstract":"Sistem pengendalian internal adalah bagian dari praktik Good Corporate Governance di mana secara teoritis, penerapan Good Corporate Governance yang baik dapat meningkatkan nilai perusahaan. Dalam studi

ini bertujuan untuk mengetahui apakah peranan Auditor Internal mempengaruhi penerapan Good Corporate Governance pada BUMN di Jember. Data yang digunakan adalah data primer yang diperoleh dengan mengirimkan kuesioner kepada responden. Pengujian kualitas data dilakukan dengan menggunakan uji validitas dan uji realibilitas. Uji statistik dengan menggunakan uji normalitas dan pengujian hipotesis menggunakan analisis regresi sederhana, uji t dan koefisien korelasi. Berdasarkan pengujian yang telah dilakukan, diperoleh hasil yang menerima hipotesis alternatif (H_a). Artinya, hasil penelitian ini menunjukkan peranan Auditor Internal berpengaruh pada pelaksanaan Good Corporate Governance di Jember. Hal ini ditunjukkan dengan nilai signifikansi < 0.05 dan $t_h > t_{tabel}$, hasil penelitian sekaligus menunjukkan ketidaksamaan dengan penelitian terdahulu yaitu Setiawan (2011) dan menunjukkan hasil yang sama dengan penelitian Gumilang (2009) yang melakukan penelitian dengan judul yang sama.

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particle":"","parse-names":false,"suffix":"","}], "container-title": "Diponegoro Journal of
Accounting", "id": "ITEM-1", "issue": "1", "issued": {"date-parts": [[2017]]}, "page": "2-
6", "title": "No 主観的健康感を中心とした在宅高齢者における 健康関連指標に
関する共分散構造分析 Title", "type": "article-
journal", "volume": "2"}, "uris": ["http://www.mendeley.com/documents/?uuid=63b107
7b-bed7-446c-8e36-a09e967d12f7"]], "mendeley": {"formattedCitation": "(Nuraeni et
al., 2017)", "manualFormatting": "Prio & Sudradjat., (2017)
", "plainTextFormattedCitation": "(Nuraeni et al.,
2017)"}, "properties": {"noteIndex": 0, "schema": "https://github.com/citation-style-
language/schema/raw/master/csl-citation.json"} } kenaikan asam lemak bebas mulai
terlihat pada buah kelapa sawit yang berumur 3 hari dengan peningkatan hingga 4,2%.
Untuk mengatasi kenaikan asam lemak bebas dan kadar air pada buah simpan, maka
perlu dilakukan penanganan khusus seperti penambahan bahan antimikroba.

Asap cair adalah suatu cairan diperoleh dari proses kondensasi atau
pengembunan uap hasil pirolisis yang mengandung berbagai senyawa seperti
hemiselulosa, selulosa, dan lignin yang dapat menghambat pertumbuhan mikroba
(Prindle, 1983 dalam Lely dkk., 2017). Hemiselulosa dan selulosa akan menghasilkan
berbagai senyawa asam dari proses pirolisis, seperti asam asetat, fenol, dan lain-lain.
Sedangkan lignin akan menghasilkan senyawa aromatik berupa aroma dan warna dari
proses pirolisis. Pirolisis merupakan sebuah proses dekomposisi kimia bahan organik
dengan bantuan pemanasan yang terjadi tanpa atau sedikit oksigen. Prinsip kerja dari

pirolisis adalah pemecahan struktur kimia menjadi gas/uap melalui pemanasan yang kemudian diubah menjadi cairan melalui proses kondensasi atau pendinginan

