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[Correlation between the Characteristics and Quality of Life of Hypertensive Outpatients at a Private Hospital in Yogyakarta](#)

Faridah Baroroh, Andriana Sari

Many factors can affect a person's quality of life, including therapy with antihypertensive drugs that often have uncomfortable side effects and lead to decreased quality of life. This study aimed to determine the statistical relationship between the characteristics and quality of life of hypertensive...

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Porcine-specific Primer based on Cytochrome B by Real-Time Polymerase Chain Reaction Method for Identification in Raw Meat

Nina Salamah, Yuny Erwanto, Sudibyo Martono, Abdul Rohman

Pork is a type of meat that is often used for counterfeiting products with a composition of beef. This counterfeiting can provide large profits to producers, given the price of pork is far below the price of beef. So we need specific methods to ensure the halal product. The purpose of this study was...

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Developing Premarital Education Application for Midwives at Puskesmas Around Semarang.

Dewi Puspitaningrum, Nuke Devi Indrawati, Indri Astuti Purwanti

A family contributes a significant role in the family's health status. In a family, mother and children are considered to be susceptible. It relates to women and their prenatal, antenatal, postnatal, and the development of children. There are six programs of EMAS program, from the government's program...

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### The Compliance of Hypertensive Patients in Health Center Pengasih I Kulon Progo

Andriana Sari, Muhammad Adjie Cakrawardana

Hypertension is a condition where blood vessels have persistent high blood pressure. Compliance is a behavior to adhere to doctor's advice about using medicine. The purpose of this study is to determine the compliance, the use of antihypertensive and the relationship between characteristics of patients...

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### Technical Efficiency of Maternal and Child Health Program at Public Health Center in Indonesia



Dedik Sulistiawan, Insan Rekso Adiwibowo, Muhammad Faozi Kurniawan,  
Laksono Trisnantoro, Wasis Budiarto

The limited availability of health resources in the high public demand requires the health programs and service providers, especially in Public Health Center (Puskesmas) to make efficiency. This study aims to provide information about the level of technical efficiency of Puskesmas in Indonesia in organizing...

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## The Potential Human Health Risk By Ambient Air Pollution at Campus X of University Y in Yogyakarta

Ahmad Faizal Rangkuti, Musfirah Musfirah

Background: One of the enormous contributions of human activity in determining air quality from motorized vehicles activity in public places especially educational facilities. The Campus has the potential to be polluted by primary pollutants such as Particulate Matter (PM 10) and NO<sub>2</sub>. The results of...

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## Biscuits Substitution with Tempe and Catfish Flour Increase Birth Weight of Infants Born from Mothers with Chronic Energy Deficiency

Sunarti Sunarti, Mustofa Ahda, Ahmad Ahid Mudayana, Diva Hanim, Kusnandar Kusnandar, Mukhamad Angwar

Chronic energy deficiency (CED) and anemia in pregnant women, is still a significant public health problem in Indonesia. CED on pregnant women the risk of low birth weight on newborn. Tempe and catfish are available for daily consumption and rich in protein and Fe but has been understudied to prevent...

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## Risk Management for Healthier and Safer Tourist Destination (Case Study at Parangtritis Beach, Special Region Yogyakarta, Indonesia)

Helfi Agustin, Yudah Marta

Increasing number of visitors to Parangtritis Beach affect to increases the health and safety risk. Data of Tourism and Cultural Office Bantul Regency, more than 30 tourists are victims due to rip current and 220 tourist stung by Jellyfish in 2019. This study aimed to : 1) identify potential hazards,...

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### The Amount of $\beta$ Carotene, Total Phenolic and Total Flavonoid of Ethanol Extract of Leaf Moringa Oleifera with Variation Concentration of Solvent

Nining Sugihartini, Dessy Erliani Mugita Sari, Mochammad Saiful Bachri, Sapto Yuliani

The use of Moringa leaves is increasing because it contains  $\beta$  carotene, phenolic compounds and flavonoids which are efficacious as antioxidants. The solvent concentration is a factor that affects the active content in the extract. This study aims to determine the effect of ethanol concentration on  $\beta$ ...

