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- 28 SEPTEMBER 2021**
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- ACCEPTED FULL PAPER (4 Desember 2021)
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Daftar Lampiran

	Halaman
1. Abstrak yang dikirim	3
2. Pemberitahuan submit abstrak	5
3. LoA abstrak yang dikirim	6
4. Pemberitahuan tagihan	9
5. Bukti pembayaran	11
6. Pemberitahuan full paper submission	13
7. Pemberitahuan full paper deadline	14
8. Naskah full paper	15
9. Pemberitahuan informasi konferensi secara daring	22
10. Pemberitahuan jadwal konferensi presenter	26
11. Sertifikat participant	34
12. Sertifikat presenter	36
13. LoA full paper	38
14. Naskah paper siap publish	40
15. Pemberitahuan terbit di Atlantis Press	47

Abstract

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Leaves as Ecofriendly Disposable Plates: Cultural Roots, Technology and Transformations

Martinus, Gita Paramita Djausal, Sri Ratna Sulistiyanti, Meizano Ardi Muhammad, Mareli Telaumbanua

In human's life, we use leaves, not only as food but also as food wrap. Banana leaves are the most Man leave. That are used by tropical and subtropical nations. It is used for cooking, food wrapping, and food serving. Teak leaves are also common for food serving. The environmental challenges nowadays, one of them is plastic waste. Some of the plastic waste came from disposable plastic plates, plastic cups, plastic straw and many others. From the historical and also the cultural perspective. We can use leaves and also the technology to produce mass production of eco-friendly single use plates. Lampung's local knowledge shows that tebakak leaves is a specific signature Lampung leaves that have been used for so long to serve food. Go-plate has already produced leaves plate, eco-friendly plates since 2017. The challenges for the development of the ecofriendly plater are consumer knowledge, productivity and broader marketing.

Key words: leaves, tebakak, disposable, food warp, ecofriendly



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Tebakak Leaves Plates as an Ecofriendly Disposable Plates: Cultural Roots, Technology and People Transformations

Martinus ^{1,*} Gita Paramita Djausal ² Sri Ratna Sulistiyanti ³

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ABSTRACT

Plastic has become the dominant problems in recent years since it become the dominant material for food packaging. More than 600 thousand tons of plastic becoming waste in 2019. Leaf as food packaging material has been known since the dawn of civilization In Indonesia itself leaf and other plant's organic material commonly used as traditional food wrapper. Commonly known leaf such as banana leaf, waru leaf, tepus leaf, simpur leaf, syzigium leaf and also tembakak leaf used for wrapping traditional food. Thus triggering for the use of environmentally friendly tebakak leaf plates that are easily biodegradable, easy to produce, hygienic, and have lampung cultural background. One main question can the consumer shift from plastic based disposable plate to greener leaf base plate. Can tebakak leaf plate as an ecofriendly product try to replace plastic or just another plastic alternative. And, how the consumer's perspective of tebakak leaf plates as an ecofriendly product. We learn that both leaf plates (tebakak leaf plates and teak leaf plates) can be contender for plastic plates and paper plates while styrofoam plates has the lowest value. The consumer agrees that tebakak leaf plates and the teak leaf plates are green and want to use them. The main hindrance of using the leaf plates is the availability on the market and its higher price.

Keywords: Leaf plate, Tebakak, Disposable plates, Ecofriendly

1. INTRODUCTION

Plastic has become the dominant problems in recent years since it become the dominant material for food packaging since its mass production in 1930s[1]. More than 600 thousand tons of plastic becoming waste in

2019. Even in the pandemic year, the plastic waste remain grow while the cities lock down[2].

Leaf as food packaging material has been known since the dawn of civilization[3]. In Indonesia itself leaf and other plant's organic material commonly used as traditional food wrapper[4][5] Commonly known leaf such as banana leaf, waru leaf, tepus leaf, simpur leaf,

syzigium leaf and also tembakak leaf used for wrapping traditional food.

The reason for developing this Eco-friendly tembakak leaf plate product is that the need for disposable plates. Disposable plate is useful in saving time because it does not need to be washed and can be disposed of after use and is easy to use. The need for the leaf plates to be biodegradable so that it can reduce the use of single-use plastic plates and Styrofoam. Indonesia ranks 2nd in the world as the largest contributor of plastic waste to the ocean after China[6]. In addition, the Indonesian people have long used leaves as food containers, thus triggering for the use of environmentally friendly tembakak leaf plates that are easily biodegradable, easy to produce, hygienic, and have lampung cultural background.

One main question can the consumer shift from plastic based disposable plate to greener leaf base plate. Can tembakak leaf plate as an ecofriendly product try to replace plastic or just another plastic alternative. How consumer react the tembakak leaves plates from organoleptic point of view. And, how the consumer's perspective of tembakak leaf plates as an ecofriendly product.

2. METHODOLOGY

One of main assessment for the transformations of consumer behavior is an organoleptic assessment. Organoleptic research methods are to find and quantified the quality of a product using human senses. These senses are visual sense, olfactory sense, tactile sense, taste sense, auditory sense. Even though it is quite often that method of carrying out organoleptic research usually called tasting. But it is far more complex than just taste. In this case a variety of organs participate in the process. Which are taste bud, tactile sense, visual sense and smell or olfactory sense. Perspective assessment is also done to find how consumer perspective toward an ecofriendly product. This perspective is the key how an ecofriendly product will move forward.

The assessment is done from 20 young adult respondents. These respondents are all college educated person. We hope that these respondent will shape Indonesia future consumer[7][8]. And these responders are representing Indonesian perspective towards ecofriendly product.

There are five disposable plates in review. Two comes from ecofriendly product which are tembakak leaf plate and teak leaf plate. The other three are plastic plates, Styrofoam plates and paper with hdpe lamination plates. All of the plates is shown and used by the respondents. These respondent then will score how each plates perform. There are six question with 1 to 5 grade value for each question. In short the questions are: is it changing taste; how is the appearance; how is the texture;

how is the smell; is it green; and do you want to use it on regular basis. We also look the strength and the weaknesses of the disposable product.

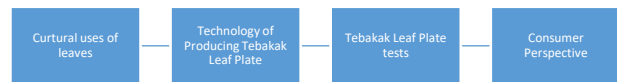


Figure 1. Leaf Plates Assessment Process

3. RESULT AND DISCUSSION

3.1. The Culture of Natural Packaging

Indonesia consists of more than a thousand three hundred ethnic diversities with its own unique culture[9]. The culture includes the traditional structures, traditional wisdoms, traditional customs, food and arts and many more[10]. Among all of the diversity, one common unique culture is its unique traditional foods[11], in conjunction to food is the technology to process the food and also the packaging to serve the food[12].

Each and any tribes in Indonesia has its unique type, process, and traditional food packaging. The existence of traditional food in general cannot be separated from the customs in cultural society. So that traditional leafy container as packaging of traditional food can be reflection of the culture of a society. Packaging culture actually started since humans know how to store and serve food. Serving and storing of food traditionally begins by keeping food in a container which he found. The container can be leaf, husk, bamboo column, Coconut shell, shell and even woven material from natural fiber they found in their culture. Along with the times the container becoming more complex, and has many cultural values. The use of leaves as food wrappers is to beautify the appearance of food, as well as adding a distinctive aroma and delicacy of food[13].

Natural packaging materials are still used in almost all regions of Indonesia on daily basis[14]. Because it is usually very cheap, readily available and not have a negative impact against environmental and will be naturally decomposed. In this case, the function of packaging as an identity is absolutely considered. However, the uniqueness of traditional packaging cannot be replaced.

3.2. Tembakak Leaf Plates

Tembakak leaf as raw materials are widely available naturally, currently leaves is not used commercially, so it is available quite abundant. Tembakak (*Ficus septica*) is a fast growing tree with seeds dispersed through rain water. The tree grows very fast with very wide leaves. The tree

is soft wood tree usually unused because of the low quality of the wood. Tebakak (*Ficus septica*) traditionally used by the people of Lampung as a food wrapper. The alkaloids found in *Ficus septica* leaves have cytotoxic effects on cancer cells[15].



Figure 2. Tebakak leaf plate used to serve lontong sayur a local delicacy

Environmentally friendly tebakak leaf plates made from Lampung tebakak leaf are an alternative to disposable plates. Tebakak leaf plates are biodegradable, easy to produce, hygienic, and have long period of storage time. The Lampung tebakak leaf material is a local wisdom from the Lampung area. Plate production is quite easy and economical because it only changes the shape of the leaves to follow the shape of the plate. The tebakak leaf plate has the integrity of the leaf structure so that the strength and characteristics of the leaves are maintained. The leaf plate has a diameter of 22 cm with a plate indentation depth of about 3 cm and is able to accommodate relatively large amounts of food (357 grams). Tebakak leaves are hot molded processed with

natural adhesives from starch so they are more durable. Tebakak leaf plates can be stored for more than 6 months.

The Lampung tebakak leaf used is local wisdom because it is a typical plant from the Lampung region which has distinctive leaf characteristics in its motifs and textures. These qualities provide additional selling points, apart from being biodegradable, for prestige and environmental concern. The resulting product has a low water content so that it can be stored for a long time. This is possible through a leaf molding machine that uses a molding press with a temperature controlled heating element.

