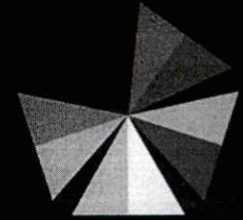


PROCEEDING



1st ICMHS

**1st International Conference
on Medicine and Health Sciences**

**Interprofessional Collaboration to Achieve
Sustainable Development Goals (SDGs)**

**Aug 31st-Sep 1st, 2016
Aston Hotel, Jember, East Java
Indonesia**



Hosted by:
Faculty of Pharmacy | Faculty of Dentistry |
Faculty of Medicine |
Faculty of Public Health | School of Nursing
University of Jember, Indonesia



*Membangun Generasi
Menuju Insan Berprestasi*

EDITORS

Ari Satia Nugraha, SF., GDipSc., MSc-res, Ph.D., Apt.

Lusia Oktora RKS, S.F., M.Sc., Apt.

Ika Puspita Dewi, S.Farm., M.Biomed., Apt.

Afifah Machclaurin, S.Farm., M.Sc., Apt.

Antonius Nugraha Widhi. Pratama, S.Farm., MPH., Apt.

CONFERENCE COMMITTEE

Steering Committee

Drs. Moh. Hasan., Ph.D (Rector of University of Jember)
Drs. Zulfikar, Ph.D (Vice Rector for Academic Affairs University of Jember)
Prof Drs Bambang Kuswandi, M.Sc., PhD
drg. Rahardyan Parnaaji, M.Kes., Sp.Pros.
dr. Enny Suswati, M.Kes.
Irma Prasetyowati, SKM., M.Kes.
Ns. Lantin Sulistyorini, S.Kep.,M.Kep.

Organizing Committee

Chairmain

Lestyo Wulandari, S.Si., M.Farm., Apt.

Secretary

Endah Puspitasari, S.Farm., M.Sc., Apt.

Treasurer

Yuni Retnaningtyas, S.Si., M.Si., Apt.
Nia Kristiningrum, M.Farm., Apt.

Secretariat, Publication, and Sponsorship Division

Eka Deddy Irawan, S.Si., M.Sc., Apt.
dr. Cicih Komariah Sp.M.
Anita Dewi Moelyaningrum, S.KM., M.Kes.
drg. Ayu Mas Hartini, Sp.PM.
Ns. Emi Wuri W., M.Kep., Sp.KepJ.

Event Division

Diana Holiday, S.F., M.Farm., Apt.
DR. drg. I Dewa Ayu Susilowati, M.Kes.
dr. Hairrudin, M.Kes.
DR. Farida Wahyuningtyas, SKM., M.Kes.
Ns. Wantiya, S.Kep., M.Kep.
dr. Ancah Caesarina Novi M., Ph.D.

Scientific Division (Editors)

Ari Satia Nugraha, SF., GDipSc., MSc-res, Ph.D., Apt.
Lusia Oktora RKS, S.F., M.Sc., Apt.
Ika Puspita Dewi, S.Farm., M.Biomed., Apt.
Afifah Machclaurin, S.Farm., M.Sc., Apt.
Antonius Nugraha Widhi. Pratama, S.Farm., MPH., Apt.
Dr. drg. Masniari Novita, M.Kes.
dr. Rini Riyanti, Sp.PK.
Yunus Ariyanto, S.KM., M.Kes
Ns. Achmad Rifa'i, M.S.

Logistic Division

Dwi Nurahmanto, S.Farm., M.Sc., Apt.

