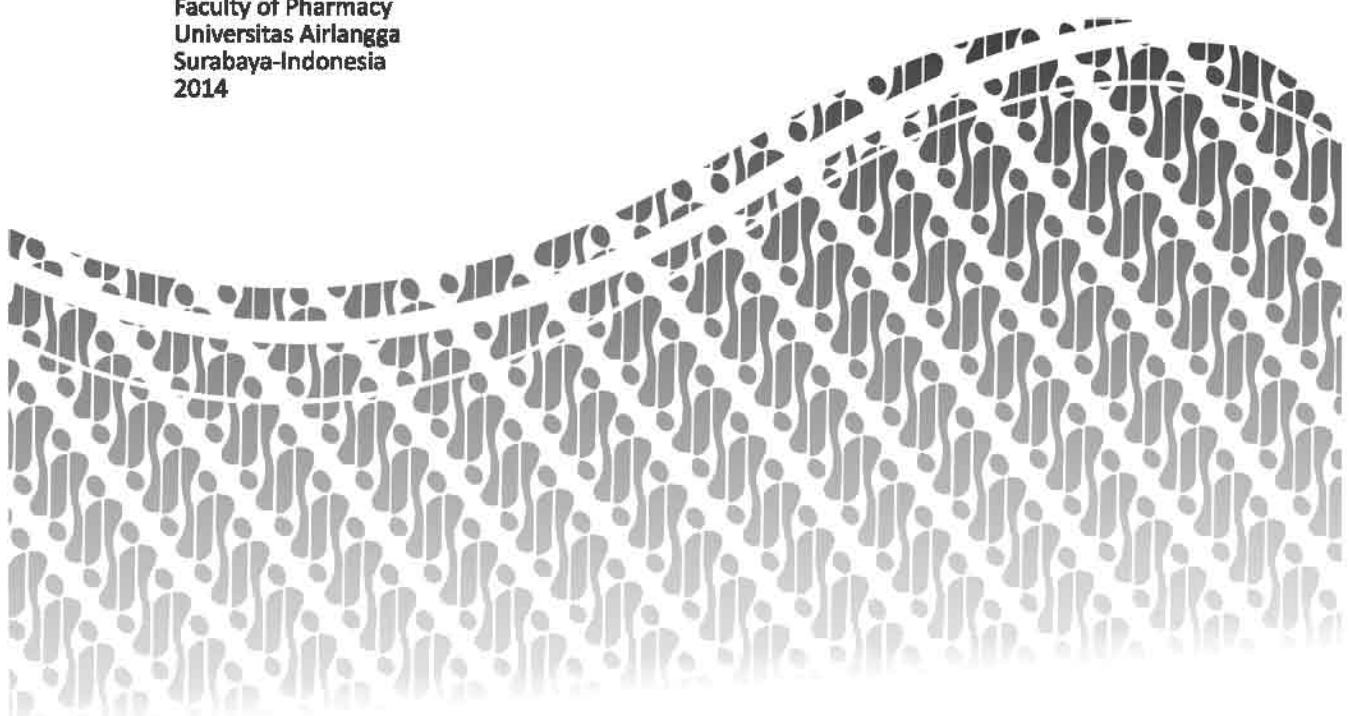


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PREFACE From Chairman

It is our pleasure to present you the proceedings of The 1st International Conference on Pharmaceutics and Pharmaceutical Sciences (ICPPS) organized by The Faculty of Pharmacy Universitas Airlangga Surabaya Indonesia.

The proceeding was produced based on papers and posters presented at The 1st International Conference on Pharmaceutics and Pharmaceutical Sciences (ICPPS), held in Surabaya, Indonesia, 14-15 November 2014.

The proceeding clearly reflects broad interest, from the participants that coming from all around the world.

The papers presented were pharmaceutics and biopharmaceutics; requirements on how to evaluate molecules in discovery and their appropriateness for selection as potential candidate; their development in context of challenges and benefits, together with associated time and cost implications and also requirements to progress through pre-clinical and clinical.

In this an opportunity, I would like to express my appreciation to the editorial team of the proceeding who have been working hard to review manuscripts, and making the first edition of this proceeding be possible.

I would like also to thanks to all invited speakers and presenters who participated in The 1st International Conference on Pharmaceutics and Pharmaceutical Sciences (ICPPS) and your contribution to this proceeding.

Finally, I hope this proceeding will give contribution to the Pharmaceutics and Pharmaceutical Sciences research.

