

Penelitian/Research

PENGARUH RASIO ANHIDRIDA ASETAT DALAM PROSES ASETILASI SELULOSA PULP KAYU SENGON (*Paraserianthes falcataria*) DALAM PEMBUATAN POLIMER SELULOSA TRI ASETAT

*The Effect of Acetate Anhydride Ratio in the Process of Cellulose Acetylation of Pulp from Sengon (*Paraserianthes falcataria*) on the Production of Cellulose Triacetate Polymer.*

Cut Meurah Rosnelly¹⁾, Abdul Aziz Darwis²⁾, Erliza Noor²⁾, Kaseno³⁾

¹⁾Pascasarjana (S3) Teknologi Industri Pertanian-Fateta IPB, Kampus IPB Darmaga IPB

²⁾Staf Pengajar Teknologi Industri Pertanian -Fateta IPB, Kampus IPB Darmaga IPB

³⁾Badan Pengkajian dan Penerapan Teknologi (BPPT) – Jl. Thamrin No.8, Jakarta 10340

ABSTRACT: Almost all of Cellulose acetate is produced by reaction of cellulose and acetic anhydride using strong acids as catalyst and acetic acid as a solvent. A typical industrial process requires very high quality cellulose raw materials having a high α -cellulose content. The cellulose used as a raw material in this research is wood pulp of sengon (*Paraserianthes falcataria*) due to fast growing species and has potential used as a raw material as if has a high cellulose content. The main objective of this research was to obtain condition for making cellulose triacetate by applying ratio levels of acetic anhydride toward cellulose in acetylation process. Cellulose triacetate flake was produced by activation and acetylation process. Activation was carried out by mixing cellulose of sengon pulp with glacial acetic in proportion 1:8 at 50 °C about 15; 30; 60; 90, and 120 minutes. Acetylation is then conducted using reagents in following proportions relative to the pulp mass; variable of acetic anhydride ratio (3.35:1), (4:1), (5:1), and (6 : 1), acetic acid as solvent (4.5 : 1), sulfuric acid (0.015 : 1) as catalyst while controlling the reaction temperature at 50°C for 60 minutes. The result showed that acetyl content of cellulose triacetate was obtained as 44.175% at 30 minutes activation and ratio of acetic anhydride toward cellulose 3.35 in acetylation process.

Key words: cellulose of wood sengon pulp, ratio of acetic anhydride, cellulose triacetate, acetyl content.

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PENDUGAAN MASA SIMPAN PRODUK KOPI INSTAN MENGGUNAKAN STUDI PENYIMPANAN YANG DI AKSELARASI DENGAN MODEL KINETIKA ARRHENIUS

Shelf-life Prediction of Instant Coffee Using an Accelerated Storage Study with Arrhenius Kinetics Model

Agus Sudibyo⁽¹⁾, Tiurlan F. Hutajulu⁽¹⁾ dan Setyadjit⁽²⁾

⁽¹⁾ Balai Besar Industri Agro (BBIA),
Jl. Ir. H. Juanda No. 11 Bogor 16122

⁽²⁾ Balai Besar Penelitian dan Pengembangan Pascapanen Pertanian,
Jl. Tentara Pelajar 12, Bogor 16114

ABSTRACT: Instant coffee is one of Indonesian's processed food product, that can be easily undergo a reduction in quality caused by adsorb of moisture. Nowadays, consumers demand products with good appearance, texture, taste and flavor whilst keeping their nutritional value. In order to meet consumers expectations for high-quality products, food industries must be conducted shelf-life studies that many times include the assessment of several analytical and sensory properties. Shelf-life dating using Arrhenius method is one of an accelerated shelf-life test. The purpose of this study were to observe initial instant coffee characteristics, to observe the changes of quality during storage, to determine the quality critical point parameter for the product and the prediction of shelf-life of the product using Arrhenius kinetics method based on its quality control parameters. In the present study it was found that during storage of the product, moisture content and brightness level color value of the product have increased, meanwhile the volatile reducing substance (VRS) value and boiled coffee aroma have decreased; and sensory evaluation based on hedonic test showed there was no significant for boiled coffee aroma. Critical parameter for this study is moisture content with the value of critical point for moisture content is 17.98%. Calculation based on Arrhenius kinetics equation at 30°C, RH 70% revealed a present of shelf-life for 588 days, at 45°C & RH 70% revealed a present of shelf-life for 398 days, and at 50°C & RH 70% revealed to make a present of shelf-life for 352days.