CONTENT

PREFACE	i
EDITORS.....	ii
CONFERENCE COMMITTEE	iii
CONTENT.....	iv
PHARMACY.....	1
COMMUNITY PHARMACISTS' COUNSELLING SKILLS ON OVER-THE-COUNTER (OTC) MEDICATIONS	2
FORMULATION AND OPTIMIZATION OF CAFFEINE NANOEMULSION USING FACTORIAL DESIGN STUDY.....	6
EFFECT OF COMBINATION SODIUM ALGINATE-GELATIN 1% : 2% CONTENT IN CHARACTERISTIC AND ANTIMICROBIAL ACTIVITY OF PROBIOTIC MICROSPHERES <i>Lactobacillus acidophilus</i>	10
ANTIDIABETIC ACTIVITY OF POWDER AND ETHANOLIC EXTRACT OF ANTLION (<i>Myrmeleon</i> sp.) ON WISTAR STRAIN WHITE MALE RATS WITH GLUCOSE PRELOAD	14
ANTIBACTERIAL AND ANTIBIOFILM POTENTIAL OF ETHANOLIC EXTRACT FROM BINTARO FLOWER (<i>Cerbera odollam</i>) AGAINST <i>Staphylococcus aureus</i> ATCC 6538.....	17
STRUCTURE MODIFICATION AND MOLECULAR MODELING OF 1-(BENZOYLOXY)UREA DERIVATIVES AS ANTICANCER DRUG CANDIDATES.....	20
CHARACTERIZATION AND THE RELEASE TEST OF ANTI-AGING TRETINOIN IN NANOEMULSION USING OLIVE OIL	23
EFFECT OF PARTICLE SIZE AND SURFACE CHARGE ON THE UPTAKE AND IMMUNE RESPONSE OF OVALBUMIN-ALGINATE MICROSPHERES	27
ANTIHYPERCHOLESTEROLEMIC EFFECT OF <i>Arcangelisia flava</i> STEM EXTRACT IN HYPERLIPIDEMIC RATS.....	31
GREEN TEA EXTRACT EFFECT ON BLOOD GLUCOSE LEVEL AND LIVER HISTOPATHOLOGY IN DIABETIC MICE	35
THREE-WAVELENGTH SPECTROPHOTOMETRIC METHOD VALIDATION FOR DETERMINATION OF PREDNISONE TABLET CONTAINING COLORING DYES	39
INFLUENCE OF OLEIC ACID ON THE IN VITRO PENETRATION OF DICLOFENAC SODIUM GEL	43
ANTIOXIDANT ACTIVITY OF METHANOL EXTRACTS FROM THE STEM BARK OF MANGROVE PLANT <i>Rhizophora mucronata</i>	47
PHYTOCHEMICAL AND ANTIOXIDANT ACTIVITY of MANGROVE PLANT <i>Sonneratia</i> sp.	51
EFFECT OF SOLID LIPID NANOPARTICLE (SLN) AND NANO STRUCTURE LIPID CARRIER (NLC) SYSTEM ON ANTIOXIDANT STABILITY OF TOMATO EXTRACT (LIPID: CETYL ALCOHOL AND ISOPROPYL MYRISTATE).....	55
EFFECTIVENESS OF BINTARO (<i>Cerbera odollam</i> Gaertn.) LEAF ETHANOLIC EXTRACT AGAINST <i>Staphylococcus aureus</i> IN-VITRO BIOFILM FORMATION	59