Chairman,

Dra. Esti Hendradi, MSI., Ph.D., Apt

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TABLE of CONTENT

Preface from Chairman

Committee	ii
Table of Contents	iii
Author Index	iii

AUTHOR INDEX

COMPARISON OF SODIUM STARCH GLYCOLATE AND CROSSCARMELLOSE SODIUM AS SUPERDISINTEGRANT IN MEFENAMIC ACID FAST DISINTEGRATING TABLET Adeltrudis Adelsa D, Oktavia Eka Puspita, Amalia Ayuningtyas, Marulita Isadora	1
STUDY EXPRESSION OF HUMAN ERYTHROPOIETIN EXPRESSION IN MAMMALIAN CELL Adi Santoso, Popi Hadiwisnuwardhani, Yana Rubiana, Yulaika Romadhani, Endah Puji Septisetyani, Dyaningtyas D.P. Putri	4
ANTIOXIDANT STABILITY ASSAY OF ALPHA TOCOPHERYL ACETATE IN SOLID LIPID NANOPARTICLE SYSTEM (LIPID BASE BEESWAX AND MONOSTEARIC GLISERYL 50:50) Anggie Widhi, Noorma Rosita, Widji Soeratri	8
A BIOACTIVE <i>BOVINE HYDROXYAPATITE</i> –GELATIN IMPLANT FOR IN VITRO GENTAMICIN RELEASE Aniek Setiya Budiatin, M. Zainuddin, Junaidi Khotib, Diah Himawati	13
EFFECT OF COMPARISON SURFACTANT AND COSURFACTANT IN WATER/OIL MICROEMULSION IN RELEASE OF OVALBUMIN Microemulsion Water/Oil with Surfactant (Span 80-Tween 80) : Cosurfactant (Ethanol) =5:1, 6:1, and 7:1 Anisa Rizki Amalia, Riesta Primaharinastiti, Esti Hendradi	18
ANALYSIS OF MYCOLIC ACIDS CLEAVAGE PRODUCT OF <i>Mycobacterium tuberculosis</i> BY GAS CHROMATOGRAPHY-FLAME IONIZATION DETECTOR Asri Darmawati, Deby Kusumaningrum, Isnaeni, Muhamad Zainuddin	21
PERIPLASMIC EXPRESSION OF GENE ENCODING ANTI-EGFRvIII SINGLE-CHAIN VARIABLE FRAGMENT ANTIBODY USING PeIB LEADER SEQUENCE IN <i>ESCHERICHIA COLI</i> Kartika Sari Dewi, Debbie Sofie Retnoningrum, Catur Riani, Asrul Muhamad Fuad	24
IN VIVO ANTIMALARIAL ACTIVITY OF ETHANOL EXTRACT AND ETHYL ACETATE FRACTION OF <i>Alectryon serratus</i> LEAVES ON <i>Plasmodium berghei</i> INFECTED MICE Aty Widyawaruyanti, Uswatun Khasanah, Lidya Tumewu, Hilkatul Ilimi, Achmad Fuad Hafid, Indah S Tantular	30
PROFILE OF COMMUNITY PHARMACISTS KNOWLEDGE IN PATIENT ASSESSMENT WITH INFLUENZA SYMPTOMS AND ITS PRODUCTS Azza Faturrohmah, Arie Sulistyarini, Ana Yuda	33

SOLUBILITY AND DISSOLUTION STUDY OF KETOPROFEN – HIDROXYPROPYL- β -CYCLODEXTRIN INCLUSION COMPLEX (Prepared by Kneading Method) Bambang Widjaja, Achmad Radjaram, Arafah Zulhana	37
FORMULATION AND STABILITY TESTING OF MELOXICAM SOLID DISPERSION GEL Budipratiwi Wisudyaningsih, Inka Dewi Nur Anggaraini, Fersiya Wardani	40
EFFECT OF MENTHOL AS PENETRATION ENHANCER TO DICLOFENAC SODIUM MEMBRANE-TYPED TRANSDERMAL PATCH CHARACTERIZATION Destria Indah Sari, Esti Hendradi, Junaidi Khotib	43
PHYSICAL CHARACTERISTICS AND RELEASE STUDY OF OVALBUMIN FROM ALGINATE MICROSPHERES PREPARED BY DIFFERENT CONCENTRATION OF ALGINATE AND BaCl ₂ USING AEROSOLIZATION TECHNIQUE Dewi Melani Hariyadi, Tristiana Erawati, Sisilia Ermawahyuningtyas	46
MUCOADHESIVE TABLET OF ETHANOLIC EXTRACT OF SAMBILOTO (<i>Andrographis paniculata</i>) AS ANTIDIABETIC USING CHITOSAN Dhadhang Wahyu Kurniawan, Hening Pratiwi, and Lingga Ikaditya	50
PHYSICAL INTERACTION STUDY OF IBUPROFEN-STEARIC ACID BINARY MIXTURE Diajeng Putri Paramita, Dwi Setyawan, Dewi Isdiartuti	59
MOLECULAR MODELING AND SYNTHESIS OF 1-(3,4-Dichlorobenzoyl)-1,3-dimethylurea Dian Agung Pangaribowo, Siswandono, Bambang Tri Purwanto	63
EXPRESSION OF RECOMBINANT HUMAN GRANULOCYTE-COLONY STIMULATING FACTOR WITHIN PERIPLASMIC COMPARTMENT OF <i>Escherichia coli</i> USING PeIB LEADER PEPTIDE Dian Fitria Agustiyanti, Asrul Muhamad Fuad	66
EVALUATION OF ANTIHYPERURICEMIC ACTIVITY FROM BULBS OF BAWANG TIWAI (<i>Eleutherine palmifolia</i> (L.) Merr.) BY IN VITRO AND IN VIVO STUDIES Dian Ratih Laksmiawati, Rininta Firdaus, Yulinda, Mediana Astika	72
ANTIOXIDANT ACTIVITY OF 96% ETHANOL EXTRACT OF COMBINATION OF STRAWBERRY FRUIT (<i>Fragaria x ananassa</i> Duch.) AND STARFRUIT (<i>Averrhoa carambola</i> L.) USING ABTS FREE RADICAL SCAVENGING METHOD Diana Serlahwaty, Indira Natalia Timang	76
ENHANCEMENT OF SOLUBILITY AND DISSOLUTION ATORVASTATIN BY MICROCRYSTALLIZATION METHOD Dolih Gozali, Yoga Windu Wardhana, Ronny Tandela	79
<i>IN VITRO</i> ANTIMALARIAL ACTIVITY OF DICHLOROMETHANE SUB-FRACTION OF <i>Eucalyptus globulus</i> L. Stem AGAINST <i>Plasmodium falciparum</i> Elis Suwarni, Achmad Fuad Hafid, Aty Widyawaruyanti	86
<i>Arcangelisia flava</i> INCREASES RATS' LEUKOCYTES BUT HAS BIPHASIC EFFECT ON RATS' LYMPHOCYTE Endah Puspitasari, Evi Umayah Ulfa, Vita Ariati, Mohammad SulthonHabibi	89

