



FAKULTAS ARSITEKTUR LANSKAP & TEKNOLOGI LINGKUNGAN
UNIVERSITAS TRISAKTI, JAKARTA, INDONESIA



Ikatan Ahli Teknik Perumahan dan
Teknik Lingkungan Indonesia



The Sustainable Development Goals: Improving Life for Future Generations

Conference Series

4th International Seminar on Sustainable Urban Development
9th August 2017, Jakarta, Indonesia

Editors:

Astri Rinanti

Rositayanti Hadisoebroto

Ade Gafar Abdullah

Asep Bayu Dani Nandiyanto

Nada Khaleefah M. A. Alrikabi

Yusnani Mohd Yusof

Mohd. Razman Salim

IOP Conference Series
Earth and Environmental Science

Scopus



THOMSON REUTERS

PAPER • OPEN ACCESS

Peer review declaration

To cite this article: 2021 *IOP Conf. Ser.: Mater. Sci. Eng.* **1106** 011002

View the [article online](#) for updates and enhancements.

You may also like

- [Peer review declaration](#)
- [Peer review declaration](#)
- [Peer review declaration](#)

Peer review declaration

All papers published in this volume of *IOP Conference Series: Materials Science and Engineering* have been peer reviewed through processes administered by the Editors. Reviews were conducted by expert referees to the professional and scientific standards expected of a proceedings journal published by IOP Publishing.

All papers published in this proceeding have been peer-reviewed, where single-blind peer-reviewed was practiced for all papers published in this proceeding. An average number of 2 reviewers was assigned for each of the papers published. The reviewed papers and comments by the reviewers were transmitted to the authors by the editors. The authors were requested to resubmit their papers as per comments by the reviewers.

Out of 60 papers submitted, 39 were accepted for publication in the proceeding after being reviewed and resubmitted by authors. Table 1 provides statistics of the papers involved in this proceeding. Selected papers published were checked against plagiarism using *Turnitin* software, courtesy of Universiti Tenaga Nasional (UNITEN) as co-organizer of iNuSTEC2020.

Among the criteria used by the editorial committee in accepting the papers are:

- The work by the author(s) is original/novel and relevant to the nuclear community
- It has notably scientific merit and motivation, with the contents of the paper stated are correct and accurate together with references
- The terminology used in the works are acceptable/in accordance with the nuclear community as a whole
- The presentation of the papers are in accordance with the practiced standard of IOP

Table 1. Statistics of the paper review process in iNuSTEC2020

No.	Item
	Conference submission management system
	<i>Website and Email</i>
	Number of submissions received
	<i>: 60 papers</i>
	Number of submissions accepted
	<i>39 papers</i>
	Acceptance Rate
	<i>65% acceptance rate</i>
	((Number of Submissions Accepted) / (Number of Submissions Received)) X 100)
	The average number of reviews per paper:
	<i>2 reviews</i>
	The total number of reviewers involved:
	<i>48 reviewers</i>
	Any additional info on the review process (i.e., plagiarism check system):
	<i>Turnitin for selected papers</i>



Contact person for queries:

Dr. Faridah Mohamad Idris (email:

faridah_idris@nuclearmalaysia.gov.my)

Table of contents for issue 1, volume 106, IOP Conference Series: Earth and Environmental Science

Volume 106

2018

← [Previous issue](#) [Next issue](#) →

The 4th International Seminar on Sustainable Urban Development 9–10 August 2017, Jakarta, Indonesia

Accepted papers received: 18 December 2017

Published online: 31 January 2018

[Open all abstracts](#)

Preface

OPEN ACCESS 011001

The 4th International Seminar on Sustainable Urban Development

 [View article](#)  [PDF](#)

OPEN ACCESS 011002

Peer review statement

 [View article](#)  [PDF](#)

Papers

OPEN ACCESS 012001

Georadar and geoelectricity method to identify the determine zone of sliding landslide

Y K Dalimunthe and A Hamid

 [View article](#)  [PDF](#)

OPEN ACCESS 012002

Analysis of slope stability and controlling factor on residual soil of folded breccia formation

S Rachman, D Muslim, N Sulaksana, M Burhannuddinnur and H Pramudito

 [View article](#)  [PDF](#)

-
- OPEN ACCESS** 012003
Intelligent seismic risk mitigation system on structure building
R Suryanita, H Maizir, E Yuniorto and H Jingga
 View article  PDF
-
- OPEN ACCESS** 012004
Microclimate landscape design at southern integrated terminal Bandar Tasik Selatan, Kuala Lumpur
L H Phin and I Krisantia
 View article  PDF
-
- OPEN ACCESS** 012005
The slope and incision length of affected local cross abrasion and accretion using ASTER GDEM image analysis
A Anugrahadi
 View article  PDF
-
- OPEN ACCESS** 012006
Influence the condition land subsidence and groundwater impact of Jakarta coastal area
S Rahman, U Sumotarto and H Pramudito
 View article  PDF
-
- OPEN ACCESS** 012007
Potential collapse due to geological structures influence in Seropan Cave, Gunung Kidul, Yogyakarta, Indonesia
B Nugroho, P A Pranantya, R Witjahjati and Rofinus
 View article  PDF
-
- OPEN ACCESS** 012008
The implementation of local wisdom in reducing natural disaster risk: a case study from West Sumatera
Z Zulfadrim, Y Toyoda and H Kanegae
 View article  PDF
-
- OPEN ACCESS** 012009
A review on disaster risk mitigation in the oil and gas project
N N Rodhi, N Anwar and I P A Wiguna
 View article  PDF
-
- OPEN ACCESS** 012010
Settlement preferences in the disaster-prone areas of Brantas River

S Hariyani

[View article](#) [PDF](#)

OPEN ACCESS

012011

Acceptance and Utilization of Technology (UTAUT) as a Method of Technology Acceptance Model of Mitigation Disaster Website

T Siswanto, R Shofiati and H Hartini

[View article](#) [PDF](#)

OPEN ACCESS

012012

Landslide early warning system prototype with GIS analysis indicates by soil movement and rainfall

Y Artha and E S Julian

[View article](#) [PDF](#)

OPEN ACCESS

012013

Identification of rice supply chain risk to DKI Jakarta through Cipinang primary rice market

D Sugiarto, A Ariwibowo, I Mardianto and D Surjasa

[View article](#) [PDF](#)

OPEN ACCESS

012014

The empowerment of sustainable design in food packaging as designer responsibilities

V Setiadi

[View article](#) [PDF](#)

OPEN ACCESS

012015

Model of cyclist accident characteristics in the city of Malang and Blitar

M Z Arifin and I W Agustin

[View article](#) [PDF](#)

OPEN ACCESS

012016

Measuring the scale of sustainability of new town development based on the assessment of the residents of the native settlement around the new town area of Gading Serpong Tangerang

M Ischak, B Setioko and D Nurgandarum

[View article](#) [PDF](#)

OPEN ACCESS

012017

Study of water quality and carbon absorbtion in West Sunter Lake using phytoplankton

C M Rusly, D Hendrawan and A Rinanti

 View article  PDF

OPEN ACCESS

012018

Knowledge management system for risk mitigation in supply chain uncertainty: case from automotive battery supply chain

I A Marie, D Sugiarto, D Surjasa and A Witonohadi

 View article  PDF

OPEN ACCESS

012019

Urban community empowerment: context on supply chain collaboration in the SMEs

Y Masnita, H Triyowati and M Rasyawal

 View article  PDF

OPEN ACCESS

012020

Comparison of productive house spatial planning in Kampung Batik - Central Java object of observation: Pekalongan and Lasem