STUDY OF ANTIOXIDANT ACTIVITY COMBINATION OF ARABICA COFFEE LEAF ETHANOL EXTRACT AND ROSELLE FLOWER PETAL WATER EXTRACT.....	62
INHIBITORY EFFECT OF NON-POLAR AND SEMI-POLAR FRACTIONS OF ETHANOLIC EXTRACT OF <i>Guazuma ulmifolia</i> Lamk. LEAVES ON RAT PREADIPOCYTES PROLIFERATION AND DIFFERENTIATION	66
THE INFLUENCE OF PHARMACEUTICAL CARE SERVICES MODEL IN PRESCRIPTION DRUGS ON PHARMACIST'S BEHAVIOR IN PHARMACEUTICAL CARE	70
COCRYSTAL OF ATORVASTATIN CALCIUM – MALONIC ACID	75
IN SILICO STUDY OF ACRYLAMIDE TOXICITIES USING TOXTREE METHOD AND ITS ANALYSIS IN POTATO CHIPS USING HPLC METHOD.....	79
IMPACT OF CISPLATIN BASE CHEMOTHERAPY ON QUALITY OF LIFE IN INDONESIAN PATIENTS WITH CERVICAL CANCER	81
<i>Arcangelisia flava</i> LEAVES ETHANOLIC EXTRACT SUPPRESSES CANCER CELL LINES VIA NON APOPTOTIC PATHWAY.....	83
BANANA AND PLANTAIN AS MEDICINAL FOOD	87
FORMULATION AND OPTIMIZATION OF CARBOPOL AND ETHYL CELLULOSE AS FLOATING-MUCOADHESIVE SYSTEM OF DILTIAZEM HYDROCHLORIDE TABLET BY FACTORIAL DESIGN ..	92
DETERMINATION OF TOTAL PHENOLIC CONTENT AND ANTIOXIDANT ACTIVITY IN METHANOLIC EXTRACT OF ROBUSTA AND ARABICA COFFEE LEAVES.....	96
MICROBIAL ASSAY OF CYPROFLOXACIN IN A BONE IMPLANT (CHITOSAN –BOVINE HYDROXYAPATITE WITH CROSS-LINKER GLUTARALDEHYDE) TOWARDS <i>Staphilococcus aureus</i> ATCC25923	100
IN VITRO α -GLUCOSIDASE INHIBITORY ACTIVITY OF VARIOUS TEA (<i>Camellia sinensis</i> L.) EXTRACTS.....	104
B-CELL EPITOPE PREDICTION of <i>Mycobacterium tuberculosis</i> Ag85A ANTIGEN	108
EFFECT OF ETHANOLIC EXTRACT OF <i>Annona muricata</i> L SEEDS POWDER TO DECREASE BLOOD GLUCOSE LEVEL OF WISTAR MALE RATS WITH GLUCOSE PRELOAD.....	112
PROTEIN DENSITY AND QUALITY OF KORO KRATOK (<i>Phaseolus lunatus</i> L. Sweet) AND KACANG TUNGGAK (<i>Vigna unguiculata</i> (L.) Walp)	116
HYPERTENSION MANAGEMENT APPROACH THROUGH MODIFIABLE RISK FACTORS IN JEMBER REGION COMMUNITY HEALTH CENTER	121
ASSOCIATION BETWEEN AEROALLERGEN SENSITIZATION AND THE SEVERITY OF ASTHMA IN PEDIATRIC PATIENTS.....	126
ANALYSIS OF FACTORS THAT RELATED MATERNAL SEVERE PREECLAMPSIA TO THE ASPHYXIA OF NEW BORN BABY IN SOEBANDI HOSPITAL JEMBER REGENCY	130
AN ANALYSIS OF THE ASPECTS OF HEALTHCARE SERVICE QUALITY IN RELATION TO PATIENT LOYALTY	133
SYNERGISTIC COMBINATION OF <i>Curcuma xanthorrhiza</i> , <i>Ficus septica</i> AND DOXORUBICIN INHIBITS METASTASIS OF BREAST CANCER THROUGH INHIBITION MMP-9 ACTIVITY	137
ASSOCIATION BETWEEN IGE SERUM LEVEL AND SEVERITY OF ASTHMA IN CHILDREN	142