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### Smoke-Free Home and Support City Health Department in Yogyakarta

Septian Emma Dwi Jatmika, Muchsin Maulana, Kuntoro Kuntoro, Santi Martini, Sri Widiarti, Sifra Chintia Mella Aprila

This research was conducted in two pillars of citizens who first implemented a smoke-free home policy in the city of Yogyakarta. Qualitative research with the method of in-depth interviews with respondents' approval. Results obtained by Yogyakarta City Health Office are a motivator and facilitator in...

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### Brief Counselling with Self-evaluation Drug Use Sheet to Improve the effectivity of Drug Therapy in Diabetes Mellitus with Hypertension Complication Outpatients

Akrom Akrom, Sari Ramadhani, Zuhruf Ginanjar Saputri

Brief counseling by Pharmacist (BCP) and self-evaluation drug use sheet (SEDUS) may improve patients' behavioral changes, thereby improve blood pressure levels. The study aims to determine the effect of BCP and self-SEDUS on blood pressure and blood glucose level of outpatients with diabetes mellitus...

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### The Implementation of Patient Safety in Indonesia

Ahmad Ahid Mudayana, Norma Sari, Heni Rusmitasari, Siti Fatonah, Desi Aulia Setyaningsih

Patient safety issues are a problem that needs to be addressed immediately in health care facilities in Indonesia, so that the standard of patient safety of health care facilities is a reference for health care facilities in Indonesia to carry out their activities. Based on Republic Indonesia Minister...

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## Behavior Factors and Cases of Helminthiasis in Elementary School Students

Liena Sofiana, Erni Gustina, Yuniar Wardani, Putri Medyawati

Helminthiasis infection is the most common infection worldwide. More than 1.5 billion people or 24% of the world's population are infected with helminthiasis where pre-school age and school-age children are vulnerable to infection of helminthiasis. Intestinal worms are the main species that most infect...

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# The Relationship between Human Resource Characteristics and the Performance of Larvae Surveyors in Gondokusuman 2 Health Center of Yogyakarta

Triani Marwati, Rokhmayanti Rokhmayanti, Desi Nurfiti, Sigit Martana

The city of Yogyakarta is an endemic area of Dengue Hemorrhagic Fever (DHF) where DHF cases can be found each year. In Gondokusuman 2 Health Center of Yogyakarta, the number of DHF cases still fluctuates all year round where there were a total of 60 cases in 2016. The eradication and prevention of DHF...

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# Air Quality Analysis (PM 2.5) in Smoke-Free Home in Yogyakarta City

Muchsin Maulana, Septian Emma Dwi Jatmika, Kuntoro Kuntoro, Santi Martini, Sri Widiarti, Yuliantiven Yuliantiven

Background: good air quality is the air that free from pollutant-induced irritation. Particulate matter is a complex of solid and tin particle that found on the air. PM 2.5 is the particle that has 2.5 micrometers of diameter size or called a fines air particle. The one of air pollutant on some house...

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## What Elderly Needs to Improve Their Quality of Life? A Qualitative Study

Ratu Matahari, Wahyuni Arumsari, Kartika Setyaningsih Sunardi

The Special Region of Yogyakarta is a province that has experienced an increase in the number of elderly people or known as the aged population boom. According to the National Economic Survey (SUSENAS) in 2007, it is known that Yogyakarta is the highest population of elderly in Indonesia with the index...

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## Early Menarche with Breast Cancer Awareness: A Literature Review

Sitti Nur Djannah, Solikhah Solikhah

Breast cancer is a cancer with the second highest prevalence after cervical cancer in Indonesia. The cause of high cases of breast cancer can occur because of ignorance about the triggers of the causes of breast cancer. The development and growth of the breast is influenced by the hormones estrogen and...