E R Kridarso

 View article  PDF

OPEN ACCESS

012021

Public open space for disaster mitigation in Tangerang housing estates

M I R Winandari

 View article  PDF

OPEN ACCESS

012022

Water quality study of Sunter River in Jakarta, Indonesia

Y Martinus, W Astono and D Hendrawan

 View article  PDF

OPEN ACCESS

012023

Study of pollution effect on water quality of Grogol River, DKI Jakarta

S Amira, W Astono and D Hendrawan

 View article  PDF

OPEN ACCESS

012024

Study of noise level at Raja Haji Fisabilillah airport in Tanjung Pinang, Riau Islands

H Nofriandi, A Wijayanti and M F Fachrul

 View article  PDF

OPEN ACCESS

012025

Makrozoobentos as bioindicator water quality of Krukut River, Depok, West Java, Indonesia

A D Jayanti, M F Fachrul and D Hendrawan

 View article  PDF

OPEN ACCESS

012026

The role of social message using norm abstraction level and ecological value orientation to achieve sustainable consumption

A Ekasari

 View article  PDF

OPEN ACCESS

012027

Speed–volume relationship and headway distribution analysis of motorcycle (case study: Teuku Nyak Arief Road)

E Prahara and R A Prasetya

 View article  PDF

OPEN ACCESS

012028

The dynamic of urban and protected areas at Balai Raja Wildlife Reserve, Riau, Indonesia: a social ecology approach

Suwondo, Darmadi and M Yunus

 View article  PDF

OPEN ACCESS

012029

Enhancing the open space of Jabodetabek area, Indonesia

A S Wartaman, R Situmorang and B B Suharto

 View article  PDF

OPEN ACCESS

012030

Accessibility of low-income family flats in North Jakarta city

T A Feminin, H W Wiranegara and Y Supriatna

 View article  PDF

OPEN ACCESS

012031

Simulating and evaluating an adaptive and integrated traffic lights control system for smart city application

E Djuana, K Rahardjo, F Gozali, S Tan, R Rambung and D Adrian

 View article  PDF

OPEN ACCESS

012032

Management of Hazardous Waste in Indonesia

H Widyatmoko

[View article](#) [PDF](#)**OPEN ACCESS**

012033

The correlation between temperature and humidity with the population density of *Aedes aegypti* as dengue fever's vector

M M Sintorini

[View article](#) [PDF](#)**OPEN ACCESS**

012034

The impact of total suspended particulate concentration on workers' health at ceramic industry

M M Sintorini

[View article](#) [PDF](#)**OPEN ACCESS**

012035

Public spaces and urban sustainability in the tropical built environment

Y M Yusof and M Kozłowski

[View article](#) [PDF](#)**OPEN ACCESS**

012036

Carbon emission disclosure: does it matter

Y A Sudibyo

[View article](#) [PDF](#)**OPEN ACCESS**

012037

Evaluation of axial pile bearing capacity based on pile driving analyzer (PDA) test using Neural Network

H Maizir and R Suryanita

[View article](#) [PDF](#)**OPEN ACCESS**

012038

Water accounting implementation: water footprint and water efficiency of the coffee shop in Indonesia

S P Hendratno and Y Agustine

[View article](#) [PDF](#)**OPEN ACCESS**

012039

Implementation green and low cost on landscape design of Manggarai Integrated Station, Jakarta

T Suryanti and H Meilanti

[View article](#) [PDF](#)

-
- OPEN ACCESS** 012040
Dynamics of land - use change in urban area in West Jakarta
R L Pangaribowo
 View article  PDF
-
- OPEN ACCESS** 012041
Study on water quality around mangrove ecosystem for coastal rehabilitation
G Guntur, A B Sambah, D M Arisandi, A Jauhari and A A Jaziri
 View article  PDF
-
- OPEN ACCESS** 012042
Urban simulation evaluation with study case of the Singapore Management University, Singapore
O Seanders
 View article  PDF
-
- OPEN ACCESS** 012043
Identification and analysis the illegal dumping spot of solid waste at Ciliwung segment 5 riverbanks
D Indrawati and P Purwaningrum
 View article  PDF
-
- OPEN ACCESS** 012044
Park system concept for environmental sustainability in urban spatial development
Q Uniaty
 View article  PDF
-
- OPEN ACCESS** 012045
Composing the theme of city to be diverse and sustainable
H W Wiranegara
 View article  PDF
-
- OPEN ACCESS** 012046
Determinants of corporate dividend policy in Indonesia
H S Lestari
 View article  PDF
-
- OPEN ACCESS** 012047
Performance of warm mix asphalt with Buton natural asphalt-rubber and zeolite as an additives
N Wahjuningsih, S P Hadiwardoyo, R J Sumabrata and M Anis

[View article](#) [PDF](#)**OPEN ACCESS**

012048

Treating domestic effluent wastewater treatment by aerobic biofilter with bioballs medium

R Permatasari, A Rinanti and R Ratnaningsih

[View article](#) [PDF](#)**OPEN ACCESS**

012049

The essential aspect in sewerage regulation in Indonesia

L Siami

[View article](#) [PDF](#)**OPEN ACCESS**

012050

The applied technologies to access clean water for remote communities

I B Rabindra

[View article](#) [PDF](#)**OPEN ACCESS**

012051

Effect of aluminizing on hardenability of steel (S45C)

D Prayitno and R Sugiarto

[View article](#) [PDF](#)**OPEN ACCESS**

012052

Urban farming model in South Jakarta

E Indrawati

[View article](#) [PDF](#)**OPEN ACCESS**

012053

Ground water potential assessment of Jatijajar-Ayah-Karangbolong mountain area, South Gombong

U Sumotarto

[View article](#) [PDF](#)**OPEN ACCESS**

012054

Improving the result of forecasting using reservoir and surface network simulation

R S Hendri and J Winarta

[View article](#) [PDF](#)**OPEN ACCESS**

012055

Factors affecting quality of social interaction park in Jakarta

N I Mangunsong

 View article  PDF

OPEN ACCESS

012056

Water quality assessment for self-sufficient water resources for DKI Jakarta

R Yanidar, D M Hartono and S S Moersidik

 View article  PDF

OPEN ACCESS

012057

Potential impact of particulate matter less than 10 micron (PM₁₀) to ambient air quality of Jakarta and Palembang

I Agustine, H Yulinawati, D Gunawan and E Suswantoro

 View article  PDF

OPEN ACCESS

012058

Influence of motorcycles lane to the traffic volume and travel speed in Denpasar, Indonesia

A M Mulyadi

 View article  PDF

OPEN ACCESS

012059

River water pollution condition in upper part of Brantas River and Bengawan Solo River

D Roosmini, M A Septiono, N E Putri, H M Shabrina, I R S Salami and H D Ariesyady

 View article  PDF

OPEN ACCESS

012060

Transformation of traditional houses in the development of sustainable rural tourism, case study of Brayut Tourism Village in Yogyakarta