{ ADDIN CSL_CITATION {"citationItems":[{"id":"ITEM-1","itemData":{"abstract":"Kota Padang merupakan ibukota Provinsi Sumatera Barat yang berfungsi sebagai pusat kegiatan perdagangan, jasa, pendidikan, pariwisata, transportasi, dan industri. Hal ini diikuti dengan pertumbuhan transportasi yang menyebabkan kepadatan lalu lintas di jalan-jalan Kota Padang. Jumlah kendaraan bermotor di Kota Padang mengalami peningkatan dari 224.514 unit pada tahun 2004 menjadi 427.235 unit pada tahun 2014 (BPS, 2014). Peningkatan jumlah kendaraan berdampak terhadap kualitas udara Kota Padang yang salah satunya adalah meningkatnya konsentrasi gas karbonmonoksida (CO) di Kota Padang. Tingkat pencemaran dan sebaran emisi udara di suatu kota perlu dilakukan dengan sebuah model. Tujuan penelitian ini yaitu menentukan tingkat konsentrasi, dispersi gas CO serta merekomendasikan strategi pengendalian yang sesuai untuk Kota Padang Metode yang digunakan dalam penelitian ini menggunakan persamaan Box model serta Gaussian model yang dapat disusun berdasarkan mekanisme transport polutan dengan mempertimbangkan input sub-model meteorologi, sub-model emisi serta sub-model dispersi, berdasarkan kategori jalan pada jalan dua arah dan searah. Konsentrasi yang didapatkan dari kedua persamaan tersebut divalidasi dengan konsentrasi pengukuran langsung di lapangan. Konsentrasi yang telah divalidasi selanjutnya divisualisasi guna menggambarkan sebaran gas CO pada masing-masing ruas jalan. Analisis data berupa strategi yang dapat diterapkan dalam pengendalian gas CO di Kota Padang berdasarkan aspek teknis, lingkungan serta aspek kelembagaan yang dilakukan dengan analisa SWOT. Persamaan Gaussian model dinilai lebih akurat dalam mendapatkan konsentrasi gas CO, hal ini terlihat dari hasil validasi sebesar 88,9 %, sedangkan box model hanya sebesar 30,6 %. Konsentrasi gas CO terbesar terdapat pada kategori jalan arteri dua arah tanpa adanya pohon sebesar 3.403,7 $\mu\text{g}/\text{m}^3$, sedangkan konsentrasi terendah sebesar 2.923,1 $\mu\text{g}/\text{m}^3$ terdapat pada ruas jalan arteri searah yang memiliki pohon pelindung. Strategi pengendalian berdasarkan aspek lingkungan difokuskan dengan penanaman pohon di sepanjang

jalan yang belum terdapat pohon pelindung, sedangkan aspek kelembagaan dengan memperkuat kapasitas, organisasi serta regulasi dalam menyelenggarakan pengelolaan pencemaran udara yang efektif dan efisien.", "author": [{"dropping-particle": "", "family": "Yuliando", "given": "Dedy Try", "non-dropping-particle": "", "parse-names": false, "suffix": ""}], "container-title": "Tesis", "id": "ITEM-1", "issued": {"date-parts": ["2017"]}, "page": "1-149", "title": "Strategi Pengendalian Pencemaran Gas Karbon Monoksida (Co) Oleh Aktivitas Transportasi Di Kota Padang, Sumatera Barat", "type": "article-journal"}, "uris": ["http://www.mendeley.com/documents/?uuid=c9e00e73-7caa-4bb2-925f-c77430c5a997"]}, "mendeley": {"formattedCitation": "(Yuliando, 2017)", "plainTextFormattedCitation": "(Yuliando, 2017)", "previouslyFormattedCitation": "(Yuliando, 2017)"}, "properties": {"noteIndex": 0, "schema": "https://github.com/citation-style-language/schema/raw/master/csl-citation.json"} }. Bahan baku pembuatan asap cair umumnya dari bahan-bahan yang mengandung senyawa karbon seperti kayu, tempurung/cangkang, ranting, daun, dan sebagainya.