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## HIV/AIDS Acceptance and Access to Health Care Services on Female Sex Workers

Fitriana Putri Utami, Ratu Matahari

The World Health Organization (WHO) estimates that every year there are 350 million new Sexual Transmitted Infection (STI) sufferers in developing countries. Areas with a high prevalence of STIs are accompanied by a high prevalence of HIV / AIDS which is found in many high-risk sexual behaviors. One...

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## Effect of Gotu Kola (*Centella asiatica*) Extract Toward Expression of Caspase 3 of Hippocampus Pyramidal Cells on Dementia Model Rats Induced by Trimethyltin.

Sapto Yuliani, Nikmawati Linar

Hippocampus is part of brain that has an important role in the process of memory. Hippocampus is very sensitive to oxidative stress. Oxidative stress in the hippocampus can cause apoptosis of neurons associated with the pathogenesis of dementia. Gotu kola (*Centella asiatica*) has antioxidants effect that...



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### The Relationship between Perception of Dengue Hemorrhagic Fever and Prevention Behaviour in Sorogenen 2 Purwomartani Kalasan Sleman Yogyakarta

Ayuna Lintang Sari, Tri Wahyuni Sukesi

Dengue Hemorrhagic Fever (DHF) is a disease found in most tropical and subtropical regions. The natural hosts of DHF are humans. The agent is a dengue virus that belongs to the family Flaviridae and the genus Flavivirus. Around 2.5 billion people in the world are at risk of contact with dengue. World...

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### Clinical Pharmacoepidemiology Study of Antihypertensive and Antidiabetes Mellitus Drug in DM-Hypertensive Outpatient in a Private Hospital

Akrom Akrom, Muna Marzuqoh

Diabetes mellitus and hypertension are degenerative diseases that require long-term treatment. This study aims to describe the anti DM and antihypertensive drug

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### The Effect of Bangle (Zingiber Cassumunar Roxb.) Rhizome Chloroform Extract on Nitric Oxide and Reactive Oxygen Intermediate Secretions in Vitro

Nurkhasanah Nurkhasanah, Nanik Sulistyani, Mifta Annisa Ghifarizi

The immune system is needed by the body to maintain its integrity against the dangers caused by various substances in the environment. Immunomodulators are substances that can regulate the immune system and increase immunity. Bangle (Zingiber cassumunar Roxb.) Provides an immunomodulatory effect with...

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### The Effect of Ethyl Acetate Fraction of Bangle (Zingiber Cassumunar Roxb.) Rhizome Extracts on Interleukin-10 and Interleukin-14 Expression in Vitro

Nurkhasanah Nurkhasanah, Nanik Sulistyani, Adya Desyana Sofyan

An unbalanced immune system results in reduced ability to protect the body from pathogens. Immune system imbalances can be restored with immunomodulators. One plant that has the potential to be immunomodulatory is the bangle rhizome (Zingiber cassumunar Roxb.) Which has curcumin as an immunomodulator...

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### Relationships of Diet with Overweight Events in Disabled Youth.

Titiek Hidayati, Akrom Akrom, Erviana Erviana, Indri Nurasa

More than one billion people are estimated to live with various types of disabilities. There are around 15% of the world population, namely 110 million (2.2%) and 190 million (3.8%) people aged 15 years and over have difficulties in performing their functions. Problems that concern persons with disabilities...

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### Antioxidant Activity of Combination of Mangosteen Peel (Garcinia Mangostana) and Green Tea Leaves (Camellia Sinensis)

Hari Susanti

Mangosteen peel and green tea leaves are natural antioxidants that have been widely used in the community. Usually, people use it as a tea drink. The aim of this study was to find the composition of green tea-mangosteen peel combination which has the highest antioxidant. The material used is a mixture...