IN VITRO ANTIMALARIAL ACTIVITY OF CHLOROFORM SUBFRACTION OF SALAM BADAK LEAVES
(*Acmena acuminatissima*)

Erna Cahyaningsih, Achmad Fuad Hafid, Aty Widayawaruyanti 92

CHARACTERIZATION OF DOSAGE FORM AND PENETRATION DICLOFENAC SODIUM WITH
MICROEMULSION SYSTEM IN HPMC 4000 GEL BASE (Microemulsion W/O with ratio use of surfactant
Span 80 – Tween 80 : Cosurfactant Ethanol 96% = 6:1)

Esti Hendradi, Tutiek Purwanti, Karina Wahyu Irawati 95

CONSTRUCTION AND VALIDATION OF THE STRUCTURE-BASED VIRTUAL SCREENING PROTOCOLS
WITH PDB CODE OF 3LN1 TO DISCOVER CYCLOOXYGENASE-2 INHIBITORS

Mumpuni E, Nurrochmad A, Pranowo HD, Jenie UA, Istyastono EP 99

VALIDATED UV SPECTROPHOTOMETRIC METHOD FOR THE DETERMINATION OF ASPIRIN IN RABBIT
PLASMA : APPLICATION TO BIOAVAILABILITY STUDY OF ASPIRIN MICROCAPSULE IN RABBIT

Faizatul, Novi yantih, Teguh Iman Saputra 102

EFFECT OF COMPARISON OF SURFACTANT AND COSURFACTANT W/O MICROEMULSION OVALBUMIN
WITH SOYBEAN OIL TO PHYSICOCHEMICAL CHARACTERIZATION (w/o Microemulsion with Surfactant
Span 80- Tween 80 : Cosurfactant Ethanol 96% = 5:1; 6:1 and 7:1)

Farida Mutiara Sari, Riesta Primaharinastiti, Esti Hendradi 105

pH INFLUENCE IN DESALTING PROCESS OF CRUDE PERTUSSIS TOXIN (PT) AND FILAMENTOUS
HEMAGGLUTININ (FHA) PURIFICATION FROM *Bordetella pertussis* BY SEPHADEX G-25 COLUMN
CHROMATOGRAPHY

Faris Adrianto, Esti Hendradi, Neni Nurainy, Isnaeni 108

SEPARATION OF COSMETIC PRESERVATIVES USING SILICA-BASED MONOLITHIC COLUMN

Febri Annuryanti, Riesta Primaharinastiti, Moch. Yuwono 111

PREPARATION AND CHARACTERIZATION OF TELMISARTAN-CITRIC ACID CO-CRYSTAL

Fikri Alatas, Hestiary Ratih, Sundani Nurono Soewandhie 114

PATIENTS' AND CAREGIVERS' LIQUID MEDICATION ADMINISTRATION ERRORS

Gusti Noorizka Veronika Achmad, Gesnita Nugraheni 117

THE POTENCY OF CANARIUM OIL (*Canarium indicum*) AS A MATERIAL FOR STRUCTURED LIPID
PRODUCTION

Hamidah Rahman, Johnner P Sitompul, Kusnandar Anggadiredja, Tutus Gusdinar 121

EFFECT OF TREHALOSE ON THERMAL PROPERTIES OF PHOSPHOLIPID-DDA AND TPGS MIXTURES

Helmy Yusuf 124

PREPARATION AND CHARACTERIZATION OF FLUKONAZOLE- β -CYCLODEXTRIN INCLUSION COMPLEXES

Hestiary Ratih, Fikri Alatas, Erin Karlina 127

ISOLATION AND IDENTIFICATION OF ANTIOXIDANT COMPOUND BY BIOPRODUCTION OF
ENDOPHYTIC FUNGI OF TURMERIC (*Curcuma longa* L.) ISOLATE CL.SMI.RF11