V R Vitasurya, G Hardiman and S R Sari

 View article  PDF

OPEN ACCESS

012061

Outdoor thermal comfort and behaviour in urban area

I Inavonna, G Hardiman and A B Purnomo

 View article  PDF

OPEN ACCESS

012062

Influence of food kiosk attraction on the road's level of service

I W Agustin

 View article  PDF

-
- OPEN ACCESS** 012063
Study of locations' characteristics for stabilization of street vendors in Surakarta City
M J Rahayu, I Buchori and R Widjajanti
 View article  PDF
-
- OPEN ACCESS** 012064
Environmental performance and financial report integrity: challenges for the mining sector in Indonesia
S Mayangsari
 View article  PDF
-
- OPEN ACCESS** 012065
The prospects of the domestic water equity indicators in Indonesia: a review
A Nastiti, A Komarulzaman and A Sudradjat
 View article  PDF
-
- OPEN ACCESS** 012066
The spatial distribution of suspended sediment analysis along Krueng Cut River, Banda Aceh
M Irham, Y Fadhla and I Setiawan
 View article  PDF
-
- OPEN ACCESS** 012067
The numerical model of the sediment distribution pattern at Lampulo National fisheries port
M Irham and I Setiawan
 View article  PDF
-
- OPEN ACCESS** 012068
The potential of household solid waste reduction in Sukomanunggal District, Surabaya
I D A A Warmadewanthi and S Kurniawati
 View article  PDF
-
- OPEN ACCESS** 012069
Cleaner production options for reducing industrial waste: the case of batik industry in Malang, East Java-Indonesia
M Sirait
 View article  PDF
-
- OPEN ACCESS** 012070

Granulometric analysis at Lampulo Fishing Port (LFP) substrate, Banda Aceh, Indonesia

S Purnawan, I Setiawan, H A Haridhi and M Irham

 [View article](#)  [PDF](#)

OPEN ACCESS

012071

Potential reduction of non-residential solid waste in Sukomanunggal district West Surabaya

I D A A Warmadewanthi and S A Reswari

 [View article](#)  [PDF](#)

OPEN ACCESS

012072

Network integration modelling of feeder and BRT(bus rapid transit) to reduce the usage of private vehicles in Palembang's suburban area

D Nur'afalia, F Afifa, L Rubianto and K D M E Handayeni

 [View article](#)  [PDF](#)

OPEN ACCESS

012073

Proposing water balance method for water availability estimation in Indonesian regional spatial planning

A T Juniati, D Sutjningsih, H Soeryantono and E Kusratmoko

 [View article](#)  [PDF](#)

OPEN ACCESS

012074

Pathok Negoro mosque as the form of territorial defense region of Mataram Kingdom of Islam Java in Jogjakarta

E Setyowati, G Hardiman and T W Murtini

 [View article](#)  [PDF](#)

OPEN ACCESS

012075

Activities of four bus terminals of Semarang City gateway and the related GHG emission

H S Huboyo, I W Wardhana, E Sutrisno, L S Wangi and R A Lina

 [View article](#)  [PDF](#)

OPEN ACCESS

012076

Model of sustainability of vernacular kampongs within *Ngadha* culture, Flores

M B Susetyarto

 [View article](#)  [PDF](#)

OPEN ACCESS

012077

The effect of environmental performance and accounting characteristics to earnings informativeness

V Herawaty

 View article PDF

OPEN ACCESS

012078

Nitrogen removal on recycling water process of wastewater treatment plant effluent using subsurface horizontal wetland with continuous feed

T Tazkiaturrizki, P Soewondo and M Handajani

 View article PDF

OPEN ACCESS

012079

The determination of ground water quality based on the presence of *Escherichia coli* on populated area (a case study: Pasar Minggu, South Jakarta)

Y Rohmah, A Rinanti and D I Hendrawan

 View article PDF

OPEN ACCESS

012080

Distribution patterns study of *Escherichia coli* as an Indicator for ground water quality at Matraman District, East Jakarta

U Anisah, B Iswanto and A Rinanti

 View article PDF

OPEN ACCESS

012081

Escherichia coli as bioindicator of the groundwater quality in Palmerah District, West Jakarta, Indonesia

M P Dayanti, M F Fachrul and A Wijayanti

 View article PDF

OPEN ACCESS

012082

Development of salt production technology using prism greenhouse method

G Guntur, A A Jaziri, A A Prihanto, D M Arisandi and A Kurniawan

 View article PDF

OPEN ACCESS

012083

Constructing counterproductive behavior for supporting environmental management system research

Tiarapuspa, D L Indyastuti and W R Sari

 View article PDF

OPEN ACCESS

012084

The linkage between household water consumption and rainfall in the semi-arid region of East Nusa Tenggara, Indonesia

J J Messakh, D L Moy, D Mojo and Y Maliti

[View article](#) [PDF](#)**OPEN ACCESS**

012085

Towards green loyalty: the influences of green perceived risk, green image, green trust and green satisfaction

K Chrisjatmiko

[View article](#) [PDF](#)**OPEN ACCESS**

012086

Leachate characterization and performance evaluation of leachate treatment plant in Cipayung landfill, Indonesia

E Noerfitriyani, D M Hartono, S S Moersidik and I Gusniani

[View article](#) [PDF](#)**OPEN ACCESS**

012087

Harvesting of freshwater microalgae biomass by *Scenedesmus* sp. as bioflocculant

A Rinanti and R Purwadi

[View article](#) [PDF](#)**OPEN ACCESS**

012088

Molecular imprinted hydrogel polymer (MIHP) as microbial immobilization media in artificial produced water treatment

E Kardena, S L Ridhati and Q Helmy

[View article](#) [PDF](#)**OPEN ACCESS**

012089

Decolourization of remazol black-5 textile dyes using moving bed bio-film reactor

R Pratiwi, S Notodarmojo and Q Helmy

[View article](#) [PDF](#)**OPEN ACCESS**

012090

Biosorption of heavy metal copper (Cu^{2+}) by *Saccharomyces cerevisiae*

S A J Ririhena, A D Astuti, M F Fachrul, M D S Silalahi, R Hadisoebroto and A Rinanti

[View article](#) [PDF](#)**OPEN ACCESS**

012091

Waste utilization of red snapper (*Lutjanus* sp.) fish bone to improve phosphorus contents in compost

S Ramadhani, B Iswanto and P Purwaningrum

[View article](#) [PDF](#)**OPEN ACCESS**

The prospect of hazardous sludge reduction through gasification process

012092

R Hakiki, T Wikaningrum and T Kurniawan

[View article](#) [PDF](#)**OPEN ACCESS**

012093

Antecedents of willingness to pay for green products

S I Pratiwi and L A Pratomo

[View article](#) [PDF](#)**OPEN ACCESS**

012094

The effect of biomass concentration on polymer alginate in the immobilized biosorbent formation during the sorption process of heavy metal Cu²⁺

A Rinanti, D Jonathan, M D S Silalahi, M F Fachrul and R Hadisoebroto

[View article](#) [PDF](#)**OPEN ACCESS**

012095

Batch leachate treatment using stirred electrocoagulation reactor with variation of residence time and stirring rate

I S Sitorus, W Astono and B Iswanto

[View article](#) [PDF](#)**OPEN ACCESS**

012096

Effects of *Clitoria ternatea linn.* flower juice on the elasticity, texture and pores of the denture retainer component

E Erfan and C Cudharma

[View article](#) [PDF](#)**OPEN ACCESS**

012097

Study on financial risk towards individual investor as strategy to improve urban community empowerment

F M Leon and A Aprilia

[View article](#) [PDF](#)**OPEN ACCESS**

012098

Reconception of mandatory-based corporate social and environmental responsibility in Indonesia

S B Yunari, S Suhariningsih, R Syafa'at and S Sihabudin

[View article](#) [PDF](#)**OPEN ACCESS**

012099

Refuse derived fuel potential in DKI Jakarta

H Widyatmoko

[View article](#) [PDF](#)**OPEN ACCESS**

012100

Petroleum residues degradation in laboratory-scale by *rhizosphere* bacteria isolated from the mangrove ecosystem