Cangkang kelapa sawit merupakan limbah padat dari sisa produksi minyak kelapa sawit yang memiliki banyak manfaat, seperti pemanfaatan sebagai bahan bakar di PMKS, perbaikan jalan, bahan tambah campuran beton, hingga sebagai bahan pestisida pada asap cair. Menurut hasil penelitian {ADDIN CSL_CITATION {"citationItems": [{"id": "ITEM-1", "itemData": {"DOI": "10.23955/rkl.v9i3.779", "ISSN": "1412-5064", "abstract": "Chemical components of liquid smoke which is produced via pyrolysis of palm oil solid waste have been analyzed by using gas chromatography mass spectroscopy (GC-MS). Solid waste consists of shell, empty fruit bunch, and palm fiber. Solid waste was obtained from palm oil manufactory in Tanjung Semantok, Aceh province. The objective of this research was to investigate the chemical components in liquid smoke obtained from various palm oil solid waste. Sample was pyrolyzed at 500°C for 5 hours by using tube furnace reactor type 21100 which is equipped by thermolyne as temperature adjustment. The yield of pyrolysis

from shell, empty fruit bunch and palm fiber are 52,02; 29,59; and 34,88%, respectively. The results showed that 27; 13 and 11 compounds of chemical were observed in liquid smoke obtained by pyrolysis of shell, empty fruit bunch, and palm fiber, respectively. Overall, acetic acid and phenol are the highest concentration of chemical obtained in this research.

"author":{"dropping-particle":"","family":"Haji","given":"Abdul Gani","non-dropping-particle":"","parse-names":false,"suffix":""},"container-title":"Jurnal Rekayasa Kimia & Lingkungan","id":"ITEM-1","issue":"3","issued":{"date-parts":[["2013"]]},"page":"110-117","title":"Komponen Kimia Asap Cair Hasil Pirolisis Limbah Padat Kelapa Sawit","type":"article-journal","volume":"9"},"uris":["http://www.mendeley.com/documents/?uuid=8b46974e-3961-48ad-a9c2-f1856b683288"]},"mendeley":{"formattedCitation":"(Haji, 2013)","manualFormatting":"Haji, (2013)","plainTextFormattedCitation":"(Haji, 2013)","previouslyFormattedCitation":"(Haji, 2013)"},"properties":{"noteIndex":0},"schema":"https://github.com/citation-style-language/schema/raw/master/csl-citation.json"} } tentang komponen kimia pada larutan asap cair dari cangkang kelapa sawit menyatakan kandungan paling banyak yaitu senyawa asam asetat 2,70% dan fenol 21,02%. Kandungan asam asetat mampu menurunkan pH lingkungan perkembangbiakan bakteri, mengasamkan sitoplasma, hingga merusak tegangan permukaan membran sel bakteri {

ADDIN CSL_CITATION {"citationItems":[{"id":"ITEM-1","itemData":{"DOI":"10.20886/jphh.2013.31.2.170-178","ISSN":"02164329","abstract":"The liquid smoke obtained from the destructive distillation on coconut shell) at 0,25-6,0% concentration-range could in vitro to inhibit the colony growth of fungi , i.e. and species as much as consecutively 5,59-97,85% and 6,06-94,97%. At 7% liquid-smoke consentrntion the inhibition reached 100% (for both spescies). The liquid smoke obtained from 400 C distillation temperature could inhibit fungi growth the most effectivelly, i.e. 16,26% for and 15.06% for. In vivo, the liquid smoke at 0,5%, 1%, and 5% consentrntion-was effective to repard (up to 100%) the antracnose disease as well as fusarium-wilt that