Hindra Rahmawati, Bustanussalam, Partomuan Simanjuntak 130

MODIFICATION PROCESS OF NATURAL CASSAVA STARCH : THE STUDY OF CHARACTERISTICS AND PHYSICAL PROPERTIES Prasetia, Jemmy A, C.I.S. Arisanti, N.P.P.A. Dewi, G.A.R. Astuti, N.W.N Yulianingsih, I M.A.G. Wirasuta	133
DRUG USE PROFILE OF DIABETIC PATIENTS IN EAST SURABAYA PRIMARY HEALTH CARE I Nyoman Wijaya, Azza Faturrohmah, Ana Yuda, Mufarriha, Tesa Geovani Santoso, Dina Kartika, Hikmah Prasasti N, Whanni Wido Agustin	136
GLYCINE MAX DETAM II VARIETY AS PREVENTIVE AND CURATIVE ORGAN DAMAGE DUE TO EXPOSURE TO ,LEAD (Pb) Rika Yulia, Sylvan Septian Ressandy, Gusti Ayu Putu Puspikaryani, I Putu Agus Yulyastrawan, Dewa Ayu Kusuma Dewi	142
AN ACTIVITY TEST OF MATOA LEAVES EXTRACT AS HEART RATE FREQUENCY REDUCTION WITH ADRENALINE INDUCTION Ika Purwidyaningrum, Elin Yulinah Sukandar, Irda Fidrianny	144
EFFORT TO REDUCE COMPRESSIBILITY OF RAMIPRIL THROUGH CRYSTAL ENGINEERING Indra, Sundani N Soewandhi	147
IN VITRO ALPHA-GLUCOSIDASE INHIBITORY ACTIVITY OF ETHANOLIC LEAF EXTRACT AND FRACTIONS OF <i>Rauvolfia serpentina</i> (L.) Benth. ex Kurz Julie Anne D. Bolaños, Ivan L. Lawag	150
PERIPLASMIC EXPRESSION OF GENE ENCODING ANTI-EGFRvIII SINGLE-CHAIN VARIABLE FRAGMENT ANTIBODY USING PeIB LEADER SEQUENCE IN <i>Escherichia coli</i> Kartika Sari Dewi, Debbie Sofie Retnoningrum, Catur Riani, Asrul Muhamad Fuad	153
CHARACTERIZATION AND LD ₅₀ VALUE DETERMINATION OF 1,5-bis(3'-ethoxy-4'-hydroxyphenyl)-1,4-pentadiene-3-one (EHP) Lestari Rahayu, Septian, Esti Mumpuni	159
DEVELOPMENT OF MELOXICAM TRANSDERMAL MATRIX TYPE PATCH USING POLYVINYLPIRROLIDONE, HYDROXYPROPYL METHYLCELLULOSE, AND ETHYL CELLULOSE COMBINATION Lidya Ameliana, Monica Iwud, Selly Rio	162
ANTIHEPATITIS C VIRUS ACTIVITY SCREENING ON <i>Harpullia arborea</i> EXTRACTS AND ISOLATED COMPOUND Lidya Tumewu, Evhy Apryani, Mei Ria Santi, Tutik Sri Wahyuni, Adita Ayu Permanasari, Myrna Adianti, Chie Aoki, Aty Widyawaruyanti, Achmad Fuad Hafid, Maria Inge Lusida, Soetjipto, Hak Hotta.....	165
HPLC METHOD PRECISION TO ASSAY OF A-MANGOSTIN IN Mangosteen (<i>Garcinia mangostana</i> L.) FRUIT RIND EXTRACT FORMULATED IN ORAL SOLUTION Lilie Nurhidayati, Siti Sofiah, Ros Sumarny, Kevin Caesar	168

PREPARATION AND CHARACTERIZATION OF NARINGENIN-LOADED CHITOSAN NANOPARTICLES FOR CHEMOPREVENTION

Lina Winarti, Lusia Oktora Ruma Kumala Sari 170

RELATIONSHIP OF KNOWLEDGE AND PATIENT BEHAVIOR ON SELF MEDICATION PIROXICAM (Studies of Pharmacy in Sukun District , Malang City)

Liza Pristianty, Reshtia Eriana Putri, Hidayah Rachmawati 173

EFFECT OF CHRONIC USE OF ENERGY DRINK ON KIDNEY

Mahardian Rahmadi, Zamrotul Izzah, Mareta Rindang A, Aniek Setya B, Suharjono 176

SCREENING OF SURFACE MODIFIERS TO PRODUCE STABLE NANOSUSPENSION : A GENERAL GUIDANCE

Maria Lucia Ardhani Dwi Lestari 179

DEVELOPMENT OF SIMPLE POLYPHENOL SENSOR BASED ON SODIUM META PERIODATE AND 3-METHYL-2-BENZOTHAZOLINONE HYDRAZONE FOR COFFEE SAMPLES

Moch. Amrun Hidayat, Nindya Puspitaningtyas, Agus Abdul Gani, Bambang Kuswandi 181