A Rinanti and I J Nainggolan

[View article](#) [PDF](#)**OPEN ACCESS**

012101

Characterization of biosurfactant produced by petrofilic bacteria isolated from hydrocarbon impacted soil and its potential application in bioremediation

D M Arsyah, E Kardena and Q Helmy

[View article](#) [PDF](#)**OPEN ACCESS**

012102

Textile wastewater treatment: colour and COD removal of reactive black-5 by ozonation

I W K Suryawan, Q Helmy and S Notodarmojo

[View article](#) [PDF](#)**OPEN ACCESS**

012103

Potential of solid waste utilization as source of refuse derived fuel (RDF) energy (case study at temporary solid waste disposal site in West Jakarta)

D Indrawati, M Lindu and P Denita

[View article](#) [PDF](#)**OPEN ACCESS**

012104

Increasing urban community empowerment through changing of poverty rate index on the productive zakat impact

M H Zaenal, A D Astuti and A S Sadariyah

[View article](#) [PDF](#)**OPEN ACCESS**

012105

Improvement of bagasse become liginosulfonate surfactant for oil industry

R Setiati, S Prakoso, S Siregar, T Marhaendrajana, D Wahyuningrum and S Fajriah

[View article](#) [PDF](#)**OPEN ACCESS**

012106

Petroleum system of Northwest Java basin based on gravity data analysis

E Widiyanto

[View article](#) [PDF](#)

OPEN ACCESS

012107

The analysis of quantitative methods for renewable fuel processes and lubricant of materials derived from plastic waste

J R Rajagukguk

 View article  PDF

OPEN ACCESS

012108

The new management policy: Indonesian PSC-Gross split applied on CO₂ flooding project

S Irham, S N Sibuea and A Danu

 View article  PDF

OPEN ACCESS

012109

The new energy management policy: Indonesian PSC-gross-split applied on steam flooding project

S Irham and P Julyus

 View article  PDF

OPEN ACCESS

012110

Assessment of existing local houses condition as analysis tools for shore housing improvement program in Weriagar district, Bintuni Bay

F Firmansyah, A Fernando and I P R Allo

 View article  PDF

OPEN ACCESS

012111

Effect of iron and magnesium addition for ethanol production from the conversion of palm oil mill effluent by anaerobic processes

M Handajani, A Gumilar and M Syafila

 View article  PDF

OPEN ACCESS

012112

Design of combination biofilter and subsurface constructed wetland-multilayer filtration with vertical flow type using *Vetiveria zizanioides* (akar wangi)

A D Astuti, M Lindu, R Yanidar and M Faruq

 View article  PDF

OPEN ACCESS

012113

Effect of immobilized biosorbents on the heavy metals (Cu²⁺) biosorption with variations of temperature and initial concentration of waste

W P Siwi, A Rinanti, M D S Silalahi, R Hadisoebroto and M F Fachrul

 View article  PDF

-
- OPEN ACCESS** 012114
The multi-level perspective analysis: Indonesia geothermal energy transition study
A Wisaksono, J Murphy, J H Sharp and P L Younger
 View article  PDF
-
- OPEN ACCESS** 012115
Optimization biogas management as alternative energy from communal scale dairy farm
R Ruhiyat and L Siami
 View article  PDF
-
- OPEN ACCESS** 012116
Development of weighting value for ecodrainage implementation assessment criteria
S Andajani, D P A Hidayat and B E Yuwono
 View article  PDF
-
- OPEN ACCESS** 012117
The effect of mixing ratio variation of sludge and organic solid waste on biodrying process
A C Nasution and G A Kristanto
 View article  PDF
-
- OPEN ACCESS** 012118
Microclimate and architectural tectonic: vernacular floating house resilience in Seberang Ulu 1, Palembang
P Puspitasari, T Kadri, I Indartoyo and L Kusumawati
 View article  PDF
-
- OPEN ACCESS** 012119
The effect of leachate recirculation with enzyme cellulase addition on waste stability in landfill bioreactor
N Saffira and G A Kristanto
 View article  PDF
-
- OPEN ACCESS** 012120
Phytoremediation of heavy metal copper (Cu^{2+}) by sunflower (*Helianthus annuus L.*)
G Mahardika, A Rinanti and M F Fachrul
 View article  PDF

JOURNAL LINKS

[Journal home](#)

[Journal scope](#)

[Information for organizers](#)

[Information for authors](#)

[Contact us](#)

[Reprint services from Curran Associates](#)

IOPSCIENCE

[Journals](#)

[Books](#)

[IOP Conference Series](#)

[About IOPscience](#)

[Contact Us](#)

[Developing countries access](#)

[IOP Publishing open access policy](#)

[Accessibility](#)

IOP PUBLISHING

[Copyright 2024 IOP Publishing](#)

[Terms and Conditions](#)

[Disclaimer](#)

[Privacy and Cookie Policy](#)

[Text and Data mining policy](#)

PUBLISHING SUPPORT

[Authors](#)

[Reviewers](#)

[Conference Organisers](#)



PAPER • OPEN ACCESS

Effects of *Clitoria ternatea linn.* flower juice on the elasticity, texture and pores of the denture retainer component

To cite this article: E Erfan and C Cudharma 2018 *IOP Conf. Ser.: Earth Environ. Sci.* **106** 012096

View the [article online](#) for updates and enhancements.

You may also like

- [\(Invited\) A Functional Analysis of MEA Attributes and Properties for the Quality Control of Polymer Electrolyte Fuel Cells](#)

Xiaozi Yuan, Christine Nayoze-Coynel, Nima Shaigan et al.

- [Profile-Decomposing Output of Multi-Channel Odor Sensor Array](#)

Xiaofan Zheng, Yoichi Tomiura, Kenshi Hayashi et al.

- [A review on wear failure of hydraulic components: existing problems and possible solutions](#)

Anubhav Kumar Sharma, Niranjana Kumar and Alok Kumar Das

Effects of *Clitoria ternatea linn.* flower juice on the elasticity, texture and pores of the denture retainer component

E Erfan^{1*}, C Cudharma²

¹Oral Biology Department, Faculty of Dental, Universitas Trisakti Jakarta, Indonesia

²Clinical Programme, Faculty of Dental, Universitas Trisakti Jakarta, Indonesia

*Corresponding Author : erni.erfan@trisakti.ac.id

Abstract. *Clitoria ternatea* flower has a variety of antioxidant compounds. To analyze the effects of the flower juice on the elasticity, roughness and pore components of partial denture retainer (stainless steel wire). 0.8 cm of retainer wire components were soaked in the juice (1 g/mL) for 4, 6, and 8 hours at room temperature. Polident and mineral water were used as controls. Measurement of the elasticity, texture and pore of each component based on the addition of wire length, number of pixels, and pores average. *C. ternatea* flower juice showed no statistically significant difference effects among all type solutions on the elasticity, texture and pore of the retainer component. *C. ternatea* flower juice did not cause alteration in the retainer component in terms of elasticity, texture and pore.

Keywords: *Clitoria ternatea*, elasticity, pore and wire, roughness

1. Introduction

C. ternatea flower contained phenolic compounds, flavonoid, anthocyanin, saponin, alkaloid, and anthocyanidin.[1, 2] Stainless steel wire is most used in prosthodontic and orthodontic treatment due to its content and excellent corrosion resistance in the oral environment [3]. The wire's components was 17-20%, 8-12%, and 0.15% for was chromium, nickel and carbon respectively [4]. It is imperative to find natural materials which through a simple method can be processed as a cleaning solution for the denture retainer. So that maintenance cost of it can be reduced.