Keywords : *shelf-life, accelerated storage, coffee instant, Arrhenius model.*

Penelitian/Research

STUDI PRODUKSI PEKTIN ASETAT SEBAGAI BAHAN BAKU LEMBARAN BIOPLASTIK

The Study for Production of Acetylated Pectin as raw material for Bioplastic Films

Rienoviar ¹⁾, Suminar Setiati Achmadi ²⁾

¹⁾ Balai Besar Industri Agro (BBIA), Jl. Ir. H Juanda 11, Bogor 16122

²⁾ Departemen Kimia, Fakultas Matematika Ilmu Pasti Alam, Institut Pertanian Bogor.
Kampus Darmaga, Bogor 16680

ABSTRACT: The study was aim at obtaining the optimal acetylation and activation time for obtaining water insoluble acetylated pectin which would be used for bioplastic material. The activation time for swelling of pectin were 120, 180, and 240 minutes, meanwhile the acetylation time were 60, 90, and 120 minutes. The experiment revealed that the activation time of 180 minutes and acetylation time of 120 minute, produced water insoluble (hydrophobic) material were diluted in dimethyl sulfoxide, and the highest acetyl substitution was 62.9% (wb). Infrared spectroscopic analysis indicated that the absorption band of pectin and the acetylated pectin were different at wave number 1743 cm^{-1} of which the ester group of the material can be detected. The analysis of pectin acetate structure by stereophotomicroscope revealed that the highest surface density was resulted from activation time and acetylation time of 120 minutes. Moreover, the best result of the bioplastic sheet of pectin acetate was produced by using pressure of 100 Psi at temperature of 100°C for 5 minutes pressure.

Keywords: *acetylated pectin, activation time, hydrophobic polymer, bioplastic film*

Penelitian/Research

PENGOLAHAN MINUMAN AIR TEBU SEGAR AMAN KONSUMSI

The Production of Fresh and Healthy Sugar Cane Juice

Zarlis.M.S

Balai Riset dan Standardisasi Industri Padang
Komplek LIK Ulu Gadut Padang

ABSTRACT: Research on The production of fresh and healthy sugar cane had been conducted. The purpose of this study is to find out such of the simple technology which can be used for additional materials that wealthy warranty to pure impurities of sugar cane, in order to produced special sugar cane juice, natural color, most of the consumers like to, and keeping for a long time. The implementation of this research by giving additional ascorbic acid :0%, 0.05%, 0.10% and 0.15%, egg albumin flocculant (2 eggs for each sugar cane juce per litre); sterilization at 70°C, filtration, pasterurilization at 121°C during 5 minutes, storage in room and cold chamber temperature. The result of the optimal research shows that the process of this study which gives 0.10% ascorbic acid as the additional essence, bright yellowish color, specific taste of fresh sugar cane that to be fond of panelist; pH 5.11; ascorbic acid content 51.8 mg/100 ml; sugar content 16.6%; turbidity 11.08 FTV; color 8.07 Pt.Co; metals pollution(Pb,Cu and Zn) with microbiologis pollution(ALT,coliform and yeast/mold) are fulfill the standard grade of drink. It,s still in good and worthy for more than one (1) year in the cold chamber/refrigerator and of course 2.5 months in the room storage. The implementation of this research can be aplicated in the small scale of industry.

Keywords : *Sugar cane, purification, bottling and sterilization*

Penelitian/Research

PRODUKSI BIODIESEL DARI BAHAN BAKU MINYAK JELANTAH DENGAN MENGGUNAKAN ABU TANDAN AREN SEBAGAI KATALIS

Production Biodiesel of Used Cooking Oil by Using Palm Sugar Bunches Ash as Catalyst