CORRELATION OF CD4 WITH TOTAL LYMPHOCYTE COUNTS IN HIV PATIENTS.....	145
DENTISTRY.....	148
Determinants of HIV/AIDS Awareness and Knowledge in Tanah Papua, Indonesia	149
THE ABILITY OF ANTI-INFLAMMATORY JATROPHA CURCAS LEAF EXTRACT AT COX-2 EXPRESSION ON MONOCYTES WERE EXPOSED LPS	154
NOVEL METHOD THYROID HORMONE MEASUREMENT	158
ROBUSTA COFFEE BEANS INCREASE LEVELS OF TNF- α AS A RESPONSE TO <i>Streptococcus</i> <i>mutans</i>	162
THE LEVELS OF TNF-A IN GINGIVAL CREVICULAR FLUID (GCF) OF OSING TRIBE WOMEN WITH OCCLUSAL DISHARMONY	165
Effects of Robusta Coffee Bean Extract (<i>Coffea robusta</i>) on the Viability of Neutrophils Exposed by <i>Porphyromonas gingivalis</i>	169
ROBUSTA COFFEE BEANS DECREASE OF INFLAMMATION IN DENTAL CARIES.....	173
The Progressive Low Chronic Inflammation on Oral Tissues In Elderly.....	177
DENTAL CARIES IN PREGNANT WOMEN WHO VISITED POSYANDU OF SEVERAL PUBLIC HEALTH CENTERS IN JEMBER.....	182
Role of Chemoattractant Chemokine (SDF-1/CXCR4) In Bone Marrow Niche.....	185
Establishment of a Rat Model of Temporomandibular Joint Osteoarthritis using Intraarticular Injection of Complete Freund's Adjuvant	190
PUBLIC HEALTH	194
RECIPROCAL DETERMINISM "DAKOCAN" CHALLENGE EFFORTS TO REDUCE HIV AND AIDS CASES IN JEMBER DISTRICT.....	195
IRON TABLETS DISTRIBUTION OF PREGNANT WOMAN IN THE DISTRICT AND CITY OF EAST JAVA PROVINCE.....	200
RISK MANAGEMENT OF DUE TO EXPOSURE TO PESTICIDE POISONING FOR TOBACCO FARMERS IN THE JEMBER DISTRICT.....	204
AN OVERVIEW OF MOTHER KNOWLEDGE AFTER GIVING BIRTH ABOUT EXCLUSIVE BREASTFEEDING.....	208
DISASTER PREPAREDNESS AT PUBLIC HEALTH CENTER (PHC) BY SCORING ANALYSIS OF GENERAL ASPECTS, HEALTH CARE, SURVEILLANCE, ENVIRONMENTAL SANITATION AND LOGISTICS.....	212
INDEPENDENT FAMILY PLANNING IN RURAL AND URBAN AREAS GRESIK DISTRICT	215
UNMET NEED FOR FAMILY PLANNING ON ELIGIBLE COUPLE IN INDONESIA: 2007 IDHS DATA ANALYSIS	219
Shells That Have been Polluted by lead around Youtefa Bay in Jayapura City That Have Potential Risk Of Non Carcinogenik	223
DESIGN AND IMPLEMENTATION DIARRHEAL SURVEILANCE REPORT INFORMATION SYSTEM WITH WATERFALL METHOD IN HEALTH DEVELOPMENT OF JEMBER.....	227

LOCAL WISDOM OF JEMBER COMMUNITY IN REDUCING CYANOGENIC LEVELS TO LOWER URINE THIOCYANATE LEVELS	229
UNDERWEIGHT AND MORBIDITY STATUS AMONG UNDER FIVE YEARS CHILDREN IN SURABAYA.....	234
CONDOM USE AMONG EXIT CLIENTS OF FEMALE SEXUAL WORKERS FOR PREVENTION HIV/AIDS IN MAKASSAR.....	237
THE SOCIAL SUPPORT AND PREVALENCE EMESIS GRAVIDARIUM ON PREGNANT MOTHER IN TRIMESTER I AT PUSKESMAS KEMBARAN I BANYUMAS REGENCY.....	241
NURSING.....	245
We need a bigger bomb: a community attempt on fighting dengue fever in a suburban Surabaya, Indonesia	246
APPLICATION OF STANDART NURSING LANGUAGE (NANDA, NOC. NIC) USING SOCIAL MEDIA: INSTAGRAM® TO INCREASE INFORMATION SEEKING BEHAVIOUR AND MOTIVATION OF NURSING STUDENT.....	250
THE EFFECT OF ONION (<i>Allium ascalonicum</i> L.) COMPRES TOWARD BODY TEMPERATURE OF CHILDREN WITH HIPERTERMIA IN BOUGENVILLE ROOM DR. HARYOTO LUMAJANG HOSPITAL	253
ACHIEVEMENT OF BLOOD PRESSURE TARGET WITH MEDICATION ADHERENCE AND SODIUM CONSUMPTION IN SAIFUL ANWAR GENERAL HOSPITAL OUTPATIENT CLINIC	257
EFFECT OF INSTRUCTIONAL VIDEO OF SPLINTING PROCEDURE TO NURSING STUDENTS SPLINTING SKILL (PREHOSPITAL SETTING).....	261
THE CORRELATION BETWEEN NURSE PERFORMANCE & THE LEVEL OF JAMKESMAS PATIENT SATISFACTION IN DAHLIA II WARD, NGUDI WALUYO WLINGI HOSPITAL	266
How To Maintain High Quality Cardiopulmonary Resuscitation In Adults : Literature Review	270
SMOKING BEHAVIOUR AMONG MIDDLE AND LATE ADOLESCENTS IN A SUB DISTRICT OF MALANG DISTRICT, EAST JAVA, INDONESIA.....	275
THE DIFFERENCES DECLINE BREAST ENGORGEMENT CONDUCTED CONVENTIONAL METHODS (BREAST MASSAGE) WITH HERB YEAST-KATU.....	282