1.1. Conceptual framework

Making artificial teeth has the purpose to improve some functions, the functions are mastication, phonetics, and aesthetic. In addition to maintaining the health of tissues in the oral cavity against further damage. There are a variety of dentures one of which is partially removable partial denture. The denture retainer is a partially removable denture component as part of a denture used for the purpose of obtaining stability or denture fixation [5]. Elasticity, texture, and pores of the denture retainer are the essential factors in determining the denture retainer quality and also affects its corrosion behavior, biocompatibility and supporting in the health oral cavity of a user [3], [6]



2. Research Method

2.1. Used materials

Clitoria ternatea (Ct) flower, Stainless steel wire (AISI 302), mineral water, Polident tablet.

2.2. Preparation of Ct flower juice.

Ct flower, harvested in May where growth in Jakarta. Stainless steel wire with 0.8 mm in length. The flower part used was the crown.

After ten of the crowns are washed cleanly, they are immersed in sterile water for 5 minutes. Then the crowns of the flower are squeezed to get 9 mL its juice. The juice was filtered using filter paper and then filtered through milli pores filter ($\phi = 0.22 \mu\text{m}$, Sartorius) to prevent contamination of the juice. The final volume of the juice was 8 mL which was divided into four tubes. The tubes were tube I, II, III as a place of wire which soaked in the water for 4, 6, 8 hours and tube C1 as an internal control. There were two other tubes. They were filled the wire which was soaked in Polident solution and mineral water respectively as the positive control (C2) and negative control (C3).

2.3. Test Performed

The elasticity, texture and pore of the wire were performed by accurately observed using optical an microscope . The microscope oriented at 90 degress to the wire surface.[3] All the images were captured at 50x magnification. The elasticity is measured based on the change in the wire length. The measurements were done before and after (4, 6, and 8 hours) immersion. The imaging data of microstructural features of the wire were analyzed further more by ImageJ plugin version 1.46r to obtaian numerical data in the ratio scale [7]. Furthermore, the data were analyzed statistically using repeated ANOVA ($p > 0.05$) to find out the difference between treatment and control group data.

3. Results and Discussion

Tabel 1 shows the length of the tested wire before and after soaked in the juice of *C. ternatea* flower on three repetitions of measurements. The duration of immersion time is used base on the length of time a person eats his food in a day (4-6 hours) (the time when removable orthodontic users do not use their wire) and duration of teens and adult human sleep in a day (± 8 hours) [8]. While sleeping a removable prosthodontic users does not use the dentures. The measurements are intended to know the elasticity of the wires. We did not calculate their modulus of elasticity. Table 1 shows that no tested wire underwent a lengthy alteration. It describes that the three cleaning solutions did not affect the elasticity of the wire for 8 hours immersion period.

Table 1. The length of the wire before and after soaked in the juice of *C. ternatea* flower.

	Length of the wire (cm) after soaked in the juice			
	0 hour	4 hours	6 hours	8 hours
I	0.800	0.800	0.800	0.800
II	0.800	0.800	0.800	0.800
III	0.800	0.800	0.800	0.800
C2	0.800	0.008	0.800	0.800
C3	0.800	0.800	0.800	0.800

The calculated surface roughness values were; arithmetical mean deviation (Ra), root mean square deviation (Rq), kurtosis of the assessed profile (Rku), skewness of the assessed profile (Rsk), lowest valley (given by the min measurements) (Rv), highest peak (given by the max measurements) (Rp), and the total height of the profile (Rt) [9]. The value of the parameters described the surface texture of the tested wire. All values of the seven parameters of each soaked wire are presented in Tables 2.a. and 2.b. The data in both tables are obtained respectively based on value of Gaussian filtering (GF) and Fast Fourier Transform (FTT) bandpass filtering results.

Table 2. Average roughness parameters of the wire at before and after soaked in the juice; (a) Gaussian Filtering (GF); (b) Fast Fourier Transform (FFT) bandpass filtering.

(a) GF for roughness parameters								
	hrs	Ra	Rq	Rku	Rsk	Rv	Rp	Rt
I	0	99.426	100.794	1.117	1.042	60	164	224
	4	99.426	100.794	1.117	1.042	60	164	224
	6	141.258	146.076	1.167	1.068	7.333	255	262.333
	8	153.072	157.939	1.133	1.057	0	245.667	245.667
II	0	130.256	153.874	1.198	1.081	1.333	255	256.333
	4	130.256	153.874	1.198	1.081	1.333	255	256.333
	6	148.784	154.017	1.154	1.064	2	255	257
	8	143.733	149.063	1.146	1.063	0	255	255
III	0	132.797	140.521	1.290	1.117	0	255	255
	4	132.797	140.521	1.290	1.117	0	255	255
	6	136.654	143.123	1.233	1.094	0	255	255
	8	134.411	141.399	1.196	1.084	0	254.667	254.667
C2	0	134.113	139.277	1.171	1.071	0	255	255
	4	134.113	139.277	1.171	1.071	0	255	255
	6	136.654	143.123	1.233	1.094	0	255	255
	8	154.256	160.147	1.158	1.068	0.333	255	255.333
C3	0	98.300	111.766	1.818	1.292	2.684	245.129	247.813
	4	98.300	111.766	1.818	1.292	2.684	245.129	247.813
	6	146.419	151.683	1.140	1.062	0.667	253.667	254.333
	8	135.879	145.675	1.283	1.121	0	255	255

(b) FFT bandpass filtering for roughness parameters								
	hrs	Ra	Rq	Rku	Rsk	Rv	Rp	Rt
I	0	0.006	0.046	89.700	9.092	0	1	1
	4	0.006	0.046	89.700	9.092	0	1	1
	6	3.929E-4	0.005	698.496	16.191	0	1	1
	8	0.006	0.046	89.600	9.085	0	1	1
II	0	0.006	0.046	89.700	9.092	0	1	1
	4	0.006	0.046	89.700	9.092	0	1	1
	6	3.929e-4	0.005	698.496	16.191	0	1	1
	8	3.929e-4	0.005	698.496	16.191	0	1	1
III	0	0.006	0.046	89.700	9.092	0	1	1
	4	0.006	0.046	89.700	9.092	0	1	1
	6	3.926e-4	0.005	336.370	14.644	0	1	1
	8	0.006	0.046	89.700	9.092	0	1	1
C2	0	3.926E-4	0.005	336.370	14.644	0	1	1
	4	3.926E-4	0.005	336.370	14.644	0	1	1
	6	3.926E-4	0.005	336.370	14.644	0	1	1
	8	0.006	0.046	89.600	9.085	0	1	1
C3	0	3.929E-4	0.005	698.496	16.191	0	1	1
	4	3.929E-4	0.005	698.496	16.191	0	1	1
	6	3.929E-4	0.005	336.370	14.644	0	1	1
	8	0.006	0.046	89.700	9.092	0	1	1

Table 2 showed the surface roughness parameter data based on Gaussian filtering techniques (sigma value = 5) and Fast Fourier Transform (FFT) with bandpass filter size of 10 x 20 pixels with 178.75 pixels/mm. The homogeneity of Table 2 data did not differ significantly.

The pore diameters of the tested wires at before and after immersed in the three cleaning solutions ranged from 30 to 16 μm . The results of statistic test showed that there is no difference of length,

surface roughness and pore diameter between wires soaked in the juice of flower of Ct, Polident and mineral water significantly.