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### Evaluation of the Adsorption and Reduction of Au(III) on Esterified Humic Acid

Dian Prasasti, Sri Juari Santosa, Sri Sudiono

Electronic waste is increasing every year, one of which is electronic waste metal. Gold mining is less profitable than taking gold from electronics. One of the adsorbents that can be used is humic acid. To study the effect of functional groups on the adsorption of Au (III) ions, the adsorption-reduction...

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### The Effects of SNEDDS (Self-Nano Emulsifying Drug Delivery System) Black Cumin Oil Seeds (*Nigella sativa* L) to The

# Histopatology of Lung Organs of The Sprague Dawley Rats That Induced by DMBA

Iis Wahyuningsih, Hani Pertiwi Khoirunnisa

Lung cancer is the cancer that caused death, especially for men in Indonesia. One of the compounds that causes cancer is 712-Dimethylben(a)anthracene (DMBA). Black cumin seed oils (BCSO) is able to reduce the damage of lung cells to the DMBA-induced rat. To improve total medicine that could arrive...

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# Isolation of Actinomycetes from Sugarcane (*Saccharum officinarum*) Rhizosphere and the Ability to Produce Antibiotic.

Nina Nur Aini, Nanik Sulistyani

Actinomycetes are well-known microorganism as secondary metabolites producers which serve as antibiotics. In this study, sugar cane (*Saccharum officinarum*) rhizosphere soil samples were collected from Piyungan, Bantul, Yogyakarta. The aims of this study were to obtain Actinomycetes isolates from sugar...

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## Causative Microorganism of Pneumonia and Antibiotics Sensitivity Pattern on Teaching Hospital in Surakarta, Indonesia

Yeni Farida, Muchtar Hanafi, Maryani Maryani, Qisty Aulia Khoiry, Hesti Diah Prahastiwi

Pneumonia still remains as a significant cause of mortality due to the virulence factors of the causative microorganism. The causative microorganism profile of pneumonia differs from one region to another. This study aimed to identify the etiology of pneumonia and bacterial sensitivity pattern to antibiotics....

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Dian Eka Ermawati, Fildza Alya I, Fea Prihapsara

Gold is a substance that can be used as a collagen forming catalyst, it can help regenerate the skin. Vit.E is a natural antioxidant compound that can be used to help regenerate and brighten the skin. Gold is a metal so it is difficult to apply into the skin. Gold and vit.E are formulated with SNEDDS...

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# Antioxidant Activity of Combination of Mangosteen Peel (*Garcinia Mangostana*) and Green Tea Leaves (*Camellia Sinensis*)

Hari Susanti  
Faculty of Pharmacy  
Universitas Ahmad Dahlan  
Yogyakarta, Indonesia  
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**Abstract**—Mangosteen peel and green tea leaves are natural antioxidants that have been widely used in the community. Usually, people use it as a tea drink. The aim of this study was to find the composition of green tea-mangosteen peel combination which has the highest antioxidant. The material used is a mixture of mangosteen peel and green tea leaves powder with a composition (92.5: 7.5); (95: 5) and (97.5: 2,5). The combination powder mixture was extracted by maceration method using ethanol solvent. Antioxidant tests were carried out using the DPPH method. The antioxidant activity is expressed as ES50. Gallic acid is used as a positive control. The results showed that gallic acid and extracts of the combination of mangosteen peel-green tea leaves had antioxidant activity with ES 50, respectively 3.025 µg/ml; 20.62 µg/ml; 33.175 µg/ml and 38.210 µg/ml. The combination of mangosteen peel-green tea leaves (92.5: 7.5) is a combination with the highest antioxidant activity.