Some of the characteristics of the machine for the production of leaf plates are precision pressure, temperature control, and plate mold adapting to the leaf structure. The Lampung tebakak leaves are used because of their strong structure, wide cross-section, and distinctive leaf characteristics. This innovation can make a substitute product for plastic plates and Styrofoam to overcome the bad impact of plastic and Styrofoam on the environment (plastic decomposes takes more than 100 years, while styrofoam does not decompose[16]).

The advantages of tebakak leaf plate products are:

1. Using the natural ingredients of Lampung local wisdom, namely the Lampung tebakak leaf.
2. Using leaf natural structure for its strength and waterproofness so that it is easy to produce.
3. Made of organic material so that it is easy to decompose in the soil and is environmentally friendly.
4. Free from chemicals.

The disadvantages of environmentally friendly leaf plate products are:

1. Leaf plates do not last long if exposed to water for a long period of time.

Table 1. Product Comparison

Aspects	Leaf Plates	Plastic Plates	Styrofoam plates	Paper Plates
Market price	Rp. 1500,-	Rp. 1,000,-	Rp. 500,-	Rp. 1,000,-
Shelf time	6 months	5 years	5 years	2 years
Natural Decomposition Time	2-4 weeks	100-200 years	More than 500 years	Paper decompose in 1 Month but the plastic lamination will decompose in 100 years
Waterproof	Yes	yes	yes	yes
Heat Resistance	Good	Not good	best	good

Raw material available locally	Yes	no	no	partial
Machine capacity	Low	high	high	high

3.3. Tebakak Leaf Plates Machine

The machine is developed since 2017 for producing leaf plate. It is a manual machine that can be easily replicated for scale up purposes. The machine using a hot press molding to mold the tebakak leaf into plates[17]. It is using two 350-watt heating elements. The temperature is controlled using a PID controller (Proportional Integral and Derivative controller) to achieve 1-degree accuracy. The accuracy is needed as a charred leaf plate is not desirable. Below shown the leaf plate molding machine.



Figure 3. Leaf Plate Molding Machine

The process of making environmentally friendly leaf plates made from lampung tebakak leaves using a leaf plate molding machine, sterilizer, and raw materials tebakak leaves. The tebakak leaf plate production process begins with the preparation of raw materials, tebakak leaves. Fresh leaves then cleaned through washing and drying. After that, the layering out the leaves to strengthen the structure. Then, the hot press process is to press the leaf layer using a pair of dies heated under controlled conditions (about 3 minutes). Then after the molding the plates is cut to trim the edges. The leaf plates were then sterilized using a sterilizer. Lastly, the packing process to send it to customer.

3.4. The Transformation

The plates review process includes a group of young adult with a college academic back ground. This type of group is chosen as a representative of future Indonesian consumer behavior. In the future Indonesia will have a demographic bonus as young and educated citizen will be the largest percentage of all Indonesian citizen[18]. They will assess the tebakak leaf plates using organoleptic approach in comparison of teak leaf plates, plastic plates, styrofoam plates and paper (paper with hdpe plastic lamination) plates. They will also be asked for their perspective of using the plates.

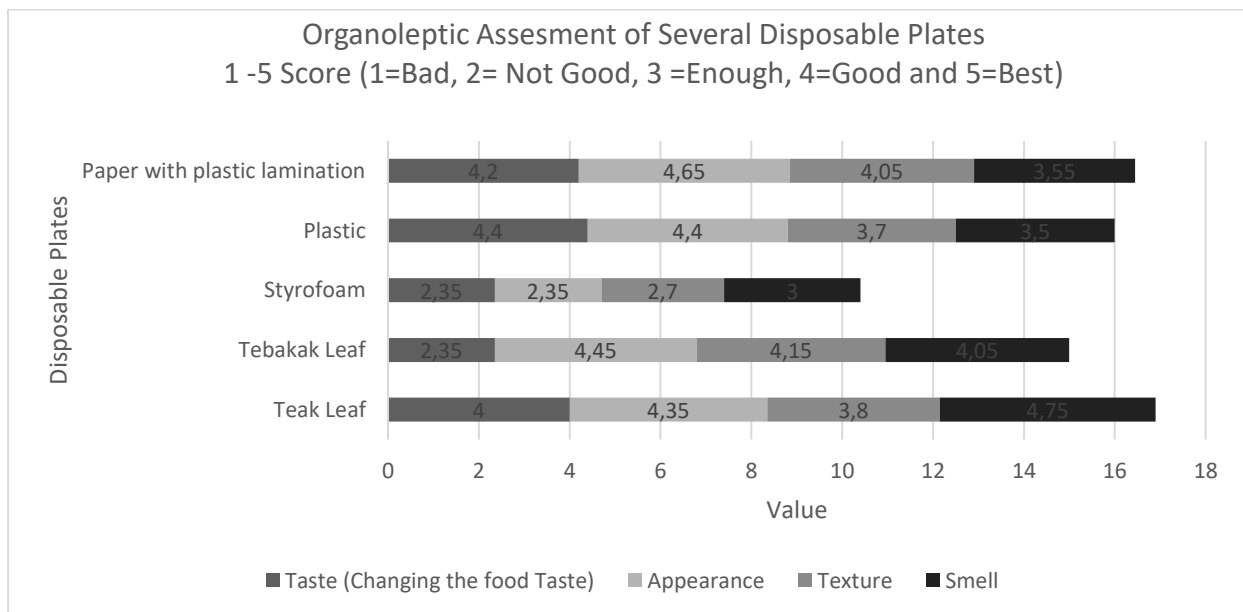


Figure 4. Organoleptic Assessment of Disposable Plates

Taste will become the enemy of leafy food container as shown on above figure because there are not as inert

as the other disposable plates (plastic plates, styrofoam plates and paper plates). As the leaf when contact with

food tends to alter the food taste. But this result can be view both ways (negatively or positively). Negatively, both of tebakak leaf plates and teak leaf plates can alter the food taste. But Positively, the altered taste might be just fine and not worsen the food taste. The argument also shown support on how the plates smell. Both leaf plates (tebakak and teak) smell quite nice better that other

disposable plate (plastic plates, styrofoam plates and paper plates). As usually taste and smell tied positively in food. Form figure 4, we learn that both leaf plates (tebakak leaf plates and teak leaf plates) can be contender for plastic plates and paper plates while styrofoam plates has the lowest value.

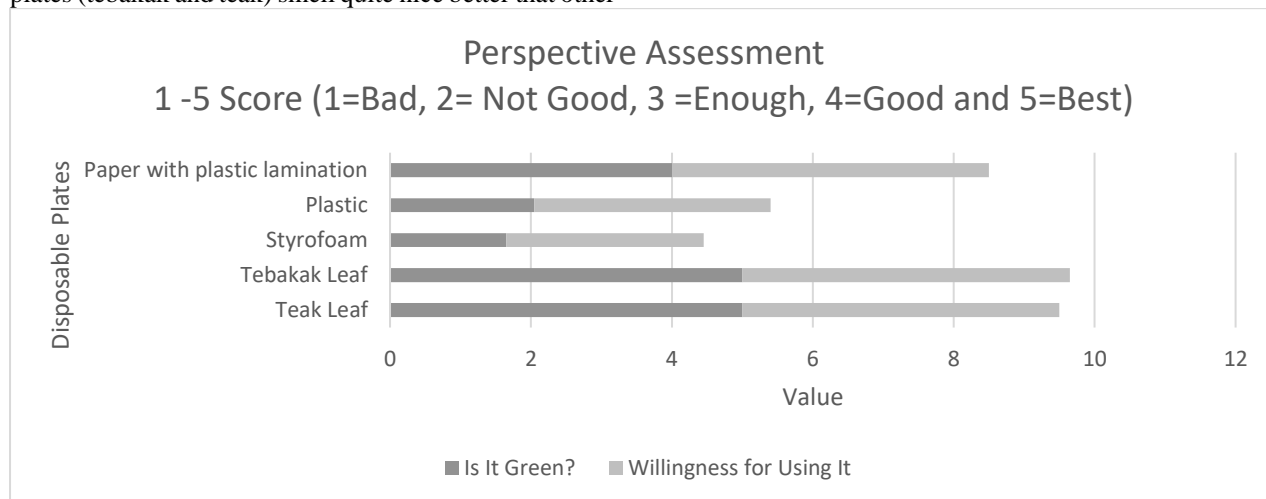


Figure 5. Perspective View on Disposable Plates

Perceptively there is no down arguments for how green is both for the tebakak leaf plates and the teak leaf plates. And the group also agrees that they want to use the tebakak leaf plates and the teak leaf plates. The main hindrance of using the plates is the availability on the market and its higher price. From Table 2. Product Comparison, we learn that the leaf plate machine capacity is quite low compared to other plates machine. If we can push the capacity of the leaf plate machine, then we can lower the leaf plate price and also flooding the market with plastic alternative product. More people will aware there are eco-friendly leaf plate products.