VALIDATION OF AN HPLC ANALYTICAL METHOD FOR DETERMINATION OF LEVOFLOXACIN IN OPHTHALMIC PREPARATIONS

Mochamad Yuwono, Riasta Primaharinastiti, Ageng Teguh Wardoyo 184

VALIDATION OF SPECTROPHOTOMETRIC METHOD FOR ESTIMATION OF EPERISONE HYDROCHLORIDE IN TABLET DOSAGE FORM

Nia Kristiningrum, Diah Yuli Pangesti 187

ANTIOSTEOPOROTIC ACTIVITY OF 96% ETHANOLIC EXTRACTS OF ABELMOSCHUS MANIHOT L.MEDIK LEAVES AND EXERCISE ON INCREASING BONE DENSITY OF FEMALE MICE'S FEMORAL TRABECULAR

Niliestria Ayu Faramitha Sholikhah 190

EFFECT OF -CYCLODEXTRIN ON SPF VALUE AND INHIBITION OF KOJIC ACIDSTYROSINASE ACTIVITY IN VANISHING CREAM BASE FORMULATION (ON SUNSCREEN PRODUCT CONTAINED OXYBENZONE)

Noorma Rosita, Diana, Diana Winarita, Tristiana Erawati, Widji Soeratri 193

ANTIMICROBIAL ACTIVITY OF LACTOBACILLI PROBIOTIC MILK AND GUAVA LEAF ETHANOLIC EXTRACT (Psidium guajava) COMBINATION AGAINST BACTERIAL CAUSE OF DIARRHEA

Nur Putri Ranti, Isaeni, Juniar Moechtar, Febri Annuryanti 197

THE INFLUENCES OF PARTICLE SIZE AND SHAPE ON ZETA POTENTIAL OF COENZYME Q10 NANOSUSPENSION

Nuttakorn Baisaeng 200

SYNTHESIS, MOLECULAR DOCKING, AND ANTITUMOR ACTIVITY OF N,N'-Dibenzoyl-N,N'-Dimethylurea AGAINST HUMAN BREAST CANCER CELL LINE (MCF-7)

Nuzul Wahyuning Diyah 203

EXPRESSION OF ANTI-EGFRVIII SINGLE CHAIN FRAGMENT ANTIBODY (SCFV) ON THE SURFACE OF PICHIA PASTORIS

Pratika Viogenta, Asrul Muhamad Fuad, Suharsono 206

SUBCLONING OF <i>csf3syn</i> (COLONY STIMULATING FACTOR-3) GENE INTO pGAPZ? AND TRANSFORMATION OF RECOMBINANT VECTOR INTO <i>PICHIA PASTORIS</i> Prety Ihda Arfia, Asrul Muhamad Fuad	212
THE USE OF PERICARP MANGOSTEEN (<i>Garcinia mangostana</i> L.) EXTRACT IN FORMULATION OF CREAM-TYPE O / W Rahmah Elfiyani, Naniek Setiadi Radjab, Mia Sagita Sofyan	218
CHITOSAN BASED PARTICULATE CARRIER OF DITERPENE LACTON OF SAMBILOTO PREPARED BY IONIC GELATION-SPRAY DRYING :EFFECT OF STIRRING RATE AND NOZZLE DIAMETER Retno Sari, Titin Suhartanti, Dwi Setyawan, Esti Hendradi, Widji Soeratri	222
GAS CHROMATOGRAPHY-MASS SPECTROMETRY METHOD VALIDATION FOR PESTICIDES RESIDUES ANALYSIS IN FOOD USING QuEChERS KIT Riesta Primaharinastiti, Setyo Prihatiningtyas, Mochammad Yuwono	225
CHARACTERIZATION OF PARACETAMOL ORALLY DISINTEGRATING TABLET USING GELATIN 1% AND 2% AS BINDER AND POLYPLASDONE XL-10 10% AS DISINTEGRANT (Prepared by Freeze Drying Method) Roisah Nawatila, Dwi Setyawan. Bambang Widjaja	230
ANTIOXIDANT STUDY OF COSOLVENT SOLUTION OF MANGOSTEEN (<i>Garcinia mangostana</i> L.) RIND EXTRACT IN RATS BY USING MDA PARAMETER Ros Sumarny, Liliek Nurhidayati, Yati Sumiyati, Fransiska Diana Santi	233
SCREENING OF SELECTED PHILIPPINE ROOT CROPS FOR β -Glucosidase INHIBITION Sarah Jane S. Almazora, Ivan L. Lawag	236
NIOSOME EMULGEL FORMULATION AND STABILITY TEST OF CINNAMON (<i>Cinnamomum burmanii</i> Nees & Th. Nees) Bark ETHANOLIC EXTRACT AS ANTIOXIDANT Sasanti Darijanto, Fidriani Irda, Widhita P.A.S	239
THEOPHYLLINE RELEASE FROM SUSTAINED RELEASE TABLET USING LACTOSA AND PVP K30 AS A CHANELLING AGENT Sugiyartono, Retno Sari, Agus Syamsur Rijal, TriMulyani, Agustina Maharani	242
EFFORTS TO PRODUCE 1-(BENZOYLOXY)UREA AS ANTICANCER DRUG CANDIDATE Suko Hardjono	245
DEVELOPMENT OF PEGylated RAPAMYCIN LITHOCHOLIC ACID MICELLE FOR CANCER THERAPY Aran Tapsiri, Kanokwan Jaiprasert, Rungtip Nooma, Awadsada Sukgasem, Supang Khondee	248
FEASIBILITY OF ORAL IMMUNIZATION AGAINST JAPANESE ENCEPHALITIS VIRUS USING CHITOSAN PARTICLES Supavadee Boontha, Worawan Boonyo, Hans E. Junginger, Tasana Pitaksuteepong, Netti Waranuch, Assadang Polnok, Narong Nitatpattana, Sutee Yoksan	251