**Keywords**—mangosteen, green tea, combination, antioxidant, DPPH

## I. INTRODUCTION

Tea leaves are widely consumed by the public and having many benefits in health [1]. As levels of fermentation increased from green to oolong to black tea, the major flavan-3-ol profiles changed. Total catechins were 13.6 g/100 g in green and 4.2 g/100 g dry weight in black tea [2]. Quercetin, myricetin and kaempferol are major flavonols making up 2 - 3% of water soluble extractive in tea. Flavonols in tea are mainly in glycosidic form because non-glycosidic forms are water insoluble. Variable flavonols content are demonstrated possibly due to use of different analytical techniques. For example, 0.83-1.59, 1.79 - 4.05 and 1.56 - 3.31 g/kg are found respectively for myricetin, quercetin and kaempferol in green tea after acid hydrolysis, when these results are compared on dry weight bases [3]. Previous researchers reported that polyphenol compound in tea leaves have antioxidant activity.

Mangosteen peel is a source of natural antioxidants. The content of secondary metabolites in the peel of the mangosteen fruit is tannin and xanthenes. Xanthenes are natural chemical substances classified as polyphenolic compounds. Xanthenes are very beneficial for body health as an antioxidant, antiproliferative, anti-inflammatory and antimicrobial [3]. According to the Nature of Health Resources, xanthenes, mangostin, garcinone, flavonoids and tannins in the mangosteen are phenolic bioactive compounds.

The skin of the mangosteen which contains xanthenes has a high antioxidant function so that it can neutralize and destroy free radicals which trigger the emergence of degenerative diseases, such as cancer, heart disease, arthritis, cataracts, and diabetes mellitus.

Some researchers previously reported that extract combinations could increase biological activity. One of them [4] reported that antioxidant activity from a combination of mangosteen peel extract, soursop leaves, red betel nut and taro tuber with variations of LHHL dosage for each extract in a row on a volume ratio (1: 1: 1: 1) has the highest antioxidant activity with inhibition ability of 93.73%.

Antioxidant activity is owned by most phenolic compounds caused by the presence of phenolic hydroxyl groups in their molecular structure. When reacting with free radicals, these compounds form new radicals that are stabilized by the aromatic resonance effect of the nucleus. Thus the propagation phase which includes radical reactions will be inhibited [5]. To determine the antioxidant activity can be done by several methods including: DPPH method, Ferric Reduction Power method, TBA method.

On the market, single mangosteen peel extract and single green tea preparations are available. In developing products into tea preparations, mangosteen peel needs to be combined with tea leaves. Therefore it is necessary to look for a comparative composition of mangosteen peel and tea leaves to produce optimal antioxidant activity. Based on the background above, it is deemed necessary to have research on the optimization of the composition of mangosteen peel and green tea leaves along with the test of antioxidant activity.

## II. MATERIAL AND METHOD

### A. Tools and Materials

The equipment used in this study, namely: analytic scales, knives, magnetic stirrers, Buchner funnels, aluminum foilpaper, glass wares of various sizes, a set of Spectrophotometer (UV-1800 Shimadzu).

Mangosteen peel and tea leaves powder obtained from Beringharjo local market (special Region of Yogyakarta, Indonesia), FeCl<sub>3</sub> p.a (E-Merck), gallic acid (sigma), ethanol p.a (E-Merck), DPPH (Sigma).



**B. Method**

**1) Extract Preparation**

The powder of mangosteen peel and tea leaves were authenticated by expert at Biological Pharmacy Laboratory Faculty of Pharmacy, University of Gadjah Mada with Certificate number : UGM/FA/4527/M/03/02 The mangosteen peel-tea leaves composition of combination in this study were (92.5:7.5), (95:5), (97.5:2,5)w/w. Each combination were weighed as much as 100 grams, then extracted by maceration method with the help of sonication for 2 hours by using ethanol solvent. The macerate was filtered using vacuum and filter paper to separate the pulp and filtrate, the filtrate was then evaporated with a vacuum rotary evaporator to obtain the thick extract.