Total assessment form both test shown that future consumer tries to avoid styrofoam plates and plastic plates. And they agree that tebakak leaf plates, teak leaf plates and paper plates is best for them. In the end food taste changing by the leaf plates is not really a turn away for the consumer. The biggest challenge for the leaf pates is can we push the capacity of the leaf plate machine, if so then we can lower the leaf plate price and also flooding the market with plastic alternative product.

Table 2. Total Assessment

Organoleptic and Perspective Assessment					
	Teak leaf plate	Tebakak leaf plate	Styrofoam plate	Plastic plate	Paper with plastic lamination plate
Taste (Changing the food Taste)	4	2.35	2.35	4.4	4.2
Appearance	4.35	4.45	2.35	4.4	4.65
Texture	3.8	4.15	2.7	3.7	4.05
Smell	4.75	4.05	3	3.5	3.55
Is It Green?	5	5	1.65	2.05	4
Willingness for Using It	4.5	4.65	2.8	3.35	4.5
Total	4.4	4.1083333	2.475	3.567	4.1583

CONCLUSIONS

We learn that both leaf plates (tebakak leaf plates and teak leaf plates) can be contender for plastic plates and paper plates while styrofoam plates has the lowest value. And the group also agrees that tebakak leaf plates and the teak leaf plates are green and they want to use them. The main hindrance of using the plates is the availability on the market and its higher price. If we can push the capacity of the leaf plate machine, then we can lower the leaf plate price and also flooding the market with plastic alternative product. Total assessment form both test shown that future consumer tries to avoid styrofoam plates and plastic plates. And they agree that tebakak leaf plates, teak leaf plates and paper plates is best for them. In the end food taste changing by the leaf plates is not really a turn away for the consumer.

ACKNOWLEDGMENTS

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Tue, Oct 19, 2021 at 9:36 PM

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Best regards,

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THE 2ND INTERNATIONAL INDONESIA CONFERENCE ON INTERDISCIPLINARY STUDIES 2021

MIGRATION, GENTRIFICATION, AND ENVIRONMENTAL CHALLENGES:
A GLOBAL SOUTH PERSPECTIVE



MIGRATION



GENTRIFICATION



ENVIRONMENT



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INDONESIA



DR. PAUL WALEY*
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Bandar Lampung, 19 October 2021

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**MIGRATION, GENTRIFICATION, AND ENVIRONMENTAL CHALLENGES:
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MIGRATION



GENTRIFICATION



ENVIRONMENT



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PROGRAM SCHEDULE

(Jakarta, Indonesia Time GMT +7)

Day 1 - 26 October 2021

Start	End	Program
08:30 AM	09:00 AM	Opening Ceremony Indonesia Raya Speech - Dean FISIP Universitas Lampung, Dra. Ida Nurhaida, M. Si. Opening remarks from Rector of Universitas Lampung, Prof. Dr. Karomani, M. Si.
09:00 AM	11:00 AM	Keynotes Speakers (Plenary Session I) Prof. Dr. Karomani, M. Si.* (Indonesia), Assoc. Prof. Dr. Ari Darmastuti (Indonesia) Dr. Ir. Yudha Mediawan, M. Sc. (Indonesia) Moderator: Andi Windah, S.I.Kom., M.Comn. & MediaSt.
11:00 AM	11:45 AM	Q&A session for Keynote Speakers
11:45 AM	01:00 PM	<i>Lunch Break</i>
01:00 PM	02:00 PM	Paralel Session I Participants join breakout room Room 1 : Migration Room 2 : Migration Room 3 : Gentrification Room 4 : Environment Challenges
02:00 PM	02:05 PM	<i>Break</i>
02:05 PM	03:35 PM	Keynotes Speaker (Plenary Session II) Dr. Paul Waley (UK), Johanna Alkan Olsson, Ph. D. (Sweden), Prof. Shimada Yuzuru (Japan) Moderator: Intan Fitri Meutia, Ph. D.
03:35 PM	04:00 PM	Q&A session for Keynote Speakers

Day 2 - 27 October 2021

Start	End	Program
08:30 PM	09:30 AM	Keynote Speaker (Plenary Session III) Prof. Mohd. Kamarulnizam Abdullah (Malaysia) & Asst. Prof. Grichawat Lowatcharin, Ph.D (Thailand) Moderator: Devi Yulianti, M. A.
09:30 AM	10:15 AM	Q&A session for Keynote Speakers
10:15 AM	10:20 AM	<i>Break</i>
10:20 AM	12:00 PM	Paralel Session II Participants join breakout room Room 1 : Migration Room 2 : Migration Room 3 : Gentrification Room 4 : Environment Challenges Room 5 : Environment Challenges
12:00 PM	01:30 PM	<i>Lunch Break</i>
01:30 PM	03:00 PM	Closing

Tuesday, 26 October 2021
01.00-02.00 PM (Jakarta, Indonesia Time)

ROOM 1

Code	Title	Presenter
PM-01	Navigating The Dark Side Of Digital Space: Study Case on The Phenomenon Of Digital Fear Of Missing Out (FOMO) In Twitter Of K-Pop Fans in Bandar Lampung	Cindyta Adevia Ananda, S.I.Kom, Andi Windah, S.I.Kom, Mcom&Mediast
PM-02	Exploring Relative Deprivation Theory with Social Identity Theory to Inequalities: Issue of Migrants in Biak, Papua	Novieta H Sari
PM-03	The Impact of Migration on University Education Comparative Analysis Between Croatia and Indonesia	Robert Mikac, Achmad Yudi Wahyudin
PM-04	Explaining In-migration Using Measures of Accountability and Responsiveness of Local Governments	Devi Yulianti, Peerasit Kamnuansilpa, Intan Fitri Meutia
PM-05	The Agenda Setting Policy for Hajj and Umrah in Post Pandemic	Intan Fitri Meutia, Bayu Sujadmik, Devi Yulianti Kristian, Adi Putra Savira

ROOM 2

Code	Title	Presenter
PM-06	Social Media, Public Participation, and Digital Diplomacy	Ari Darmastuti, Astiwi Inayah, Khairunnissa Simbolon, Moh. Nizar
PM-07	Migration-Security-Development Nexus Approach In Viewing The International Migration Phenomenon Of Migrant Workers In Lombok	Mega Nisfa Makhroja, Syaiful Anam
PM-08	Social capital mapping of Indonesian Return Migrant workers as a development Resource in Lampung Timur Regency	Meiliyana, S. Indriati Caturiani, Ita Prihantika
PM-09	Piil Pesenggiri as Cultural Values and Urban Planning in Kota Baru Lampung Province: Opportunities and Challenges	Bendi Juantara, Darmawan Purba, Indra Bulan, Dwiwana Habsari
PM-10	Inequality Impact of MSME Assistance in Indonesia on Urban Migration in the Post Pandemic Era	Nana Nurwaesari, Putri Maulidiyah, Dian May



ROOM 3

Code	Title	Presenter
PG-01	Collaborative Strategy to Support Sustainability of Grand Forest Parks in Urban Areas	Rahayu Sulistiowati, Suprihatin Ali, Christine Wulandari, Melya Selvi, Diana Melinda
PG-02	Analysis Of City Development Policy On Community Decision Factors In The Purchase Of Subsidy House	Deddy Aprilani, Rosy Febriani Daud.
PG-03	Participatory Communication for Empowering Urban Farming Families (Study on Family Business " Prima Flora - Prima Aqiqah " Bandar Lampung City)	Bangun Suharti Nanang, Trenggono, Andy Corry W, Ibrahim Besar.
PG-04	Establishing Inclusive Public Space Through Stakeholders Cooperation (Merak Blantung Village, District of South Lampung)	Meiliyana, Suprihatin Ali, Susana Indriyati Caturiani.
PG-05	Internet and Women of Small Business Actors Processed by Catfish in Rural: Dilemma of Opportunities and Gaps in Digital Literacy	Hestin Oktiani., Eka Yuda Gunawibawa

ROOM 4

Code	Title	Presenter
PE-01	Envisioning the "Local Turn" in Our Food System: Lessons from Covid-19 Pandemic in Indonesia	Fuad Abdulgani, Bartoven Vivit Nurdin.
PE-02	Climate challenges of Small Island Developing States: cases of Barbados, Seychelles and Tuvalu	Lidija Kos – Stanišić, Dana Luša, Borna Zgurić.
PE-03	Environmental Security Threats in Bandar Lampung City: A Case Study of Household Waste Management	Khairunnisa Simbolon, Indra Jaya Wiranata.
PE-04	Water Crisis as Security Issues; Water Securitization by the Chinese Government	Gita Karisma, Hasbi Sidik.
PE-05	Community Empowerment Communication Model in Urban Agricultural Management in the City of Bandar Lampung (Study in Maju Jaya Group, Pinang Jaya Village, Bandar Lampung City)	Anna Gustina Zainal, Tony Wijaya, Vito Frasetya, Nadya Amalia, Nasution Amelia, Nasution Helvy Yanfika.