The gold standard for morphological measurements for the nano-sized component parts is the image of the electron microscope [10]. However, the use of Scanning Electron Microscope for the purpose of measurement began to be abandoned with increasing the ability of optical microscopes and the increasing functionality of plugins on the software to analyze images such as Image J. Our study proves that the images obtained from optical microscopes can show variations of data although statistically not significantly different. It can be seen from the data contained in Table 2.a., and Table 2.b [11]. Ra is a roughness parameter used to control the quality of roughness in general. Ra is easily defined and measured and provides a general description of high variations [12]. Although statistically insignificant, the data in Table 2.a, shows a change in Ra value on wire immersed in Polident and mineral water after 6 and 8 hours of immersion. While the data in Table 2.b, shows that there is a change of Ra value on the wire soaked in Polident and mineral water, after 8 hours of immersion mass.

Rku parameter illustrates the sharpness of the probability density of the amplitude probability density function profile. For Rku in the GF for roughness parameters, if the value is less than three then the distribution curve is said to be platykurtic which has relatively few high peaks and low valleys [12]. All of Rku values in Table 2.a, data show that the value of all wires at all immersion periods is less than 1. It can be stated that all the wires tested at all periods of immersion in all types of submersion solutions are not found in parts which have relatively much high peaks and low valleys. The largest variation in Rku values occurs in the data group of wires immersed in mineral water.

Table 2.b data for the Rv and Rp parameters, show the same value for all the soaked wire each is zero. However in table 2.a the data for both parameters are more varied although not statistically significant. The sum of Rv and Rp parameters values is Rt [12]. So the same thing happens to the value of the Rt parameter. This shows no 'perforation on all surfaces of the wires after immersion in all periods of immersion.

4. Conclusions

The results of this study proved that Ct flower juice did not cause the alteration in the retainer component in terms of elasticity, texture, and pore. Although the data obtained was the test results performed for 8 hours but enough to be used serve as a scientific base to utilize Ct which is a native Indonesian plant as the main ingredient of a cleaning solution.

Acknowledgment

This study was supported by a Grant-in-Aid from the Ministry of Research, Technology and Higher Education of the Republic of Indonesia.

References

- [1] Kaisoon O, Siriamornpun S, Weerapreeyakul N, and Meeso N. 2011. Phenolic compounds and antioxidant activities of edible flowers from Thailand. *Journal of Functional Foods*. 3:88-99
- [2] Nair V, Bang W Y, Schreckinger E, Andarwulan N, and Zevallos C. 2015. Protective Role of Ternatin Anthocyanins and Quercetin Glycosides from Butterfly Pea (*Clitoria ternatea* Leguminosae) Blue Flower Petals against Lipopolysaccharide (LPS)-Induced Inflammation in Macrophage Cells. *J. Agric. Food Chem.* 63:6355-6365
- [3] Elayyan F, Silikas N, and Bearn D. 2008. Ex-vivo surface and mechanical properties of coated orthodontic archwires. *European Journal of Orthodontics*. 30:661-667.
- [4] Santander SA, and Luna-Ossa C M. 2015. Stainless Steel: Material Facts for the Orthodontic Practitioner. *Revista Nacional de Odontología*. 11:20
- [5] Aquino Souza J E, Silva N R F A, Coelho P G, Ferracioli ACZRCSR, and Ricardo Alexandre Zavanelli. 2011. Retention Strength of Cobalt-Chromium vs Nickel-Chromium Titanium vs CP Titanium in a Cast Framework Association of Removable Partial Overdenture. *Journal of Contemporary Dental Practice*. 12:179-186

- [6] Venab A, Carey J, and Badawic H. 2007. Clinical Variability in Arch Wires: A Preliminary Study Evaluating Mechanical and Surface Characteristics of Two Different Sized Rectangular Stainless Steel Wires. *Open Biomedical Engineering Journal*. 1:13-22
- [7] Heima K, Bernierb F, Pelletierb R, and Lefebvreb L P. 2016. High resolution pore size analysis in metallic powders by X-ray tomography Case Studies in Nondestructive Testing and Evaluation. 6:46-52
- [8] Watson NF et. al., 2015 Recommended Amount of Sleep for a Healthy Adult: A Joint Consensus Statement of the American Academy of Sleep Medicine and Sleep Research Society. *Journal of Clinical Sleep Medicine*.11:591-592.
- [9] Ondimu S, and Murase H. 2008. *Proc. Int. Conf. of the 17th World Congress*, (Seoul : The Int. Federation of Automatic Control) pp 641-646.
- [10] Hotaling NA, Bharti K, Kriel H, and Simon Jr CG. 2015. Diameter J: A Validated Open Source Nanofiber Diameter Measurement Tool. *Biomaterials*. 61:327-338.
- [11] Rafi K, Development of Porous TiO₂ Layer on Ti6AL4V for Bone Implants. *Biotechnology and Medical Engineering National Institute of Technology Rourkela*, p 25, 2014.
- [12] Gadelmawla E S, Koura M M, Maksoud T M A, Elewa I M, and H H Soliman. 2002. Roughness parameters. *Journal of Materials Processing Technology*. 123:133-145.

Erni erfan

Effects of Clitoria ternatea linn. flower juice on the elasticity, texture and pores of the denture retainer component

 Effects of Clitoria ternatea linn. flower juice on the elasticity, texture and pores of the denture retainer component

Document Details

Submission ID

trn:oid::3618:128698806

Submission Date

Feb 20, 2026, 8:22 AM GMT+7

Download Date

Feb 20, 2026, 8:29 AM GMT+7

File Name

Erfan_2018_IOP_Conf._Ser._Earth_Environ._Sci._106_012096.pdf

File Size

298.6 KB

6 Pages

2,850 Words

13,288 Characters

3% Overall Similarity

The combined total of all matches, including overlapping sources, for each database.

Filtered from the Report

- ▶ Bibliography
- ▶ Small Matches (less than 15 words)

Exclusions

- ▶ 11 Excluded Matches

Match Groups

- 3 Not Cited or Quoted 3%**
Matches with neither in-text citation nor quotation marks
- 0 Missing Quotations 0%**
Matches that are still very similar to source material
- 0 Missing Citation 0%**
Matches that have quotation marks, but no in-text citation
- 0 Cited and Quoted 0%**
Matches with in-text citation present, but no quotation marks

Top Sources

- 2% Internet sources
- 3% Publications
- 0% Submitted works (Student Papers)

Integrity Flags

0 Integrity Flags for Review

Our system's algorithms look deeply at a document for any inconsistencies that would set it apart from a normal submission. If we notice something strange, we flag it for you to review.

A Flag is not necessarily an indicator of a problem. However, we'd recommend you focus your attention there for further review.

Match Groups

- 3 Not Cited or Quoted 3%**
Matches with neither in-text citation nor quotation marks
- 0 Missing Quotations 0%**
Matches that are still very similar to source material
- 0 Missing Citation 0%**
Matches that have quotation marks, but no in-text citation
- 0 Cited and Quoted 0%**
Matches with in-text citation present, but no quotation marks

Top Sources

- 2% Internet sources
- 3% Publications
- 0% Submitted works (Student Papers)

Top Sources

The sources with the highest number of matches within the submission. Overlapping sources will not be displayed.

1	Publication	
	Suining Wu, Bin Li, Zhixin Wang, Xiaoguang Chen, Long Shi, Shulin Tan. "An accur...	1%
2	Internet	
	iopscience.iop.org	<1%
3	Internet	
	ouci.dntb.gov.ua	<1%

PAPER • OPEN ACCESS

 Effects of *Clitoria ternatea linn.* flower juice on the elasticity, texture and pores of the denture retainer component

To cite  article: E Erfan and C Cudharma 2018 *IOP Conf. Ser.: Earth Environ. Sci.* **106** 012096

 View the [article online](#) for updates and enhancements.