**2) Determination of the Antioxidant Activity**

The antioxidant activity was conducted by DPPH method. Gallic acid was used as a positive control. The DPPH assay was done as procedure below :

Each one ml of gallic acid solution and combination extract in several concentrations added 1.0 ml of DPPH 0.15mM solution. Shaken and stayed for 30 minutes. The absorbance was read at a wavelength of 517 nm against ethanol as the blank solution [6].

**C. Data Analysis**

The percentage of radical scavenging (% inhibition) activity of gallic acid and the extracts were calculating by using equation below:

$$\% \text{inhibition} = \frac{C_{\text{Abs}} - S_{\text{Abs}}}{C_{\text{Abs}}} \times 100\% \quad (1)$$

while C<sub>Abs</sub> = The control negative absorbance

S<sub>Abs</sub> = Positive control or sample absorbance

The Effective scavenging 50 (ES50) parameter was determine by using the linear regression equation  $y=bx+a$  while y was % inhibition, x was the extract concentration. The ES50 data was statistically analysis [7].

**III. RESULT AND DISCUSSION**

Antioxidant test was carried out by DPPH method. This test was based on a decrease in the intensity of DPPH absorption due to the presence of antioxidant compounds measured at a wavelength of 517 nm. As a positive control, gallic acid is used. The ability of compounds as antioxidants is expressed in the amount of ES50 (table 1).

TABLE I. THE ES50 VALUE OF GALLIC ACID AND THE MANGOSTEEN PEEL, TEA LEAVES AND IT'S COMBINATION EXTRACT

Sample	ES50 (µg/mL) ± SD
Gallic acid	3.026 ± 0.121
MP	44.9 ± 0.326
TK	8.77 ± 0.044
MP-TL (97.5:2.5)	38.210 ± 0.658
MP-TL (95:5)	33.175 ± 0.472
MP-TL (92.5:7.5)	20.620 ± 0.230

Note: MP is mangosteen peel, TL is tea leaves, n=3

The table 1 showed that gallic acid has the highest antioxidant activity. It supported by the hydroxyl content of

the chemical structure. It has been known that the hydroxyl-phenolic group have the main role of antioxidant activity of many natural substances [8,9]. The tea leaves extract has lower IC50 that Mangosteen peel extract and The combination of both. The phenolic content of mangosteen peel plays the main role of antioxidant activity. Caffeic acid (1.51 mg/g), t-cinnamic acid (0.73 mg/g), vanillic acid (0.71 mg/g), sinapic acid (0.71 mg/g) and syringic acid (0.63 mg/g) were the predominant phenolic acids in the BHPA fraction. Zarena reported that [10] Correlation existed between the DPPH• value and the total phenolic content of the mangosteen fraction, with the correlation coefficient (r) = 0.89 (y = 1.28x), P 0.01; r = 0.85 (y = 1.19x), P 0.01; and r = 0.961 (y = 4.53x), P 0.001 for FPA, BHPA and AHPA fractions, respectively.

According to the table 1, it's seen that the addition of tea leave into the mangosteen peel will enhance the antioxidant activity. The more portion of tea leaves in the combination showed the higher antioxidant activity. In the other hand, the more tea leaves potion in the combination, its higher antioxidant activity. It caused by the more hydroxyl phenolic content in this extract. So, it can be suggested that tea leaves can be added into mangosteen peel to get a higher antioxidant activity in daily use rather than a single use of mangosteen peel.

**IV. CONCLUSION**

- Gallic acid, a combination of green tea mangosteen leaves (92.5: 7.5); (95: 5) and (97.5: 2,5) have antioxidant activity with ES50 value of 3,025; 20,62; 33,175 and 38,210 µg/ml.
- The combination of green tea mangosteen leaves (92.5: 7.5) is a combination with the highest antioxidant activity.

**ACKNOWLEDGMENT**

The author would like to thank LPPM UAD for funding this research with the 2017/2018 competitive grant scheme, Dr Joko Santosa for being expert in authentication of the sample, and Nisa & Adi for the supporting technique.

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