Wednesday, 27 October 2021

10.20-12.00 PM (Jakarta, Indonesia Time GMT +7)

ROOM 1

Code	Title	Presenter
PM-11	Balangan & Uloman The Tradition Of Invitation In The Traditional Community Of Lampung Pubian Telu Suku	Rizki Kurniawan, Bartoven Vivit, Nurdin,, Yuni Ratnasari, Asnani
PM-12	Efforts of the Provincial Government of Lampung In Providing Tourism Supply During the Pandemic and Post-Covid-19 Pandemic Within ASEAN Framework Tourism Cooperation	Tety Rachmawati, Rahayu Lestari, Fisko Arya Kamandanu, Dani Syahrobi
PM-13	The Meaning of Masculine Subjectivity in Responding to the Impact of Climate Change	Dwi Wahyu Handayani
PM-14	Opportunities And Challenges Of Migrant Workers From Global South Countries In Australia	Januari Trisnaningtyas
PM-15	Organizing The Farmers Movement In The Effort To Obtain Rights To Land: Case Study Of The Bnil Victims Of Farmers' Union In Tulang Bawang Regency, Lampung Province	Ikram
PM-16	Propaganda Of The Colonization Of The Dutch Colonization Government: The Migration Program For Most Population Out Of Java In The Early 20th Century	Purwanto Putra
PM-17	Fake News As A Tool To Manipulate The Public With False Information	Munadhil Abdul Muq̄sith, Rizky Ridho Pratomo, Anna Gustina Zainal

ROOM 2

Code	Title	Presenter
PM-18	Tracing power relations in campus introduction programs	Tabah Maryanah
PM-19	Transformation of Transmigration Areas as Ethnic Political Identity (A Study of Javanese Ethnicity in Pringsewu Regency, Lampung Province)	Junaidi, Suwarno, Frans Salsa Romando
PM-20	Role of Digital Nomad in Supporting Tourism in Indonesia: Case Study Bali	Roby Rakhmadi
PM-21	Economic Solidarity Through Women Moslem Organization in response to Covid-19 Pandemic (A Case Muslimat NU Organization at Pringsewu Regency/Kabupaten Pringsewu)	Fitrianita Damhuri, Meiliyana, S. Indriati Caturiani, Gita Paramita Djausal



PM-22	Designing Inter-Ethnic Communication Model In Hospitality Industry : Study Case Of Migrants Tourism Providers In South Lampung Regency	Karomani, Ida Nurhaida, Andi Windah.
PM-23	Social Impact of 2018 Tsunami Refugee Migration through Permanent Residential Development in South Lampung	Ahmad Robi Ulzikri
PM-24	Sustainable Development Goals and Decent Work for Women Homeworkers: Is Public Policy Important?	Novita Tresiana, Noverman Duadji, Shabina Atma Zenitha

ROOM 3

Code	Title	Presenter
PG-06	Social Capital for Urban Communities in Facing Covid-19	Dodi Faedlulloh, Vina Karmilasari, Intan Fitri Meutia, Devi Yulianti
PG-07	Urban Coffee Shop: Shifting Housing to Commercial Space	Gita Paramita Djausal, Nina Yudha Aryanti, Hani Damayanti Aprilia, Wisnu Suaka Prastowo

ROOM 4

Code	Title	Presenter
PE-06	Study Comparison Of Plastic Waste Ocean Pollution Management Strategies Between Japan And Indonesia In Efforts To Achieve SDGs Point 14	Indra Jaya Wiranata, Irvan Yama Pradipta, Elsa Ariana, Khoirunnisa Indah Cahyani, Muhammad Gazi Ramadhan.
PE-07	Green Product, Green Advertising, And Green Brand Image	Irma Ramadhani, Jeni Wulandari, Ghia Subagja.
PE-08	The Using Of E-Office In Efforts To Achieve Company Performance With Excellent Performance Model	Hani Damayanti Aprilia, Damayanti, Akgis Cahya Ningtias.
PE-09	The Danger of Environmental Damage From Disposable Mask Waste During the Covid 19 Pandemic	Vina Karmilasari, Devi Sutrisno Putri, Dodi Daedululloh, Risandi Koswara.
PE-10	Resilience in Disasters: A Survey to The University Students in Lampung Province	Simon Sumanjoyo Hutagalung, Ita Prihantika.
PE-11	Impact of Green Innovation, Cultural Environment, Company Performance during Covid-19	Supriyanto, Mohammad Benny, Alexandri Sripto.

ROOM 5

Code	Title	Presenter
PE-12	Pentahelix Model Collaboration in Tourism Industry Development Policy in Pesawaran District	Dian Kagungan, Noverman Duadji, Intan Fitri Meutia
PE-13	Leaves as Ecofriendly Disposable Plates: Cultural Roots, Technology and Transformations	Martinus, Gita Paramita Djausal, Sri Ratna Sulistiyanti, Meizano Ardi Muhammad, Mareli Telaumbanua
PE-14	Urgency of Virtual Tour for Sumatran Butterfly Conservation	Meizano Ardhi Muhammad, Gita Paramita Djausal, Martinus.
PE-15	Boosting Public-Private Partnership for sustainable Waste Management in Metro City	Dadang Karya Bakti, Toni Wijaya Suprihatin Ali, Ita Prihantika.
PE-16	Disaster and Distance Learning: Exploratory Factors Analysis of Online Learning Effectiveness During Pandemic	Eko Budi Sulistio, Simon Sumanjoyo Hutagalung
PE-17	Green Politics Theory: Industrialization And Environment	Fitri Juliana Sanjaya, Robby Darwis Nasution, Ninda Mirantama, Nabillah Audia P.U.

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To: MARTINUS ft <martinus@eng.unila.ac.id>

Thu, Nov 4, 2021 at 9:52 AM

Good morning,
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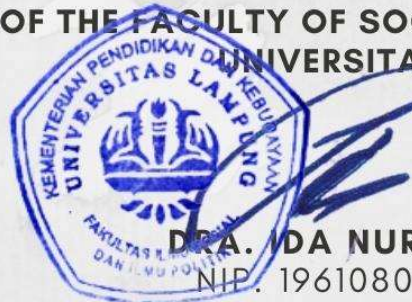
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INTERDISCIPLINARY STUDIES 2021**

*held on Tuesday-Wednesday, 26-27 October 2021 at Faculty of Social and Political Sciences,
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DEAN OF THE FACULTY OF SOCIAL AND POLITICAL SCIENCES
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DRA. DA NURHAIDA, M.SI.
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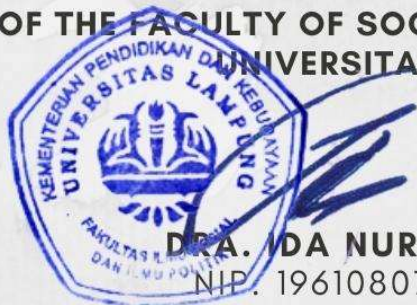
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DEAN OF THE FACULTY OF SOCIAL AND POLITICAL SCIENCES
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Authors : Martinus, Gita Paramita Djausal, Sri Ratna Sulistiyanti, Meizano Ardi Muhammad, Mareli Telaumbanua

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Tebakak Leaves Plates as an Eco-friendly Disposable Plates: Cultural Roots, Technology and People Transformations

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ABSTRACT

Plastic has become the dominant problems in recent years since it become the dominant material for food packaging. More than 600 thousand tons of plastic becoming waste in 2019. Leaf as food packaging material has been known since the dawn of civilization In Indonesia itself leaf and other plant's organic material commonly used as traditional food wrapper. Commonly known leaves such as banana leaf, waru leaf, tepus leaf, simpur leaf, syzygium leaf and also tembakak leaf are used for wrapping traditional food. Thus triggering for the use of environmentally friendly tebakak leaf plates that are easily biodegradable, easy to produce, hygienic, and have lampung cultural background. One main question can the consumer shift from plastic based disposable plate to greener leaf base plate. Can tebakak leaf plate as an eco-friendly product try to replace plastic or just another plastic alternative. And, the consumer's perspective of tebakak leaf plates as an eco-friendly product. We learn that both leaf plates (tebakak leaf plates and teak leaf plates) can be contender for plastic plates and paper plates while styrofoam plates has the lowest value. The consumer agrees that tebakak leaf plates and the teak leaf plates are green and want to use them. The main hindrance of using the leaf plates is the availability on the market and its higher price.

Keywords: Leaf plate, Tebakak, Disposable plates, Eco-friendly

1. INTRODUCTION

Plastic has become the dominant problem in recent years since it became the dominant material for food packaging since its mass production in the 1930s[1]. Even in the pandemic year, the plastic waste remains growing while the cities lock down [2].

Leaf as food packaging material has been known since the dawn of civilization [3]. In Indonesia, leaf and other plant's organic material commonly used as traditional food wrapper [4][5] Commonly known leaves such as banana leaf, waru leaf, tepus leaf, simpur

leaf, syzygium leaf and also tembakak leaf used for wrapping traditional food.

The reason for developing this Eco-friendly tebakak leaf plate product is the need for disposable plates. Disposable plate is useful in saving time because it does not need to be washed and can be disposed of after use and is easy to use. The need for the leaf plates to be biodegradable so that it can reduce the use of single-use plastic plates and Styrofoam. Indonesia ranks 2nd in the world as the largest contributor of plastic waste to the ocean after China [6]. In addition, the Indonesian people have long used leaves as food containers, thus triggering

the use of environmentally friendly tebakak leaf plates that are easily biodegradable, easy to produce, hygienic, and have a Lampung's cultural background.