THE INFLUENCE OF HYDROXY GROUP AT ORTHO (o) AND PARA (p) POSITIONS ON METILBENZOAT AGAINST SYNTHESIS OF HIDROKSIBENZOAHIDRAZIDA DERIVATIVES Suzana, Adita R, Melanny Ika .S, Juni Ekowati, Marcellino Rudyanto, Hadi Poerwono, Tutuk Budiati	254
ANTIOXIDANT ACTIVITY TEST OF BEE PROPOLIS EXTRACT (Apis mellifera L.) USING DPPH (1,1-diphenyl-2-picrilhidrazy) FREE RADICALS SCAVENGING ACTIVITY Titiek Martati, Shahyawidya	258
CAPSULE FORMULATION and EVALUATION COMBINATION OF AQUEOUS EXTRACT OF Phaleria's (Phaleria macrocarpa (Scheff Boerf)) FRUITS and LEAVES as ANTIHIPERTENSIVE AGENT Titta H Sutarna, Sri Wahyuningsih, Julia Ratnawati, Fahrouk P, Suci Nar Vikasari, Ita Nur Anisa	260
MANUFACTURE AND CHARACTERIZATION OF SOLID DISPERSION GLIKLAZID- PVP K90 Titta H Sutarna, Fikri Alatas, Cicih Ayu Ningsih	264
ANTI-INFLAMMATORY ACTIVITY OF PARA METHOXY CINNAMIC ACID (PMCA) IN NANOEMULSION USING SOYBEAN OIL Tristiana Erawati M, Anneke Indraswari P, Nanda Ghernasih N.C, Noorma Rosita, Suwaldi Martodihardjo, Widji Soeratri	266
PHYSICAL CHARACTERISTICS AND PENETRATION OF DICLOFENAC SODIUM NIOSOMAL SYSTEM USING SPAN 20 AND SPAN 60 Tutiek Purwanti, Esti Hendradi, Noverika A. Putri, Nurtya J. Devi	271
FORMULATION AND CHARACTERISZATION OF JUICE OF LIME GEL USING CMC-Na BASE Uswatun Chasanah, Esti Hendradi, Inayah	275
HEPATOPROTECTIVE ACTIVITY OF Bidens pilosa L. IN CARBON TETRACHLORIDE INDUCED HEPATOTOXICITY IN RATS Vina Alvionita Soesilo, C.J. Soegihardjo	278
CYTOTOXIC ACTIVITY ASSAY AGAINTS HELA CELL LINES OF NOVEL ANTICANCER DRUG : N-(PHENYL CARBAMOYL) ISOBUTIRAMIDE Wimzy Rizqy Prabhata, Tri Widiandani, Siswandono	284
SIMPLE STEPS PURIFICATION OF RECOMBINANT HUMAN ERYTHROPOIETIN PRODUCED IN CHINESE HAMSTER OVARY CELL CULTURE Yana Rubiyana, Endah Puji Septisetyani, Adi Santoso	287
KINETICS STUDY COCRYSTALS KETOCONAZOLE-SUCCINIC ACID PREPARED WITH SLURRY METHOD BASED ON POWDER X-RAY DIFFRACTION (PXRD) Yuli Ainun Najih, Dwi Setyawan, Achmad Radjaram	290
CONSTRUCTION OF RECOMBINANT IMMUNOTOXIN Anti-EGFRvIII scFv::HPR FUSION PROTEIN AND INDUCIBLE EXPRESSION IN Pichia pastoris AS A TARGETED DRUG CANDIDATE Yuliawati, Asrul Muhamad Fuad	297
ALTERED PHARMACOKINETIC OF LEVOFLOXACIN BY COADMINISTRATION OF ATTAPULGITE Zamrotul Izzah, Toetik Aryani, Amalia Illiyyin, Budi Suprpti	303



CHITOSAN BASED PARTICULATE CARRIER OF DITERPENE LACTON OF SAMBILOTO PREPARED BY IONIC GELATION-SPRAY DRYING :EFFECT OF STIRRING RATE AND NOZZLE DIAMETER

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INTRODUCTION

Chitosan, a cationic polysaccharide has many advantages as carrier for drug delivery system such as biocompatible, biodegradable and non toxic. Chitosan has amino group that could be crosslinked with polyanion such as tripolyphosphate so that the active ingredient will be entrapped (Agnihotri, 2004, Sinha, 2004). Diterpene lactone fraction of sambiloto (*Andrographis paniculata*) has antimalarial activity but it has low solubility in water. Entrapped diterpene lactone into chitosan matrix could improve the bioavailability of the active substance.