Rizal Alamsyah, Enny Hawani Lubis dan Susi Heryani

Balai Besar Industri Agro (BBIA), Jl. Ir. H. Juanda No.11 Bogor 16122

ABSTRACT: Research on production biodiesel of used cooking oil by using palm sugar bunches ash as catalyst has been conducted. This research was aimed at investigating to the variation of transesterification time (2, 3 and 4 hours) by adding 5% palm sugar bunches ash catalyst. The result of transesterification show the use of palm sugar bunches which is uncomposted give better result than the used of composted in term of kinematic viscosity value. For other parameter (acid value, glycerol total contain, ester value) using either composted or non composted give biodiesel that meet biodiesel requirement No. 04-7182-2006. Based on the research, it could be concluded that 2 hours transesterification using non composted catalyst give biodiesel requirement with yield of metil ester 87,90% and acid value 0,73 mg KOH/g, kinematic viscosity 2,39 cSt, glycerol total contain 0,128 (%b/b) and ester content 98,72 (%b/b). While a composted catalyst give kinematic viscosity value between 1,69 – 1,98, that is not meet biodiesel requirement (2,3 – 6,0 cSt)

Keyword : *Used cooking oil, palm sugar bunches ash catalyst, transesterification, biodiesel*

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**STUDI PEMBUATAN ARANG DAN VINEGAR BAMBU DENGAN MENGGUNAKAN
TUNGKU PIROLISIS SKALA SEMI KOMERSIAL**

The Study of Making Bamboo Charcoal and Vinegar using Pyrolysis Kiln of Semi Commercial Scale

H. G. Pohan, Hendra Wijaya dan Ade Suherman

Balai Besar Industri Agro (BBIA)
Jalan Ir.H.Juanda No 11, Bogor 16122

ABSTRACT: Study on production of bamboo charcoal and vinegar have been carried out semi commercially using pyrolysis furnace with a volume of 6 m³. The results of this study is expected to be a model of processing bamboo charcoal and vinegar for rural area. Observations were made on the characteristics of pyrolysis, yield of charcoal and bamboo vinegar, and characteristics of charcoal i.e., water content, ash, volatile matter, fixed carbon, calories, and pH. The bamboo raw material availability and techno-economical analysis were also conducted. The study revealed that the temperature of the out coming gas during the pyrolyzation process was 300 to 350 °C, the average yield of charcoal and vinegar were 27.33% and 33.61% respectively. The resulted bamboo charcoal has water content of 3.06%, volatile matter at 950 °C was 40.03% (wb), ash content was 7.2% (wb), fixed carbon of 52.37% (wb) and calorific value of 5777 cal/g. The resulted bamboo vinegar has pH 4 and its refractive index was ranged from 3.25 - 3.75. The availability of raw material bamboo in the Village at Desa Tenjojaya, Kecamatan Cibadak Kabupaten Sukabumi, within the radius of 4 km was 3620 ton, while the possible selling price of the resulted charcoal was Rp. 3.000.-/kg whereas the vinegar was Rp 5.000.-/kg. The techno-economical analysis of the processing unit of bamboo charcoal and vinegar with the capacity of 10 tons of charcoal per month revealed the Net Present Value (NPV) of Rp 596.000.000,- , the Internal Rate of Return (IRR) of 78 % or Pay-back period was 1.3 years.

Keywords: *furnace, pyrolyzation process, charcoal, vinegar, raw material availability analysis, market analysis and techno-economic analysis*

PATI RESISTEN: STRUKTUR, PREPARASI, DAN EFEK FISIOLOGISNYA

Resistant Starch (RS): Formation, Preparation, and Its Physiological Effects

Yuliasri Ramadhani Meutia

Balai Besar Industri Agro
Jl. Ir. H. Juanda 11 Bogor. 16122

ABSTRACT : Resistant starch (resistant starch - RS) is one kind of starch which resistant to amylase enzyme activity. The interesting thing of this starch is the RS that can be used as a source of dietary fiber, and it has several advantages compared with traditional dietary fiber in their application in various food products, such as it can be applied as a texture modifier in baked products as well as a crisping agent. RS can be prepared through heat treatment, enzyme treatment, the combination of heat and enzyme treatment, as well as by chemical treatment using distarch phosphate ester compounds. Along with increasing public attention to health, RS plays important role as functional foods, acts as a component of dietary fiber, prebiotic, preventing colon cancer, and has a hypoglycemic effect, as well as hypocholesterolemic effects.

Keywords: *Resistant starch (RS), functionally, formation, preparation, digestibility, physiological effects*