One main question can the consumer shift from plastic based disposable plate to greener leaf base plate. Can tebakak leaf plate as an eco-friendly product try to replace plastic or just another plastic alternative. How consumer react the tebakak leaves plates from organoleptic point of view. And, how the consumer's perspective of tebakak leaf plates as an eco-friendly product.

2. METHODOLOGY

One of main assessment for the transformations of consumer behaviour is an organoleptic assessment. Organoleptic research methods are to find and quantified the quality of a product using human senses. These senses are visual sense, olfactory sense, tactile sense, taste sense, auditory sense. Even though it is quite often that method of carrying out organoleptic research usually called tasting. But it is far more complex than just taste. In this case a variety of organs participate in the process. Which are taste bud, tactile sense, visual sense and smell or olfactory sense. Perspective assessment is also done to find how consumer perspective toward an ecofriendly product. This perspective is the key how an ecofriendly product will move forward.

The assessment is done from 20 young adult respondents. These respondents are all college educated person. We hope that these respondent will shape Indonesia future consumer[7][8]. And these responders are representing Indonesian perspective towards ecofriendly product.

There are five disposable plates in review. Two comes from ecofriendly product which are tebakak leaf plate and teak leaf plate. The other three are plastic plates, Styrofoam plates and paper with hdpe lamination plates. All of the plates is shown and used by the respondents. These respondent then will score how each plates perform. There are six question with 1 to 5 grade value for each question. In short, the questions are: is it changing taste; how is the appearance; how is the texture; how is the smell; is it green; and do you want to use it on regular basis. We also look the strength and the weaknesses of the disposable product.



Figure 1. Leaf Plates Assessment Process

3. RESULT AND DISCUSSION

3.1. The Culture of Natural Packaging

Indonesia consists of more than a thousand three hundred ethnic diversities with its own unique culture[9]. The culture includes the traditional structures, traditional wisdoms, traditional customs, food and arts and many more[10]. Among all of the diversity, one common unique culture is its unique traditional foods[11], in conjunction to food is the technology to process the food and also the packaging to serve the food[12].

Each and any tribes in Indonesia has its unique type, process, and traditional food packaging. The existence of traditional food in general cannot be separated from the customs in cultural society. So that traditional leafy container as packaging of traditional food can be reflection of the culture of a society. Packaging culture actually started since humans know how to store and serve food. Serving and storing of food traditionally begins by keeping food in a container which he found. The container can be leaf, husk, bamboo column, Coconut shell, shell and even woven material from natural fiber they found in their culture. Along with the times the container becoming more complex, and has many cultural values. The use of leaves as food wrappers is to beautify the appearance of food, as well as adding a distinctive aroma and delicacy of food[13].

Natural packaging materials are still used in almost all regions of Indonesia on daily basis[14]. Because it is usually very cheap, readily available and not have a negative impact against environmental and will be naturally decomposed. In this case, the function of packaging as an identity is absolutely considered. However, the uniqueness of traditional packaging cannot be replaced.

3.2. Tebakak Leaf Plates

Tebakak leaf as raw materials are widely available naturally, currently leaves is not used commercially, so it is available quite abundant. Tebakak (*Ficus septica*) is a fast growing tree with seeds dispersed through rain water. The tree grows very fast with very wide leaves. The tree is soft wood tree usually unused because of the low quality of the wood. Tebakak (*Ficus septica*) traditionally used by the people of Lampung as a food wrapper. The alkaloids found in *Ficus septica* leaves have cytotoxic effects on cancer cells[15].

Environmentally friendly tebakak leaf plates made from Lampung tebakak leaf are an alternative to

disposable plates. Tebakak leaf plates are biodegradable, easy to produce, hygienic, and have long period of storage time. The Lampung tebakak leaf material is a local wisdom from the Lampung area. Plate production is quite easy and economical because it only changes the shape of the leaves to follow the shape of the plate. The tebakak leaf plate has the integrity of the leaf structure so that the strength and characteristics of the leaves are maintained. The leaf plate has a diameter of 22 cm with a plate indentation depth of about 3 cm and is able to accommodate relatively large amounts of food (357 grams). Tebakak leaves are hot molded processed with natural adhesives from starch so they are more durable. Tebakak leaf plates can be stored for more than 6 months.



Figure 2. Tebakak leaf plate used to serve lontong sayur a local delicacy

The Lampung tebakak leaf used is local wisdom because it is a typical plant from the Lampung region
Table 1. Product Comparison

Aspects	Leaf Plates	Plastic Plates	Styrofoam plates	Paper Plates
Market price	Rp. 1500,-	Rp. 1,000,-	Rp. 500,-	Rp. 1,000,-
Shelf time	6 months	5 years	5 years	2 years
Natural Decomposition Time	2-4 weeks	100-200 years	More than 500 years	Paper decompose in 1 Month but the plastic lamination will decompose in 100 years
Waterproof	Yes	yes	yes	yes
Heat Resistance	Good	Not good	best	good
Raw material available locally	Yes	no	no	partial

which has distinctive leaf characteristics in its motifs and textures. These qualities provide additional selling points, apart from being biodegradable, for prestige and environmental concern. The resulting product has a low water content so that it can be stored for a long time. This is possible through a leaf molding machine that uses a molding press with a temperature controlled heating element.

Some of the characteristics of the machine for the production of leaf plates are precision pressure, temperature control, and plate mold adapting to the leaf structure. The Lampung tebakak leaves are used because of their strong structure, wide cross-section, and distinctive leaf characteristics. This innovation can make a substitute product for plastic plates and Styrofoam to overcome the bad impact of plastic and Styrofoam on the environment (plastic decomposes takes more than 100 years, while styrofoam does not decompose[16]).

The advantages of tebakak leaf plate products are:

1. Using the natural ingredients of Lampung local wisdom, namely the Lampung tebakak leaf.
2. Using leaf natural structure for its strength and waterproofness so that it is easy to produce.
3. Made of organic material so that it is easy to decompose in the soil and is environmentally friendly.
4. Free from chemicals.

The disadvantages of environmentally friendly leaf plate products are:

1. Leaf plates do not last long if exposed to water for a long period of time.

Machine capacity	Low	high	high	high
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3.3. Tebakak Leaf Plates Machine

The machine is developed since 2017 for producing leaf plate. It is a manual machine that can be easily replicated for scale up purposes. The machine using a hot press molding to mold the tebakak leaf into plates[17]. It is using two 350-watt heating elements. The temperature is controlled using a PID controller (Proportional Integral and Derivative controller) to achieve 1-degree accuracy. The accuracy is needed as a charred leaf plate is not desirable. Below shown the leaf plate molding machine.



Figure 3. Leaf Plate Molding Machine

The process of making environmentally friendly leaf plates made from lampung tebakak leaves using a leaf plate molding machine, sterilizer, and raw materials tebakak leaves. The tebakak leaf plate production process begins with the preparation of raw materials, tebakak leaves. Fresh leaves then cleaned through washing and drying. After that, the layering out the leaves to strengthen the structure. Then, the hot press process is to press the leaf layer using a pair of dies heated under controlled conditions (about 3 minutes). Then after the molding the plates is cut to trim the edges. The leaf plates were then sterilized using a sterilizer. Lastly, the packing process to send it to costumer.

3.4. The Transformation

The plates review process includes a group of young adult with a college academic back ground. This type of group is chosen as a representative of future Indonesian consumer behaviour. In the future Indonesia will have a demographic bonus as young and educated citizen will be the largest percentage of all Indonesian citizen[18]. They will assess the tebakak leaf plates using organoleptic approach in comparison of teak leaf plates, plastic plates, styrofoam plates and paper (paper with hdpe plastic lamination) plates. They will also be asked for their perspective of using the plates.