The aim of this research is to investigate the effect of process parameter of chitosan carrier preparation : stirring rate (500 rpm and 1000 rpm) during ionic gelation and nozzle diameter (0.5 mm and 1.0 mm) of spray dryer on physical characteristics of diterpene lactone fraction-chitosan particles. Evaluation of morphology, thermal analysis and drug entrapment were conducted.

EXPERIMENTAL METHODS

Material and Methods

Material

Diterpene lactone fraction of sambiloto was obtained from Department of Pharmacognosy and Phytochemistry, Faculty of Pharmacy, Airlangga University, chitosan with deacetylation degree 85% was purchased from Biotech Surindo, Natrium tripolyphosphate, pro analysis grade from Nacalay Tesque. All other reagents used in this experiment were pro analysis grade.

Preparation of chitosan particles

Independent variable	Nozzle diameter	
Stirring speed	1.0 mm	0.5 mm
500 rpm	P1	P3
1000 rpm	P2	P4

Chitosan was dissolved chitosan inof 0,15% acetic acid to make 0,1% chitosan solution. Preparation of diterpen lactone - chitosan particles was done by mixing chitosan solution and diterpene lactone fraction solution and then 0,1%tripolyphosphatesolution was added while stirring with two stirring speed.. The mixture was continuously stirred with magnetic stirrer for 2 hours. Subsequently the mixture was dried with Labplant SD-Basic Spray Dryer at 100°C, flow rate 5 ml/min, pressure 2 bar with two different nozzle diameter. The ratio of drug-chitosan-TPP was 4:10:8.

Evaluation of nanoparticles morphology

The particles was evaluated by Scanning Electron Microscopy (SEM) FEI Inspect S50. Particles were dried and coated with gold palladium and then observed for its shape and surface morphology.

Thermal analysis

Thermal analysis for diterpen lactone fraction of sambiloto, chitosan and nanoparticles was performed with Differential Thermal Analyzer (DTA) Metler Toledo FP 85. Samples were scanned from 50 to 250°C at a rate of 10°C/min.



shows the fifth formula cream had separation but the high separation in each formula were different forms. The higher the concentration of combination between Tween 80 and Span 80 (1: 1) were used resulting in lower sedimentation. This happens because the higher concentration of emulsifier were used, the ability to form a film coating will be greater so as to minimize the occurrence of phase separation.

CONCLUSION

Increasing the concentration of combination between Tween 80 and Span 80 (1: 1) can increase the viscosity of the cream so as to minimize the occurrence of phase separation, thereby improving physical stability cream of viscous extract of pericarp mangosteen (*Garcinia mangostana* L.). Formula cream of viscous extract of pericarp mangosteen that fulfill the physical stability is a cream formula with a concentration of combination between Tween 80 and Span 80 (1: 1) by 10% of the concentration range 2-10%.

REFERENCES

- Subroto, A.M. 2008. Real Food True Health. Agro Media. Ciganjur. page 73-74
- Trifena. 2012. Analisis Uji In Vitro dan In Vivo Ekstrak Kombinasi Kulit Manggis (*Garcinia mangostana* L.) dan Pegagan (*Centella asiatica* L.) Sebagai Krim Antioksidan. Tesis. FMIPA UI, Depok. page. 41, 55, 66.
- Lachman, L., Lieberman, H.A, Kanig, J.L. 1994. Teori dan Praktek Farmasi Industri II Edisi ke-3, Terjemahan: Siti Suyatmi. UI Press, Jakarta. Hlm. 1030, 1055, 1061, 1076-1079, 1080-1081, 1087.
- Kim, Cherng-ju. 2004. Advanced Pharmaceutics : Physicochemical Principles. CRC Press LLC, Florida. page 229 - 235
- Triantafillopoulos N. 1988. Measurement of Fluid Rheology and Interpretation of Rheograms Second Edition. Kaltec Scientific, Inc. USA. page. 4-5, 31.
- Martin, A., James, S., Arthur, C. 1993. Farmasi Fisik 2, Edisi Ketiga, Terjemahan : Yoshita. UI Press, Jakarta. page. 1077-1095, 1154-1161, 1164.