attacked the host cucumber plants. However, the liquid-smoke use at 5% was not recommended due to inflicting necrosis on cucumber leaves", "author": [{"dropping-particle": "", "family": "Aisyah", "given": "Imas", "non-dropping-particle": "", "parse-names": false, "suffix": ""}, {"dropping-particle": "", "family": "Juli", "given": "Nuryati", "non-dropping-particle": "", "parse-names": false, "suffix": ""}, {"dropping-particle": "", "family": "Pari", "given": "Gustan", "non-dropping-particle": "", "parse-names": false, "suffix": ""}], "container-title": "Jurnal Penelitian Hasil Hutan", "id": "ITEM-1", "issue": "2", "issued": {"date-parts": ["2013"]}, "page": "170-178", "title": "Pemanfaatan Asap Cair Tempurung Kelapa Untuk Mengendalikan Cendawan Penyebab Penyakit Antraknosa Dan Layu Fusarium Pada Ketimun", "type": "article-journal", "volume": "31", "uris": ["http://www.mendeley.com/documents/?uuid=2f99c6f8-91a4-43aa-9020-eea668ba1355"]}, "mendeley": {"formattedCitation": "(Aisyah et al., 2013)", "manualFormatting": "(Aisyah dkk., 2013)", "plainTextFormattedCitation": "(Aisyah et al., 2013)", "previouslyFormattedCitation": "(Aisyah et al., 2013)"}, "properties": {"noteIndex": 0, "schema": "https://github.com/citation-style-language/schema/raw/master/csl-citation.json"}}, {ADDIN CSL_CITATION {"citationItems": [{"id": "ITEM-1", "itemData": {"ISBN": "2013206534", "abstract": "Seiring dengan kemajuan ilmu pengetahuan dan teknologi yang menjadi pusat perhatian dunia. Maka manusia dituntut untuk menciptakan peralatan-peralatan canggih untuk teknologi muktahir. Baik itu dalam bidang bisnis, perdagangan, kesehatan, militer, pendidikan, komunikasi dan budaya maupun bidang-bidang lainnya. Maka teknologi ini membawa perubahan pada peralatan-peralatan yang dulunya bekerja secara analog mulai dikembangkan secara digital, dan bahkan yang bekerjanya secara manual sekarang banyak dikembangkan secara otomatis, seperti kamera digital, handycam,

dan sebagainya, dalam pembacaan pengukuran juga sudah dikembangkan ke dalam teknik digital. Contohnya perangkat Load Cell. Dan keuntungan menggunakan Load Cell adalah untuk mempermudah dalam pembacaan data untuk meminimalkan kesalahan dalam pembacaan data yang disebabkan adanya human error. Pada pemilihan Load Cell bertujuan untuk memilih kecocokan dalam membuat rancang bangun alat uji tarik kapasitas 3 ton, dimana dalam pemilihan ini kami memilih jenis load cell “S” karna alat yang kita rancang adalah uji tarik bukan uji tekan. Dengan kapasitas load cell 5 ton. Untuk membuat jarak aman dalam pengujian specimen ST41. Load Cell menggunakan system perangkat elektronik pengolahan data yang menjadi sebuah kurva tegangan regangan. Data-data yang diperoleh tersebut berupa besarnya pembebanan hasil dari pengujian specimen ST41.

Kata,"author":[{"dropping-particle":"","family":"Crystallography","given":"X-ray Diffraction","non-dropping-particle":"","parse-names":false,"suffix":""}], "id":"ITEM-1", "issued":{"date-parts":[["2016"]]}, "number-of-pages":"1-23", "title":" 濟 無 No Title No Title No Title", "type":"book", "uris":["http://www.mendeley.com/documents/?uuid=7bc7bbd7-ba76-4ef5-9b0f-aba801623b64"]}], "mendeley":{"formattedCitation":"(Crystallography, 2016)", "manualFormatting":"(Prindle, 1983 dalam Lely dkk., 2017)", "plainTextFormattedCitation":"(Crystallography, 2016)", "previouslyFormattedCitation":"(Crystallography, 2016)"}, "properties":{"noteIndex":0}, "schema":"https://github.com/citation-style-language/schema/raw/master/csl-citation.json"} }.