EFFECT OF SOLID LIPID NANOPARTICLE (SLN) AND NANO STRUCTURE LIPID CARRIER (NLC) SYSTEM ON ANTIOXIDANT STABILITY OF TOMATO EXTRACT (LIPID: CETYL ALCOHOL AND ISOPROPYL MYRISTATE)

Sayyidati Aqilah, Esti Hendradi, Noorma Rosita*

Pharmaceutics Department Faculty of Pharmacy Airlangga University
Surabaya, East Java-Indonesia

*corresponding author: Email: itanr@yahoo.com or noorma-r@ff.unair.ac.id

INTRODUCTION

Tomato extract was known contains many antioxidants (Chauhan *et al.*, 2010), such as lycopene, that are easily degraded by UV-B rays. The mechanism lycopene as an antiaging is to reduce skin regeneration and increase the thickness of the epidermis (Sahasrabudhe, 2011). As an antioxidant, lycopene easily degraded when exposed to light, heat, and oxygen (Chauhan *et al.*, 2011). Drug delivery system based on nanolipid carrier system, such as: Solid Lipid Nanoparticles (SLN) was appropriate to stabilize lycopene, as lipophilic substance (Wissing and Muller, 2003; Helgason *et al.*, 2009; and Okonogi dan Riangjanapatee, 2014). One of the limitations of SLN is the drug molecule that has been trapped expelled easily during storage. It is caused of the orderdness of lattice lipid crystal. Replacement part of solid lipid using liquid lipid (called as nanostructure lipid carriers or NLC) can reduce the orderdness of lattice lipid crystall and it will repaired it (Kaur *et al.*, 2015).

In this research have been tried to be compared the ability of SLN and NLC to improve the stability of antioxidant tomato extract. Using 20% total amount of lipid, extract tomato-SLN made from cetyl alcohol as solid lipid and extract tomato-NLC made from difference ratio between cetyl alcohol and isopropyl myristate (IPM) such as: 9:1 and 7:3. Tween 80 and Kollipor were used as surfactant and co-surfactant. IPM was choose because of its enhancer and emollient effect so easily to apply to the skin (Vadgama *et al.*, 2015).

MATERIALS AND METHODS

Material:

Tomato extract, contain of 20% lykopen (CN Lab Nutrition, Asian Group),, DPPH (Sigma Aldrich), cetyl Alcohol (PT.Bratachem), Isopropyl Myristate (Sigma Aldrich), Kolliphor® (Sigma Aldrich), Tween 80 (Sigma Aldrich), Metanol (Sigma Aldrich), Aquadest,

Instrument:

Ultra Turax IKA T-25, Hot-plate stirer , pH meter SCHOTT CG-842, cone and plate viscometer Brookefield, Spectrophotometer Shimadzu UV-1800, X-ray Diffractometry (XRD), , Delsa™ Nano Submicron Particle Size.

METHOD:

Determination of Tomato Extracts IC₅₀ Value by 1,1-Diphenyl-2-Picrylhydrazyl (DPPH) and Spectrophotometry Methode (Muller, 2011). IC₅₀ is the concentration of sample that can inhibite 50% free radical activity, further more call as antioxidant power. Various concentration of workong standard tomato extract solution were reacted with 0.004% DPPH solution The free radical inhibition concentrarion determined from the absorbance spectrophotometer, absorbance measurements were taken at three wavelengths, namely 505 nm, 515 nm, 525 nm. Next percent inhibition be calculated by :

$$\% \text{peredaman} = \left\{ \frac{A_{kontrol} - A_{sampel}}{A_{kontrol}} \right\} \times 100\%$$

IC₅₀ was obtained from correlation regression curves between percent free radical inhibition and concentration of extract solution, that indicate 50% inhibition of free radical activity.

Preparation of SLN and NLC tomato extract. SLN tomato extract was made of 0,25% tomato extract that contain of 20% lycopene (CN Lab Nutrition, Asian Group), 20 % cetyl alcohol as solid lipid, 5 % tween 80, and 5% kollipor and aquadest ad 100 % as aqueous phase. NLC tomato extract had same compotition with SLN, but there were cetyl alcohol replacement with IPM, with two different ratio, such as: 9:1 and 7:3. SLN and NLC tomato extract were made by High Shear Homogenization (HPH) method with a speed of 24,000 rpm conducted for 8 minutes at 4 cycle with Ultra Turax T-25.