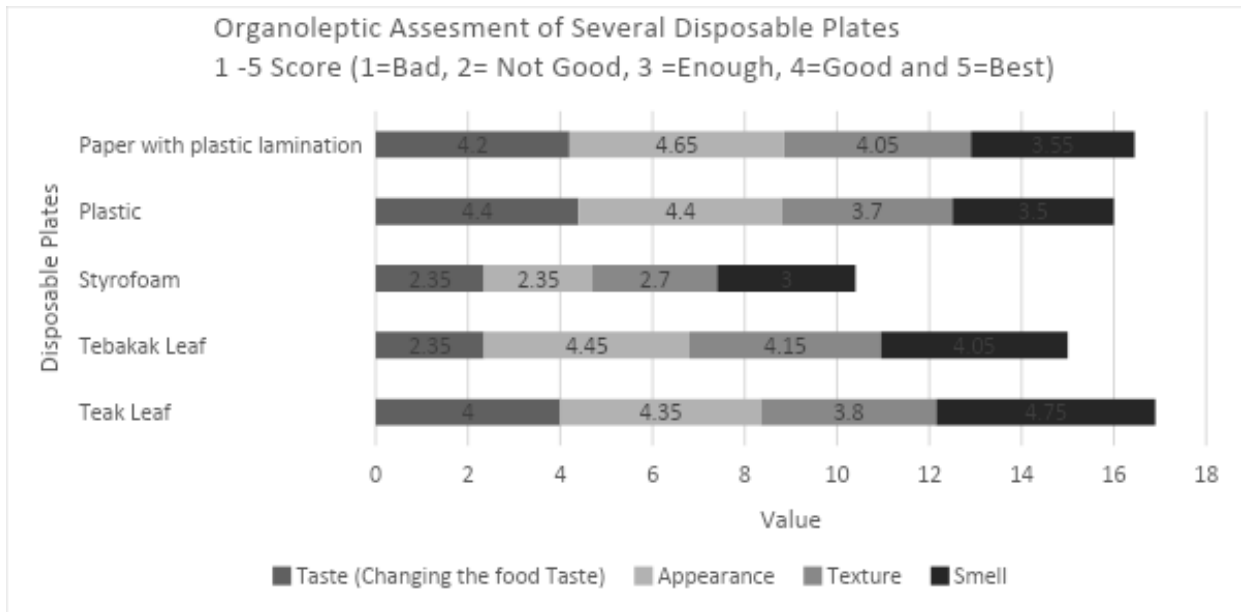


Figure 4. Organoleptic Assessment of Disposable Plates

Taste will become the enemy of leafy food container as shown on above figure because there are not as inert as the other disposable plates (plastic plates, styrofoam plates and paper plates). As the leaf when contact with food tends to alter the food taste. But this result can be view both ways (negatively or positively). Negatively, both of tebakak leaf plates and teak leaf plates can alter the food taste. But Positively, the altered taste might be just fine and not worsen the food taste. The argument

also shown support on how the plates smell. Both leaf plates (tebakak and teak) smell quite nice better that other disposable plate (plastic plates, styrofoam plates and paper plates). As usually taste and smell tied positively in food. Form figure 4, we learn that both leaf plates (tebakak leaf plates and teak leaf plates) can be contender for plastic plates and paper plates while styrofoam plates has the lowest value.

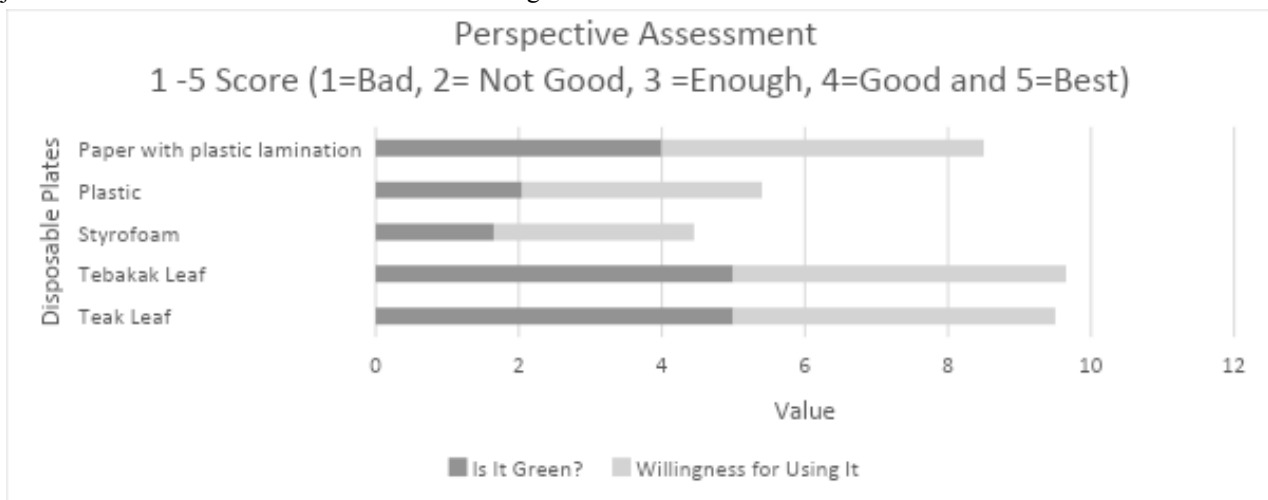


Figure 5. Perspective View on Disposable Plates

Perceptively there is no down arguments for how green is both for the tebakak leaf plates and the teak leaf plates. And the group also agrees that they want to use the tebakak leaf plates and the teak leaf plates. The main hindrance of using the plates is the availability on the market and its higher price. From Table 2. Product Comparison, we learn that the leaf plate machine capacity is quite low compared to other plates machine.

If we can push the capacity of the leaf plate machine, then we can lower the leaf plate price and also flooding the market with plastic alternative product. More people will aware there are eco-friendly leaf plate products.

Total assessment form both test shown that future consumer tries to avoid styrofoam plates and plastic plates. And they agree that tebakak leaf plates, teak leaf

plates and paper plates is best for them. In the end food taste changing by the leaf plates is not really a turn away for the consumer. The biggest challenge for the leaf plates is can we push the capacity of the leaf plate machine, if so then we can lower the leaf plate price and also flooding the market with plastic alternative product.

Table 2. Total Assessment

Organoleptic and Perspective Assessment					
	Teak leaf plate	Tebakak leaf plate	Styrofoam plate	Plastic plate	Paper with plastic lamination plate
Taste (Changing the food Taste)	4	2.35	2.35	4.4	4.2
Appearance	4.35	4.45	2.35	4.4	4.65
Texture	3.8	4.15	2.7	3.7	4.05
Smell	4.75	4.05	3	3.5	3.55
Is It Green?	5	5	1.65	2.05	4
Willingness for Using It	4.5	4.65	2.8	3.35	4.5
Total	4.4	4.1083333	2.475	3.567	4.1583

4. CONCLUSIONS

We learn that both leaf plates (tebakak leaf plates and teak leaf plates) can be contender for plastic plates and paper plates while styrofoam plates has the lowest value. And the group also agrees that tebakak leaf plates and the teak leaf plates are green and they want to use them. The main hindrance of using the plates is the availability on the market and its higher price. If we can push the capacity of the leaf plate machine, then we can lower the leaf plate price and also flooding the market with plastic alternative product. Total assessment form both tests shown that future consumer tries to avoid styrofoam plates and plastic plates. And they agree that tebakak leaf plates, teak leaf plates and paper plates is best for them. In the end food taste changing by the leaf plates is not really a turn away for the consumer.

ACKNOWLEDGMENTS

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PROCEEDINGS

**MIGRATION, GENTRIFICATION, AND ENVIRONMENTAL CHALLENGES:
A GLOBAL SOUTH PERSPECTIVE**



IICIS
2ND INTERNATIONAL INDONESIA CONFERENCE
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2nd International Indonesia Conference on Interdisciplinary Studies (IICIS 2021)

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Bandar Lampung, Indonesia



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Preface

It is our great honor and pleasure to organize the 2nd International Indonesia Conference on Interdisciplinary Studies (IICIS) 2021. This event was held on Tuesday-Wednesday, 26-27 October 2021 by the Fakultas Ilmu Sosial dan Ilmu Politik (FISIP), University of Lampung, Indonesia.

This conference aims to bring together multi-disciplinary groups of scientists and scholars from several countries and exchange ideas relating to emerging global issues, particularly the issues related to migration, gentrification, and environmental challenges. Recognizing the impact of the COVID-19 pandemic crisis has led us to significant changes to share our research at IICIS conferences. We were delighted to invite a number of scholars in the field from several countries and enable discussions at this conference.

I would like to express our best gratitude to keynote speakers from various countries who provided a high-level discussion and knowledge on the current debate on migration, gentrification, and environmental challenges. I would also like to convey my thanks to keynote speakers for their insightful and outstanding presentation: Prof. Karomani (Universitas Lampung), Dr. Paul Waley (University of Leeds, UK), Assoc. Prof. Dr. Ari Darmastuti (Universitas Lampung), Prof. Shimada Yuzuru (Nagoya University, Japan), Dr. Yudha Mediawan (Kementerian Pekerjaan Umum dan Perumahan Rakyat, Republik Indonesia), Prof. Mohd. Kamarulnizam Abdullah (Universiti Utara Malaysia), Johanna Alkan Olsson, Ph.D (Lund University, Sweden) and Asst. Prof Grochawat Lowatcharin, Ph.D. (Khon Kaen University, Thailand).

This volume consists of conference papers that were presented at the IICIS 2021 last October. The volume comprises 46 conference papers written by scholars from more than five different nationalities. As the chairman of the conference, I am so grateful for the great contribution provided by scientific committee members, editors, reviewers, writers and technical staff for their support in publishing this volume and especially, for the writers who showed their patience and eagerness in completing the revisions.