You may also like

- [\(Invited\) A Functional Analysis of MEA Attributes and Properties for the Quality Control of Polymer Electrolyte Fuel Cells](#)
Xiaozi Yuan, Christine Nayoze-Coynel, Nima Shaigan et al.
- [Profile-Decomposing Output of Multi-Channel Odor Sensor Array](#)
Xiaofan Zheng, Yoichi Tomiura, Kenshi Hayashi et al.
- [A review on wear failure of hydraulic components: existing problems and possible solutions](#)
Anubhav Kumar Sharma, Niranjana Kumar and Alok Kumar Das

Effects of *Clitoria ternatea* linn. flower juice on the elasticity, texture and pores of the denture retainer component

E Erfan^{1*}, **C Cudharma**²

¹Oral Biology Department, Faculty of Dental, Universitas Trisakti Jakarta, Indonesia

²Clinical Programme, Faculty of Dental, Universitas Trisakti Jakarta, Indonesia

*Corresponding Author : erni.erfan@trisakti.ac.id

Abstract. *Clitoria ternatea* flower has a variety of antioxidant compounds. To analyze the effects of the flower juice on the elasticity, roughness and pore components of partial denture retainer (stainless steel wire). 0.8 cm of retainer wire components were soaked in the juice (1 g/mL) for 4, 6, and 8 hours at room temperature. Polident and mineral water were used as controls. Measurement of the elasticity, texture and pore of each component based on the addition of wire length, number of pixels, and pores average. *C. ternatea* flower juice showed no statistically significant difference effects among all type solutions on the elasticity, texture and pore of the retainer component. *C. ternatea* flower juice did not cause alteration in the retainer component in terms of elasticity, texture and pore.

Keywords: *Clitoria ternatea*, elasticity, pore and wire, roughness

1. Introduction

C. ternatea flower contained phenolic compounds, flavonoid, anthocyanin, saponin, alkaloid, and anthocyanidin.[1, 2] Stainless steel wire is most used in prosthodontic and orthodontic treatment due to its content and excellent corrosion resistance in the oral environment [3]. The wire's components was 17-20%, 8-12%, and 0.15% for was chromium, nickel and carbon respectively [4]. It is imperative to find natural materials which through a simple method can be processed as a cleaning solution for the denture retainer. So that maintenance cost of it can be reduced.

1.1. Conceptual framework

Making artificial teeth has the purpose to improve some functions, the functions are mastication, phonetics, and aesthetic. In addition to maintaining the health of tissues in the oral cavity against further damage. There are a variety of dentures one of which is partially removable partial denture. The denture retainer is a partially removable denture component as part of a denture used for the purpose of obtaining stability or denture fixation [5]. Elasticity, texture, and pores of the denture retainer are the essential factors in determining the denture retainer quality and also affects its corrosion behavior, biocompatibility and supporting in the health oral cavity of a user [3], [6]



2. Research Method

2.1. Used materials

Clitoria ternatea (Ct) flower, Stainless steel wire (AISI 302), mineral water, Polident tablet.

2.2. Preparation of Ct flower juice.

Ct flower, harvested in May where growth in Jakarta. Stainless steel wire with 0.8 mm in length. The flower part used was the crown.

After ten of the crowns are washed cleanly, they are immersed in sterile water for 5 minutes. Then the crowns of the flower are squeezed to get 9 mL its juice. The juice was filtered using filter paper and then filtered through milli pores filter ($\phi = 0.22 \mu\text{m}$, Sartorius) to prevent contamination of the juice. The final volume of the juice was 8 mL which was divided into four tubes. The tubes were tube I, II, III as a place of wire which soaked in the water for 4, 6, 8 hours and tube C1 as an internal control. There were two other tubes. They were filled the wire which was soaked in Polident solution and mineral water respectively as the positive control (C2) and negative control (C3).

2.3. Test Performed

The elasticity, texture and pore of the wire were performed by accurately observed using optical an microscope . The microscope oriented at 90 degress to the wire surface.[3] All the images were captured at 50x magnification. The elasticity is measured based on the change in the wire length. The measurements were done before and after (4, 6, and 8 hours) immersion. The imaging data of microstructural features of the wire were analyzed further more by ImageJ plugin version 1.46r to obtaian numerical data in the ratio scale [7]. Furthermore, the data were analyzed statistically using repeated ANOVA ($p > 0.05$) to find out the difference between treatment and control group data.

3. Results and Discussion

Tabel 1 shows the length of the tested wire before and after soaked in the juice of *C. ternatea* flower on three repetitions of measurements. The duration of immersion time is used base on the length of time a person eats his food in a day (4-6 hours) (the time when removable orthodontic users do not use their wire) and duration of teens and adult human sleep in a day (± 8 hours) [8]. While sleeping a removable prosthodontic users does not use the dentures. The measurements are intended to know the elasticity of the wires. We did not calculate their modulus of elasticity. Table 1 shows that no tested wire underwent a lengthy alteration. It describes that the three cleaning solutions did not affect the elasticity of the wire for 8 hours immersion period.

Table 1. The length of the wire before and after soaked in the juice of *C. ternatea* flower.

	Length of the wire (cm) after soaked in the juice			
	0 hour	4 hours	6 hours	8 hours
I	0.800	0.800	0.800	0.800
II	0.800	0.800	0.800	0.800
III	0.800	0.800	0.800	0.800
C2	0.800	0.008	0.800	0.800
C3	0.800	0.800	0.800	0.800

The calculated surface roughness values were; arithmetical mean deviation (Ra), root mean square deviation (Rq), kurtosis of the assessed profile (Rku), skewness of the assessed profile (Rsk), lowest valley (given by the min measurements) (Rv), highest peak (given by the max measurements) (Rp), and the total height of the profile (Rt) [9]. The value of the parameters described the surface texture of the tested wire. All values of the seven parameters of each soaked wire are presented in Tables 2.a. and 2.b. The data in both tables are obtained respectively based on value of Gaussian filtering (GF) and Fast Fourier Transform (FTT) bandpass filtering results.

Table 2. Average roughness parameters of the wire at before and after soaked in the juice; (a) Gaussian Filtering (GF); (b) Fast Fourier Transform (FTT) bandpass filtering.