Asap cair cangkang kelapa sawit adalah cairan bersifat antimikroba yang dapat dijadikan sebagai alternatif dalam penurunan asam lemak bebas dan kadar air pada buah kelapa sawit akibat aktivitas enzim lipase. Sudah banyak dilakukan penelitian terdahulu yang memanfaatkan asap cair sebagai antimikroba dalam menjaga kualitas dari suatu produk, seperti penelitian dari { ADDIN CSL_CITATION {"citationItems":[{"id":"ITEM-1", "itemData":{"DOI":"10.17969/jtipi.v9i2.8469", "ISSN":"2085-

the increase in free fatty acids (FFA) in Crude Palm Oil (CPO) is the activity of lipase-producing microorganisms in the oil palm fruit. Lipase is a biocatalisator which accelerate oil-hydrolysis reaction. High Free Fatty Acid Levels (FFA) will caused rancidity, change the taste and color of the oil. To solve this problem, post-harvest palm fruits should treat with some special treatment, e.g. addition of anti-microbial material, such as liquid smoke The purpose of this study was to determine the effect of liquid smoke on oil palm fruit, the inhibition of elevated levels of free fatty acids (FFA) on CPO. The factors reviewed in this study is the concentration of liquid smoke used; 5, 15, and 25% and the standing time; 12, 16 and 20 hours. The parameters observed in this study are free fatty acids (FFA), water, and impurities. The results showed that the higher the concentration of liquid smoke added, the higher inhibition of oil hydrolysis. CPO levels of FFA decreased at approximately 0,03 to 0,37% after the addition of liquid smoke. Highest inhibition on ALB increase was obtained in the treatment of the sample with the addition of 25% liquid smoke and 12 hours of standing time, which is 2,46%. Keywords: Crude Palm Oil (CPO), Free Fatty Acid (FFA), Water, Impurities, Liquid Smoke.

Abstrak Salah satu penyebab peningkatan asam lemak bebas (ALB) di dalam Crude Palm Oil (CPO) adalah, karena adanya aktivitas mikroorganisme penghasil lipase di dalam buah kelapa sawit. Lipase merupakan biokatalisator yang mempercepat reaksi hidrolisis minyak. Kadar Asam Lemak Bebas (ALB) yang tinggi menyebabkan ketengikan, perubahan rasa dan warna pada minyak. Untuk mengatasi masalah ini, buah kelapa sawit perlu diberi perlakuan khusus, yaitu penambahan bahan anti mikroba pada buah kelapa sawit pasca panen, salah satunya adalah asap cair. Tujuan dari penelitian ini adalah untuk mengetahui pengaruh penambahan asap cair pada buah kelapa sawit, terhadap penghambatan peningkatan kadar asam lemak bebas (ALB) pada CPO. Adapun faktor yang ditinjau dalam penelitian ini adalah konsentrasi asap cair yang digunakan, yaitu 5, 15, dan 25% dan waktu pendiaman, yaitu 12, 16, dan 20 jam. Parameter yang diamati dalam penelitian ini antara lain, asam lemak bebas (ALB), air, dan kotoran. Hasil penelitian menunjukkan bahwa semakin tinggi konsentrasi asap

cair yang ditambahkan, maka penghambatan hidro..., "author": [{"dropping-particle": "", "family": "Maimun", "given": "Teuku", "non-dropping-particle": "", "parse-names": false, "suffix": ""}, {"dropping-particle": "", "family": "Arahman", "given": "Nasrul", "non-dropping-particle": "", "parse-names": false, "suffix": ""}, {"dropping-particle": "", "family": "Hasibuan", "given": "Fikriatul Arifah", "non-dropping-particle": "", "parse-names": false, "suffix": ""}, {"dropping-particle": "", "family": "Rahayu", "given": "Putri", "non-dropping-particle": "", "parse-names": false, "suffix": ""}], "container-title": "Jurnal Teknologi dan Industri Pertanian Indonesia", "id": "ITEM-1", "issue": "2", "issued": {"date-parts": [{"2017"}]}, "page": "44-49", "title": "Penghambatan Peningkatan Kadar Asam Lemak Bebas (Free Fatty Acid) pada Buah Kelapa Sawit dengan Menggunakan Asap Cair", "type": "article-journal", "volume": "9", "uris": ["http://www.mendeley.com/documents/?uuid=c777c94d-e833-472c-af8b-c3341a3f2c82"]], "mendeley": {"formattedCitation": "(Maimun et al., 2017)", "manualFormatting": "Maimun dkk, (2017)", "plainTextFormattedCitation": "(Maimun et al., 2017)", "previouslyFormattedCitation": "(Maimun et al., 2017)"}, "properties": {"noteIndex": 0, "schema": "https://github.com/citation-style-language/schema/raw/master/csl-citation.json"} } yang memanfaatkan larutan asap cair cangkang kelapa dengan konsentrasi 5, 15, dan 25% serta waktu pendiaman 12, 16, dan 20 jam sebagai bahan antimikroba dalam menghambat peningkatan asam lemak bebas dan kadar air pada buah kelapa sawit, dan diperoleh nilai terbaik dengan konsentrasi dan waktu pendiaman 25% dan 12 jam. Kemudian penelitian dari { ADDIN CSL_CITATION {"citationItems": [{"id": "ITEM-1", "itemData": {"author": [{"dropping-particle": "", "family": "Buah", "given": "Tandan", "non-dropping-particle": "", "parse-names": false, "suffix": ""}, {"dropping-particle": "", "family": "Terhadap", "given": "Segar", "non-dropping-particle": "", "parse-names": false, "suffix": ""}, {"dropping-particle": "", "family": "Mutu", "given": "Kualitas", "non-dropping-particle": "", "parse-