Regards,

Chairman of the 2nd IICIS 2021

Dra. Ida Nurhaida, M.Si

Table of Contents

Organizing Committee	iii
Preface	v
Navigating the Dark Side of Digital Space	1
<i>Cindyta Adevia Ananda, Andi Windah</i>	
Exploring Relative Deprivation Theory with Social Identity Theory to Inequalities: Issue of Migrants in Biak, Papua.....	7
<i>Novieta H Sari</i>	
The Impact of Migration on University Education	14
<i>Robert Mikac, Achmad Yudi Wahdyudin</i>	
Explaining In-migration Using Measures of Accountability and Responsiveness of Local Governments.....	25
<i>Devi Yulianti, Peerasit Kamnuansilpa, Intan Fitri Meutia</i>	
The Agenda Setting Policy for Hajj and Umrah in Post Pandemic.....	32
<i>Intan Fitri Meutia, Bayu Sujadmiko, Devi Yulianti, Kristian Adi Putra, Savira Nur Aini</i>	
Social Media, Public Participation, and Digital Diplomacy	38
<i>Ari Darmastuti, Astiwi Inayah, Khairunnisa Simbolon, Moh. Nizar</i>	
Migration-Security-Development Nexus Approach in Viewing the International Migration Phenomenon of Migrant Workers in West Nusa Tenggara	48
<i>Mega Nisfa Makhroja, Syaiful Anam</i>	
Social Capital Mapping of Indonesia Return Migrant Workers as Development Resource in Lampung Timur Regency	56
<i>Meiliyana, Ita Prihantika, S. Indriati Caturiani</i>	
Piil Pesenggiri as Cultural Values and Urban Planning in Kota Baru Lampung Province: Opportunities and Challenges.....	61
<i>Bendi Juantara, Darmawan Purba, Indra Bulan, Dwiyana Habsary</i>	
Inequality Impact of MSME Assistance in Indonesia on Urban Migration in the Post Pandemic Era.....	67
<i>Nana Nurwaesari, Putri Maulidiyah, Dian May Fitri</i>	
Public Service Innovation (Innovation of “Tape Pasar” in Surakarta, Central Java Province)	73
<i>Yunita Ratna Sari, Komang Jaka Ferdian, Dodi Faedlulloh</i>	

Lampung Tourism Supply During the Pandemic and Post Covid-19 Pandemic	78
<i>Rahayu Lestari, Tety Rachmawati, Fisko Arya Kamandanu, Dani Syahrobi</i>	
The Meaning of Masculine Subjectivity in Responding to the Impact of Climate Change.....	87
<i>Dwi Wahyu Handayani</i>	
Sustainable Development Goals and Decent Work for Women Homeworkers: Is Public Policy Important?	93
<i>Novita Tresiana, Noverman Duadji, Shabina Atma Zenitha</i>	
Designing Inter-Ethnic Communication Model in Hospitality Industry.....	103
<i>Karomani, Ida Nurhaida, Andi Windah</i>	
Propaganda “Kolonisatie” of The Dutch Colonial Government.....	113
<i>Purwanto Putra</i>	
Fake News as a Tool to Manipulate the Public With False Information.....	118
<i>Munadhil Abdul Muqsith, Rizky Ridho Pratomo, Anna Gustina Zaina, Ana Kuswanti</i>	
Tracing Power Relations in Campus Initiations Program.....	128
<i>Tabah Maryanah</i>	
Transformation of Transmigration Areas as Ethnic Political Identity (A Study of Javanese Ethnicity in Pringsewu Regency, Lampung Province).....	135
<i>Junaidi Junaidi, Suwarno Suwarno, Frans Salsa Romando</i>	
Role of Digital Nomad in Supporting Tourism in Indonesia: Case Study Bali	143
<i>Roby Rakhmadi</i>	
Economic Solidarity Through Women Moslem Organization in response to Covid-19 Pandemic (A Case Muslimat NU Organization at Pringsewu Regency/Kabupaten Pringsewu).....	149
<i>Fitrianita Damhuri, Meiliyana, Gita Paramitha, S.Indriati Caturiani, Hana Soraya</i>	
Effort of “Komisi Nasional Perempuan” in Struggling for P-KS Bill in Indonesia.....	157
<i>Putri Alifah, Restu Rahmawati, Dodi Faedlulloh</i>	
Collaborative Strategy for the Sustainability of the Wan Abdul Rahman Forest Park (Tahura WAR) in Supporting Ecotourism in Lampung Province	165
<i>Rahayu Sulistiowati, Suprihatin Ali, Christine Wulandari, Melya Riniarti, Selvi Diana Meilinda</i>	
Analysis of City Development Policy on Community Decision Factors on the Purchase of Subsidy House.....	174
<i>Deddy Aprilani, Rosy Febriani Daud</i>	

Participatory Communication for Empowering Urban Farming Families.....	181
<i>Bangun Suharti, Nanang Trenggono, Andy Corry W, Ibrahim Besar</i>	
Altruism and Solidarity of Urban Societies in the Era of the Covid-19 Pandemic Through Digital Gotong Royong	190
<i>Dodi Faedlulloh, Vina Karmilasari, Junaidi, Muhammad Guntur Purbuyo</i>	
George Floyd’s and Racism Issue as Political Agenda in U.S Presidential Election as Depicted on Digital Media	196
<i>Vidya Kusumawardani, Dodi Faedlulloh</i>	
Examining Social Capital for Urban Societies in the Midst of Covid-19 Through Digital Gotong Royong	202
<i>Dodi Faedlulloh, Vina Karmilasari, Intan Fitri Meutia, Devi Yulianti</i>	
Urban Coffee Shop: Shifting Housing to Commercial Space	209
<i>Gita Paramita Djausal, Nina Yudha Aryanti, Hani Damayanti Aprilia, Wisnu Suaka Prastowo, M. Hanif Khairy Vidiantara</i>	
Food Insecurity and Agribusiness Expansion in Papua, Indonesia.....	213
<i>Fuad Abdulgani, Muhammad Zulfikar, Bartoven Vivit Nurdin</i>	
Climate Challenges of Small Island Developing States: Cases of Tuvalu, Seychelles and Barbados	220
<i>Lidija Kos – Stanišić, Đana Luša, Borna Zgurić</i>	
Environmental Security Threats in Bandar Lampung.....	231
<i>Khairunnisa Simbolon, Indra Jaya Wiranata</i>	
Water Crisis as a Security Issue: Water Securitization in People’s Republic of China.....	236
<i>Gita Karisma, Hasbi Sidik</i>	
Community Empowerment Communication Model in Urban Agricultural Management in the City of Bandar Lampung	243
<i>Anna Gustina Zainal, Toni Wijaya, Vito Frasetyat, Nadya Amalia Nasution, Helvy Yanfika</i>	
Study Comparison of Plastic Waste Ocean Pollution Management Strategies Between Japan and Indonesia.....	252
<i>Elsa Ariana, Khoirunnisa Indah Cahyani, M. Ghazy Ramadhan, Irvan Yama Pradipta, Indra Jaya Wiranata</i>	
Green Products Image in the Perspective of Young Consumers	259
<i>Irma Ramadhani, Jeni Wulandari, Ghia Subagja</i>	
The Using of E-Office in Efforts to Achieve Company Performance with Excellent Performance Model.....	265
<i>Hani Damayanti Aprilia, Damayanti</i>	

The Danger of Environmental Damage from Disposable Mask Waste During the Covid 19 Pandemic	272
<i>Vina Karmilasari, Devi Sutrisno Putri, Dodi Faedlulloh, Risandi Koswara</i>	
Resilience in Disasters: A Survey to The University Students in Lampung Province	279
<i>Simon Sumanjoyo Hutagalung, Ita Prihantika</i>	
Impact of Green Innovation, Cultural Environment, Company Performance During Covid-19	285
<i>Supriyanto, Suropto, Mohammad Benny Alexandri, Putri Irmala Sari</i>	
Pentahelix Model Collaboration in Tourism Industry Development Policy in Pesawaran Regency	295
<i>Dian Kagungan, Noverman Duadji, Intan Fitri Meutia</i>	
Tebakak Leaves Plates as an Eco-friendly Disposable Plates: Cultural Roots, Technology and People Transformations.....	302
<i>Martinus Martinus, Gita Paramita Djausal, Sri Ratna Sulistiyanti, Meizano Ardi Muhammad, Mareli Telaumbanua</i>	
The Urgency of Virtual Tour for Sumatran Butterfly Conservation.....	308
<i>Meizano Ardhi Muhammad, Gita Paramita Djausal, Martinus, Sony Ferbangkara, Alia Larasati</i>	
Boosting Public-Private Partnership for sustainable Waste Management in Metro City.....	313
<i>Dadang Karya Bakti, Toni Wijaya, Suprihatin Ali, Ita Prihantika</i>	
Disaster and Distance Learning: Exploratory Factors Analysis of Online Learning Effectiveness During Pandemic	319
<i>Eko Budi Sulistio, Simon Sumanjoyo Hutagalung</i>	
Green Politics Theory: Industrialization and Environment.....	324
<i>Fitri Juliana Sanjaya, Robby Darwis Nasution, Nabillah Audia Putri Utami, Ninda Mirantama</i>	

Tebakak Leaves Plates as an Eco-friendly Disposable Plates: Cultural Roots, Technology and People Transformations

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ABSTRACT

Plastic has become the dominant problems in recent years since it become the dominant material for food packaging. More than 600 thousand tons of plastic becoming waste in 2019. Leaf as food packaging material has been known since the dawn of civilization In Indonesia itself leaf and other plant's organic material commonly used as traditional food wrapper. Commonly known leaves such as banana leaf, waru leaf, tepus leaf, simpur leaf, syzygium leaf and also tembakak leaf are used for wrapping traditional food. Thus triggering for the use of environmentally friendly tebakak leaf plates that are easily biodegradable, easy to produce, hygienic, and have lampung cultural background. One main question can the consumer shift from plastic based disposable plate to greener leaf base plate. Can tebakak leaf plate as an eco-friendly product try to replace plastic or just another plastic alternative. And, the consumer's perspective of tebakak leaf plates as an eco-friendly product. We learn that both leaf plates (tebakak leaf plates and teak leaf plates) can be contender for plastic plates and paper plates while styrofoam plates has the lowest value. The consumer agrees that tebakak leaf plates and the teak leaf plates are green and want to use them. The main hindrance of using the leaf plates is the availability on the market and its higher price.