Entrapment efficiency (EE)

5 mg sample was dissolved in 10 ml of ethanol then filtered. Solution was analyzed by HPLC Agilent 1100 with mobile phase of methanol: phosphoric acid pH 3=50:50 at wavelength of 228 nm. The assays were performed in triplicate. The entrapment efficiency (EE) of diterpenelactone in chitosan nanoparticles was calculated by this equation :

$$EE = (\text{actual drug} / \text{theoretically drug}) \times 100\%$$

RESULTS

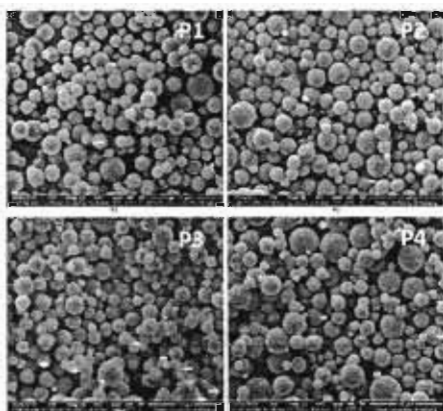


Figure 1 SEM micrographs of particles of diterpene lactone-chitosan prepared with different condition (mag 10.000x)

Sem photograph of particles diterpene lactone - chitosan (figure 1) showed that the particles have spherical shape and smooth surface with wide range particle size.

From DTA thermogram (Figure 2) it was indicated that endothermic peak of diterpene lactone appears at 222 °C and chitosan glass transition appears at 145.6 °C. Endothermic peak of diterpene lactone fraction was no longer exist in chitosan particulate system since it had been entrapped in chitosan matrix.



Figure 2. DTA thermogram of diterpene lactone (A), chitosan (B) and diterpene lactone-chitosan particles (C)

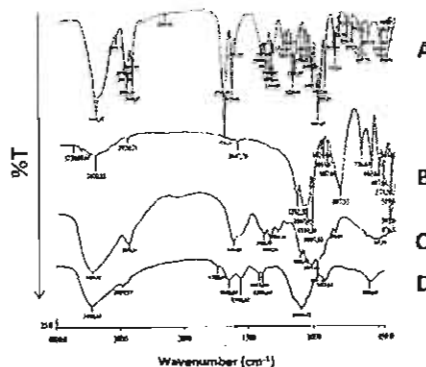


Figure 3. FTIR spectra of diterpene lactone (A), tripolyphosphate (B), chitosan (C), diterpene lactone-chitosan particles (D)

	Drug content ± SD (%)	EE ± SD (%)
P1	4.79 ± 0.04	26.36 ± 2.42
P2	3.84 ± 0.04	21.11 ± 2.04
P3	4.38 ± 0.02	24.12 ± 0.82
P4	3.82 ± 0.03	21.01 ± 1.69

Table 2. Drug content and Entrapment Efficiency (EE) of diterpene lactone-chitosan particles (n=3)

FTIR analysis was performed to confirm the crosslink interaction of chitosan and tripolyphosphate. Absorption band at 1643 cm⁻¹ attributed to amide bond of chitosan. New band at 1555 cm⁻¹ indicated hydrogen bond and 1643 cm⁻¹ band confirmed linkage between P3O5-5 of tripolyphosphate and NH3⁺ of chitosan (Figure 3).

From drug entrapment efficiency, it was known that as stirring speed increased from 500 rpm to 1000 rpm, the entrapment of drug become lower decrease from about 24-26% to 21% (Table 2). From statistical analysis of one way Anova with α 0.05, it was known that drug entrapment efficiency of particles prepared with different stirring rate was significantly difference since nozzle diameter didn't affect the entrapment efficiency.



CONCLUSION

The result showed that diterpen lactone – chitosan particles prepared by ionic gelation-spray drying with composition and condition in this study has spherical shape with wide range size from 400 nm to 4000 nm. Highest drug entrapment efficiency was obtained from particles prepared with 500 rpm stirring rate and 1,0 mm nozzle diameter.

REFERENCES

Agnihotri, S.A., Mallikarjuna, N.N., Aminabhavi, T.M., 2004. Recent advances on chitosan based micro-nanoparticles in drug delivery. *Journal of Controlled Release*, Vol. 100, p. 5-28

Amaro, M.I., Tajber, L., Corrigan, O.I., Healy, A.M., 2011. Optimisation of spray drying process conditions for sugar nanoporous microparticles (NPMPs) intended for inhalation. *International Journal Pharmaceutics*, Vol. 421 p. 99-109

Bhumkar, Devika R., Pokharkar, Varsha B.,

2006. Studies on effect of pH on cross-linking of chitosan with sodium tripolyphosphate: a technical note. *AAPS PharmSciTech*, Vol. 7, article S0.

Gupta, Vivek Kumar, Karar, P.K., 2011. Optimization of process variable for the preparation of chitosan/alginate nanoparticles. *International journal of pharmacy and pharmaceutical sciences*, Vol 3, Suppl 2, p. 78-80.

He, P., Davis, S.S., Illum, L., 1999. Chitosan microsphere prepared by spray drying. *International Journal of Pharmaceutics*, Vol. 187, p. 53-65.

Ko, J.A., Park, H.J., Hwang, S.J., Park, J.B., Lee, J.S., 2002. Preparation and characterization of chitosan microparticles intended for controlled drug delivery. *Int J Pharm*, Vol. 249, p. 165-174.

Sinha, V.R., A.K. Singla, S. Wadhawan, R. Kaushik, R. Kumria, K. Bansai, S. Dhawan. 2004. Chitosan Microspheres as a Potential Carrier for Drugs. *Int. J. Pharm.* Vol. 274, p. 1-33.