Characterisation of sample. Furthermore, sample were characterized such as: pH, viscosity, particle size and its distribution were measured by pH meter, cone and plate viscosimeter and DelsnanoTM particle size analyzer respectively. Characterization be held before and after UV-B exposure.

Measurement antioxidant stability. Each sample were exposed with 32.400 Joule/hour UV-B radiation for 2, 5, 9, 15, and 21 hours. After reacting with DPPH solution, the absorbance was observed by spectrophotometer and were calculated the percent inhibition of free radical activity using equation 1. Furthermore the stability of antioxidant were interpreted based on constanta of percent scavenging activity decreasing in antioxidant power (*k* value) on the appropriate reaction order.

RESULT AND DISCUSSION

IC₅₀ of tomato extract. The regression equation obtained was $y = 637,23x + 7.7944$ with a correlation coefficient was $r = 0.9973$. IC₅₀ values can be obtained from the regression equation by entering a value of $y = 50\%$ to obtain the value of x , namely the concentration of tomato extract, which can inhibit 50% free radical activity of DPPH. IC₅₀ value of tomato extract obtained is equal to 0.0662%.

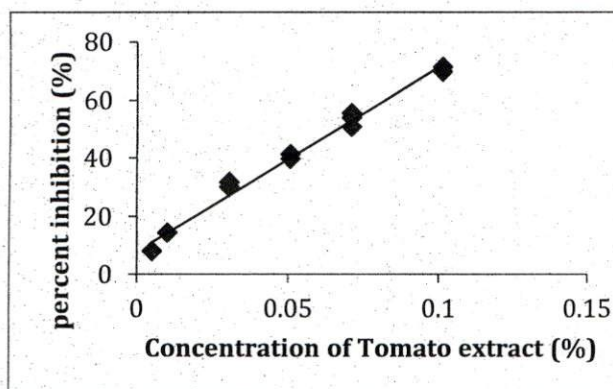


Figure 1. Calculation curve of percent inhibition of free radical activity

Further more, preparation SLN-tomato extract and NLC-tomato extract using extract tomato concentration at least twice to its IC₅₀.

Character of SLN-tomato extract and NLC-tomato extract.

All character of sample presented in table1. All sample had pH in between skin pH range . It was mean all sample did not have potential irritation for skin. There were no significant change of pH relatively after 21 hour UV-B exposure.

Table 1. Character of tomato extract-SLN and tomato extract-NLC

Sample	Mean pH ± SD (%KV)	Mean diameter (nm) ± SD (%KV)	mean PI ± SD (%KV)	Mean Viskositas (cPs) ± SD (%KV)	
Without UV-B exposure	SLN	5,73 ± 0,20 (3,49)	274,17 ± 8,38 (3,06)	0,47 ± 0,02 (3,34)	7733,33 ± 1419,72 (18,36)
	NLC 9:1	5,82 ± 0,07 (1,21)	203,54 ± 5,64 (2,77)	0,29 ± 0,01 (4,14)	1916,33 ± 152,67 (7,97)
	NLC 7:3	5,87 ± 0,14 (2,46)	187,8 ± 31,15 (1,66)	0,20 ± 0,10 (4,78)	1231,00 ± 331,39 (26,92)
	SLN	5,68 ± 0,28 (4,93)	411,27 ± 11,24 (2,73)	0,33 ± 0,10 (29,59)	6845,33 ± 1003,23 (14,66)
After UV-B exposure for 21 hours	NLC 9:1	5,64 ± 0,09 (1,60)	229,72 ± 13,75 (5,98)	0,30 ± 0,01 (2,76)	1232,56 ± 300,24 (24,36)
	NLC 7:3	5,83 ± 0,12 (2,06)	235,92 ± 8,78 (3,72)	0,24 ± 0,01 (5,31)	906,12 ± 171,14 (18,89)
	SLN	5,68 ± 0,28 (4,93)	411,27 ± 11,24 (2,73)	0,33 ± 0,10 (29,59)	6845,33 ± 1003,23 (14,66)
	NLC 9:1	5,64 ± 0,09 (1,60)	229,72 ± 13,75 (5,98)	0,30 ± 0,01 (2,76)	1232,56 ± 300,24 (24,36)

NLC had viscosity lower than SLN. Viscosity NLC with ratio cetyl alcohol : IPM 7:3 lower than 9:1. It was consequence of solid lipid replacement by liquid lipid.. This phenomena were the same with the particle size.