names":false,"suffix":"","}], "id": "ITEM-1", "issue": "1", "issued": {"date-parts": [{"2022"}]}, "page": "38-47", "title": "THE EFFECT OF PALM OIL LIQUID APPLICATIONS ON FRESH FRUIT ON", "type": "article-journal", "volume": "4", "uris": [{"http://www.mendeley.com/documents/?uuid=e6935231-322a-4965-a503-27b2bc8f2474"}]}, "mendeley": {"formattedCitation": "(Buah et al., 2022)", "manualFormatting": "Ramadhan dkk, (2022)", "plainTextFormattedCitation": "(Buah et al., 2022)", "previouslyFormattedCitation": "(Buah et al., 2022)"}, "properties": {"noteIndex": 0, "schema": "https://github.com/citation-style-language/schema/raw/master/csl-citation.json"} } tentang perendaman larutan asap cair cangkang kelapa sawit pada TBS dengan perlakuan semprot, suntik, dan kombinasi dengan dosis 80% dan waktu perendaman selama 24 jam terhadap kualitas CPO yang dihasilkan menyatakan bahwa larutan asap cair cangkang kelapa sawit mampu menurunkan kadar asam lemak bebas dengan perlakuan kombinasi (semprot+suntik) memperoleh nilai terbaik.

Berdasarkan uraian di atas, penulis tertarik melakukan penelitian lebih dalam lagi mengenai **“Kajian Lama Durasi Perendaman Buah Simpan Kelapa Sawit (*Elaeis Guineensis* Jacq.) Dalam Larutan Asap Cair Cangkang Kelapa Sawit”**.

1.2. Tujuan Penelitian

Tujuan dari perencanaan penelitian ini adalah sebagai berikut:

1. Mengetahui pengaruh perendaman buah simpan dalam larutan asap cair cangkang kelapa sawit dengan durasi 12, 16, 20, dan 24 jam.
2. Mengetahui durasi terbaik pada perendaman buah simpan dalam larutan asap cair cangkang kelapa sawit.

1.3. Hipotesis Penelitian

Berdasarkan uraian latar belakang diatas, maka diduga,

1. Durasi yang tidak sama pada perendaman buah simpan dalam larutan asap cair cangkang kelapa sawit akan memperoleh hasil yang berbeda.
2. Terdapat durasi terbaik pada perendaman buah simpan dalam larutan asap cair cangkang kelapa sawit.

1.4. Manfaat Penelitian

Manfaat dari penelitian ini adalah memberikan informasi mengenai pemanfaatan limbah cangkang kelapa sawit yang diolah menjadi asap cair sebagai bahan antimikroba serta durasi terbaik pada perendaman buah simpan dalam larutan asap cair cangkang kelapa sawit.