(a) GF for roughness parameters								
	hrs	Ra	Rq	Rku	Rsk	Rv	Rp	Rt
I	0	99.426	100.794	1.117	1.042	60	164	224
	4	99.426	100.794	1.117	1.042	60	164	224
	6	141.258	146.076	1.167	1.068	7.333	255	262.333
	8	153.072	157.939	1.133	1.057	0	245.667	245.667
II	0	130.256	153.874	1.198	1.081	1.333	255	256.333
	4	130.256	153.874	1.198	1.081	1.333	255	256.333
	6	148.784	154.017	1.154	1.064	2	255	257
	8	143.733	149.063	1.146	1.063	0	255	255
III	0	132.797	140.521	1.290	1.117	0	255	255
	4	132.797	140.521	1.290	1.117	0	255	255
	6	136.654	143.123	1.233	1.094	0	255	255
	8	134.411	141.399	1.196	1.084	0	254.667	254.667
C2	0	134.113	139.277	1.171	1.071	0	255	255
	4	134.113	139.277	1.171	1.071	0	255	255
	6	136.654	143.123	1.233	1.094	0	255	255
	8	154.256	160.147	1.158	1.068	0.333	255	255.333
C3	0	98.300	111.766	1.818	1.292	2.684	245.129	247.813
	4	98.300	111.766	1.818	1.292	2.684	245.129	247.813
	6	146.419	151.683	1.140	1.062	0.667	253.667	254.333
	8	135.879	145.675	1.283	1.121	0	255	255

(b) FFT bandpass filtering for roughness parameters								
	hrs	Ra	Rq	Rku	Rsk	Rv	Rp	Rt
I	0	0.006	0.046	89.700	9.092	0	1	1
	4	0.006	0.046	89.700	9.092	0	1	1
	6	3.929E-4	0.005	698.496	16.191	0	1	1
	8	0.006	0.046	89.600	9.085	0	1	1
II	0	0.006	0.046	89.700	9.092	0	1	1
	4	0.006	0.046	89.700	9.092	0	1	1
	6	3.929e-4	0.005	698.496	16.191	0	1	1
	8	3.929e-4	0.005	698.496	16.191	0	1	1
III	0	0.006	0.046	89.700	9.092	0	1	1
	4	0.006	0.046	89.700	9.092	0	1	1
	6	3.926e-4	0.005	336.370	14.644	0	1	1
	8	0.006	0.046	89.700	9.092	0	1	1
C2	0	3.926E-4	0.005	336.370	14.644	0	1	1
	4	3.926E-4	0.005	336.370	14.644	0	1	1
	6	3.926E-4	0.005	336.370	14.644	0	1	1
	8	0.006	0.046	89.600	9.085	0	1	1
C3	0	3.929E-4	0.005	698.496	16.191	0	1	1
	4	3.929E-4	0.005	698.496	16.191	0	1	1
	6	3.929E-4	0.005	336.370	14.644	0	1	1
	8	0.006	0.046	89.700	9.092	0	1	1

Table 2 showed the surface roughness parameter data based on Gaussian filtering techniques (sigma value = 5) and Fast Fourier Transform (FFT) with bandpass filter size of 10 x 20 pixels with 178.75 pixels/mm. The homogeneity of Table 2 data did not differ significantly.

The pore diameters of the tested wires at before and after immersed in the three cleaning solutions ranged from 30 to 16 μm. The results of statistic test showed that there is no difference of length,

surface roughness and pore diameter between wires soaked in the juice of flower of Ct, Polident and mineral water significantly.

The gold standard for morphological measurements for the nano-sized component parts is the image of the electron microscope [10]. However, the use of Scanning Electron Microscope for the purpose of measurement began to be abandoned with increasing the ability of optical microscopes and the increasing functionality of plugins on the software to analyze images such as Image J. Our study proves that the images obtained from optical microscopes can show variations of data although statistically not significantly different. It can be seen from the data contained in Table 2.a., and Table 2.b [11]. Ra is a roughness parameter used to control the quality of roughness in general. Ra is easily defined and measured and provides a general description of high variations [12]. Although statistically insignificant, the data in Table 2.a, shows a change in Ra value on wire immersed in Polident and mineral water after 6 and 8 hours of immersion. While the data in Table 2.b, shows that there is a change of Ra value on the wire soaked in Polident and mineral water, after 8 hours of immersion mass.

Rku parameter illustrates the sharpness of the probability density of the amplitude probability density function profile. For Rku in the GF for roughness parameters, if the value is less than three then the distribution curve is said to be platykurtic which has relatively few high peaks and low valleys [12]. All of Rku values in Table 2.a, data show that the value of all wires at all immersion periods is less than 1. It can be stated that all the wires tested at all periods of immersion in all types of submersion solutions are not found in parts which have relatively much high peaks and low valleys. The largest variation in Rku values occurs in the data group of wires immersed in mineral water.

Table 2.b data for the Rv and Rp parameters, show the same value for all the soaked wire each is zero. However in table 2.a the data for both parameters are more varied although not statistically significant. The sum of Rv and Rp parameters values is Rt [12]. So the same thing happens to the value of the Rt parameter. This shows no 'perforation on all surfaces of the wires after immersion in all periods of immersion.

4. Conclusions

The results of this study proved that Ct flower juice did not cause the alteration in the retainer component in terms of elasticity, texture, and pore. Although the data obtained was the test results performed for 8 hours but enough to be used serve as a scientific base to utilize Ct which is a native Indonesian plant as the main ingredient of a cleaning solution.

Acknowledgment

This study was supported by a Grant-in-Aid from the Ministry of Research, Technology and Higher Education of the Republic of Indonesia.

References

- [1] Kaisoon O, Siriamornpun S, Weerapreeyakul N, and Meeso N. 2011. Phenolic compounds and antioxidant activities of edible flowers from Thailand. *Journal of Functional Foods*. 3:88-99
- [2] Nair V, Bang W Y, Schreckinger E, Andarwulan N, and Zevallos C. 2015. Protective Role of Ternatin Anthocyanins and Quercetin Glycosides from Butterfly Pea (*Clitoria ternatea* Leguminosae) Blue Flower Petals against Lipopolysaccharide (LPS)-Induced Inflammation in Macrophage Cells. *J. Agric. Food Chem.* 63:6355-6365
- [3] Elayyan F, Silikas N, and Bearn D. 2008. Ex-vivo surface and mechanical properties of coated orthodontic archwires. *European Journal of Orthodontics*. 30:661-667.
- [4] Santander SA, and Luna-Ossa C M. 2015. Stainless Steel: Material Facts for the Orthodontic Practitioner. *Revista Nacional de Odontología*. 11:20
- [5] Aquino Souza J E, Silva N R F A, Coelho P G, Ferracioli ACZRCSR, and Ricardo Alexandre Zavanelli. 2011. Retention Strength of Cobalt-Chromium vs Nickel-Chromium Titanium vs CP Titanium in a Cast Framework Association of Removable Partial Overdenture. *Journal of Contemporary Dental Practice*. 12:179-186

- [6] Venab A, Carey J, and Badawic H. 2007. Clinical Variability in Arch Wires: A Preliminary Study Evaluating Mechanical and Surface Characteristics of Two Different Sized Rectangular Stainless Steel Wires. *Open Biomedical Engineering Journal*. 1:13-22
- [7] Heima K, Bernierb F, Pelletierb R, and Lefebvreb L P. 2016. High resolution pore size analysis in metallic powders by X-ray tomography Case Studies in Nondestructive Testing and Evaluation. 6:46-52
- [8] Watson NF et. al., 2015 Recommended Amount of Sleep for a Healthy Adult: A Joint Consensus Statement of the American Academy of Sleep Medicine and Sleep Research Society. *Journal of Clinical Sleep Medicine*.11:591-592.
- [9] Ondimu S, and Murase H. 2008. *Proc. Int. Conf. of the 17th World Congress*, (Seoul : The Int. Federation of Automatic Control) pp 641-646.
- [10] Hotaling NA, Bharti K, Kriel H, and Simon Jr CG. 2015. Diameter J: A Validated Open Source Nanofiber Diameter Measurement Tool. *Biomaterials*. 61:327-338.
- [11] Rafi K, Development of Porous TiO₂ Layer on Ti6AL4V for Bone Implants. *Biotechnology and Medical Engineering National Institute of Technology Rourkela*, p 25, 2014.
- [12] Gadelmawla E S, Koura M M, Maksoud T M A, Elewa I M, and H H Soliman. 2002. Roughness parameters. *Journal of Materials Processing Technology*. 123:133-145.