UV-B exposed for 21 hours decreased the viscosity but increased particle size. Based on Stokes law, viscosity invers relate with flocculation rate of droplet emulsion. Therefore the particle size of NLC with ratio cetyl alcohol : IPM 7:3 increased significant compare with others after UV-B radiation exposure, but indicated more homogen in size.

Diffraction Pattern Determination of Lipid Cetyl alcohol and in the system SLN, NLC (9:1) and NLC (7:3) . From diffractogram (fig. 2 and table 2) were known that declining intensity of the crystal lattice cetyl alcohol after made to be SLN. It was effect of adding surfactant in the lipid. Furthermore the intensity more decline once created NLC.

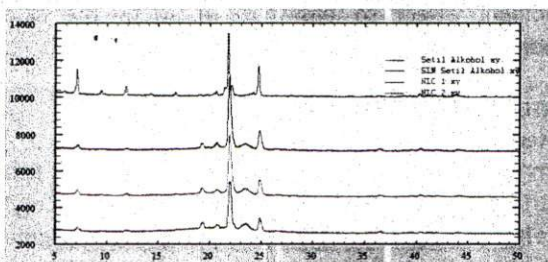


Figure 2. Diffractogram cetyl alcohol, cetyl alcohol in SLN, NLC (9:1) and NLC (7:3)

The addition liquid lipid (IPM) reduce the orderdness of lattice lipid crystal. According to Jenning (2000) the orderdness of lattice crystal corresponds to the capability of lipid to entrap the drug. The drug was more difficult to be inserted in the particle lipid that have ordered lattice crystal and was easier to expelled from the carrier

Table 2. The main diffraction peak intensity of the diffraction pattern of the sample

Sample	Angle 2θ		
	7,06°	21,76°	24,70°
Cetyl Alcohol(CA)	1523,72	3459,99	1668,71
CA in SLN	211,33	3415,49	1068,65
CA in NLC (9:1)	237,02	3257,35	833,49
CA in NLC (7:3)	190,32	2449,97	737,46

Antioxidan Stability Test. From the result of the reaction order determination of changes percent free radical activity inhibition on each exposure time of each sample was known that the reaction according to first order. Furthermore, the constanta of percent scavenging activity decreasing in antioxidant power (k value) every sample was calculated by making the regreition curve plot time versus log percent inhibition (fig.3). Using the equation for the first order can be calculated the value of k, as presented in the table 3.

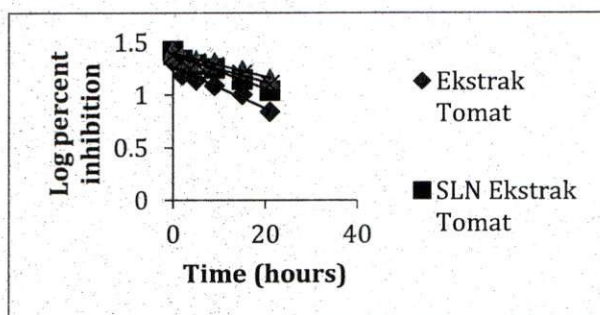


Figure 3. Change rate of log percent free radical activity inhibition of sample over time

First orde reaction means that the change was occurring exponentially with time (Martin et al., 2008). In this case that means decreasing antioxidant power depends only on the concentration of ingridient in tomato extract that has antioxidant power. The greater the value of k indicates that the rate of change of percent inhibition faster, or the sample was unstable. It was known that constanta of percent inhibition free radical activity decreasing of tomato extract was $4,58 \times 10^{-2} \pm 0,0045/$ hour faster than SLN and NLC. This was due to the lipophilic antioxidants ingredients in tomato extract, exposed to the conditions that could degrade the material. Meanwhile, when they were made in

nanolipid such as SLN and NLC, the materials were encapsulated in the system.

Table 3. Mean constanta of change rate of percent free radical activity inhibition of sample over time (based in orde 1 reaction)

Sample	Mean constanta (k) of change rate of percent inhibition between time (/hour) \pm SD* (%KV)
Tomato Extract (TE)	$4,58 \times 10^{-2} \pm 0,0045$ (9,87)
TE - SLN	$3,82 \times 10^{-2} \pm 0,0019$ (4,93)
TE - NLC 9:1	$2,59 \times 10^{-2} \pm 0,0011$ (4,19)
TE - NLC 7:3	$2,83 \times 10^{-2} \pm 0,0006$ (2,05)

The antioxidant power tomato extract in the NLC was more stable than in the SLN form. It was seen from the smaller of k value. It was the impact of reducing of lattice lipid crystal orderdness (fig. 2). Therefore the active ingredient was not easily expelled out. In this case, the more IPM addition in the system by changing the ratio of cetyl alcohol: IPM from 9: 1 to 7: 3 was not very meaningfull in stability effect. Decreasing orderdness of lipid crystal lattice was not necessarily improve the drug entrapment. There were need optimal conditions that produce optimal trapping anyway.

CONCLUSION

The conclusion of this research were:

1. Antioxidant stability of tomato extract increased in nanolipid system carrier with total amount of lipid cetyl alcohol 20%
2. Replacing part of solid lipid (cetyl alcohol) to liquid lipid (isopropyl myristate/IPM) to be NLC system in ratio 9:1 and 7:3 could increased antioxidant stability of tomato extract.
3. Increasing isopropyl myristate ratio in NLC system from 9:1 to be 7:3 did not increase antioxidant stability of tomato extract meaningfully

REFERENCES

1. Abdel-Salam, Fatma S., Seham A. Elkheshen, Azza A. Mahmoud, Hussein O. Ammar. 2015. Diflucortolone valerate loaded solid lipid nanoparticles as a semisolid topical delivery system. *Bulletin of Faculty of Pharmacy, Cairo University*
2. Chauhan, Komal, Sheel Sharma, Nidhi Agarwal, Bhushan Chauhan. 2011. Lycopene of tomato fame : its role in health and disease. *International Journal of Pharmaceutical Sciences Review and Research* vol 10
3. Jenning V., Gohl S., Comparison of Wax and Glyceride Solid Lipid Nanoparticles (SLN).

- International Journal of Pharmaceutics*, 2000, 196: 219-222.
4. Helgason, T., T.S. Awad, K. Kristbergsson, D.J. McClements, J. Weiss. 2009. Effect of surfactant surface coverage on formation of solid lipid nanoparticles (SLN). *Journal of Colloid and Interface Science* vol 334 pp 75–81
 5. Kaur, Sarabjot, Ujjwal Nautyal, Ramandeep Singh, Satvinder Singh, Anita Devi. 2015. Nanostructure Lipid Carrier (NLC): the new generation of lipid nanoparticles. *Asian Pacific Journal of Health Sciences* vol 2 pp 76-93
 6. Martin, Alfred, James Swarbrick, Arthur Cammarata. 2008. *Farmasi Fisik*. UI-Press.
 7. Muller L., Frochlih K., Bohm V; 2011, Comparative antioxidant activities of carotenoids measured by ferric reducing antioxidant power (FRAP), ABTS bleaching assay (aTEAC), DPPH assay and peroxy radical scavenging assay, *Food Chemistry* 129 (2011) 139–148
 8. Sahasrabudde, Sangeeta H. 2011. Lycopene- An Antioxidant. *Pharma Times* Vol. 43-No.12
 9. Okonogi, Siriporn, Pornthida Rianganapatee. 2014. *Physicochemical characterization of lycopene-loaded nanostructured lipid carrier formulations for topical administration*. *International Journal of Pharmaceutics*
 10. Wissing, Sylvia A., Rainer H. Müller. 2003. Cosmetic applications for solid lipid nanoparticles (SLN). *International Journal of Pharmaceutics* Vol. 254 pp 65–68
 11. Vadgama, Rajeshkumar N., Annamma A. Odaneth, Arvind M. Lali. 2015. Green synthesis of isopropyl myristate in novel single phase medium Part I: Batch optimization studies. *Biotechnology Reports* vol 8 pp 133–137