Keywords: *Leaf plate, Tebakak, Disposable plates, Eco-friendly*

1. INTRODUCTION

Plastic has become the dominant problem in recent years since it became the dominant material for food packaging since its mass production in the 1930s[1]. Even in the pandemic year, the plastic waste remains growing while the cities lock down [2].

Leaf as food packaging material has been known since the dawn of civilization [3]. In Indonesia, leaf and other plant's organic material commonly used as traditional food wrapper [4][5] Commonly known leaves such as banana leaf, waru leaf, tepus leaf, simpur

leaf, syzygium leaf and also tembakak leaf used for wrapping traditional food.

The reason for developing this Eco-friendly tebakak leaf plate product is the need for disposable plates. Disposable plate is useful in saving time because it does not need to be washed and can be disposed of after use and is easy to use. The need for the leaf plates to be biodegradable so that it can reduce the use of single-use plastic plates and Styrofoam. Indonesia ranks 2nd in the world as the largest contributor of plastic waste to the ocean after China [6]. In addition, the Indonesian people have long used leaves as food containers, thus triggering the use of environmentally friendly tebakak leaf plates

that are easily biodegradable, easy to produce, hygienic, and have a Lampung’s cultural background.

One main question can the consumer shift from plastic based disposable plate to greener leaf base plate. Can tebakak leaf plate as an eco-friendly product try to replace plastic or just another plastic alternative. How consumer react the tebakak leaves plates from organoleptic point of view. And, how the consumer’s perspective of tebakak leaf plates as an eco-friendly product.

2. METHODOLOGY

One of main assessment for the transformations of consumer behaviour is an organoleptic assessment. Organoleptic research methods are to find and quantified the quality of a product using human senses. These senses are visual sense, olfactory sense, tactile sense, taste sense, auditory sense. Even though it is quite often that method of carrying out organoleptic research usually called tasting. But it is far more complex than just taste. In this case a variety of organs participate in the process. Which are taste bud, tactile sense, visual sense and smell or olfactory sense. Perspective assessment is also done to find how consumer perspective toward an ecofriendly product. This perspective is the key how an ecofriendly product will move forward.

The assessment is done from 20 young adult respondents. These respondents are all college educated person. We hope that these respondent will shape Indonesia future consumer[7][8]. And these responders are representing Indonesian perspective towards ecofriendly product.

There are five disposable plates in review. Two comes from ecofriendly product which are tebakak leaf plate and teak leaf plate. The other three are plastic plates, Styrofoam plates and paper with hdpe lamination plates. All of the plates is shown and used by the respondents. These respondent then will score how each plates perform. There are six question with 1 to 5 grade value for each question. In short, the questions are: is it changing taste; how is the appearance; how is the texture; how is the smell; is it green; and do you want to use it on regular basis. We also look the strength and the weaknesses of the disposable product.



Figure 1. Leaf Plates Assessment Process

3. RESULT AND DISCUSSION

3.1. The Culture of Natural Packaging

Indonesia consists of more than a thousand three hundred ethnic diversities with its own unique culture[9]. The culture includes the traditional structures, traditional wisdoms, traditional customs, food and arts and many more[10]. Among all of the diversity, one common unique culture is its unique traditional foods[11], in conjunction to food is the technology to process the food and also the packaging to serve the food[12].

Each and any tribes in Indonesia has its unique type, process, and traditional food packaging. The existence of traditional food in general cannot be separated from the customs in cultural society. So that traditional leafy container as packaging of traditional food can be reflection of the culture of a society. Packaging culture actually started since humans know how to store and serve food. Serving and storing of food traditionally begins by keeping food in a container which he found. The container can be leaf, husk, bamboo column, Coconut shell, shell and even woven material from natural fiber they found in their culture. Along with the times the container becoming more complex, and has many cultural values. The use of leaves as food wrappers is to beautify the appearance of food, as well as adding a distinctive aroma and delicacy of food[13].

Natural packaging materials are still used in almost all regions of Indonesia on daily basis[14]. Because it is usually very cheap, readily available and not have a negative impact against environmental and will be naturally decomposed. In this case, the function of packaging as an identity is absolutely considered. However, the uniqueness of traditional packaging cannot be replaced.

3.2. Tebakak Leaf Plates

Tebakak leaf as raw materials are widely available naturally, currently leaves is not used commercially, so it is available quite abundant. Tebakak (*Ficus septica*) is a fast growing tree with seeds dispersed through rain water. The tree grows very fast with very wide leaves. The tree is soft wood tree usually unused because of the low quality of the wood. Tebakak (*Ficus septica*) traditionally used by the people of Lampung as a food wrapper. The alkaloids found in *Ficus septica* leaves have cytotoxic effects on cancer cells[15].

Environmentally friendly tebakak leaf plates made from Lampung tebakak leaf are an alternative to disposable plates. Tebakak leaf plates are biodegradable, easy to produce, hygienic, and have long period of storage time. The Lampung tebakak leaf material is a local wisdom from the Lampung area. Plate

production is quite easy and economical because it only changes the shape of the leaves to follow the shape of the plate. The tebakak leaf plate has the integrity of the leaf structure so that the strength and characteristics of the leaves are maintained. The leaf plate has a diameter of 22 cm with a plate indentation depth of about 3 cm and is able to accommodate relatively large amounts of food (357 grams). Tebakak leaves are hot molded processed with natural adhesives from starch so they are more durable. Tebakak leaf plates can be stored for more than 6 months.



Figure 2. Tebakak leaf plate used to serve lontong sayur a local delicacy

The Lampung tebakak leaf used is local wisdom because it is a typical plant from the Lampung region which has distinctive leaf characteristics in its motifs

Table 1. Product Comparison

Aspects	Leaf Plates	Plastic Plates	Styrofoam plates	Paper Plates
Market price	Rp. 1500,-	Rp. 1,000,-	Rp. 500,-	Rp. 1,000,-
Shelf time	6 months	5 years	5 years	2 years
Natural Decomposition Time	2-4 weeks	100-200 years	More than 500 years	Paper decompose in 1 Month but the plastic lamination will decompose in 100 years
Waterproof	Yes	yes	yes	yes
Heat Resistance	Good	Not good	best	good
Raw material available locally	Yes	no	no	partial
Machine capacity	Low	high	high	high

and textures. These qualities provide additional selling points, apart from being biodegradable, for prestige and environmental concern. The resulting product has a low water content so that it can be stored for a long time. This is possible through a leaf molding machine that uses a molding press with a temperature controlled heating element.

Some of the characteristics of the machine for the production of leaf plates are precision pressure, temperature control, and plate mold adapting to the leaf structure. The Lampung tebakak leaves are used because of their strong structure, wide cross-section, and distinctive leaf characteristics. This innovation can make a substitute product for plastic plates and Styrofoam to overcome the bad impact of plastic and Styrofoam on the environment (plastic decomposes takes more than 100 years, while styrofoam does not decompose[16]).

The advantages of tebakak leaf plate products are:

1. Using the natural ingredients of Lampung local wisdom, namely the Lampung tebakak leaf.
2. Using leaf natural structure for its strength and waterproofness so that it is easy to produce.
3. Made of organic material so that it is easy to decompose in the soil and is environmentally friendly.
4. Free from chemicals.

The disadvantages of environmentally friendly leaf plate products are:

1. Leaf plates do not last long if exposed to water for a long period of time.

3.3. Tebakak Leaf Plates Machine

The machine is developed since 2017 for producing leaf plate. It is a manual machine that can be easily replicated for scale up purposes. The machine using a hot press molding to mold the tebakak leaf into plates[17]. It is using two 350-watt heating elements. The temperature is controlled using a PID controller (Proportional Integral and Derivative controller) to achieve 1-degree accuracy. The accuracy is needed as a charred leaf plate is not desirable. Below shown the leaf plate molding machine.



Figure 3. Leaf Plate Molding Machine

The process of making environmentally friendly leaf plates made from lampung tebakak leaves using a leaf plate molding machine, sterilizer, and raw materials tebakak leaves. The tebakak leaf plate production process begins with the preparation of raw materials, tebakak leaves. Fresh leaves then cleaned through washing and drying. After that, the layering out the leaves to strengthen the structure. Then, the hot press process is to press the leaf layer using a pair of dies heated under controlled conditions (about 3 minutes). Then after the molding the plates is cut to trim the edges. The leaf plates were then sterilized using a sterilizer. Lastly, the packing process to send it to customer.

3.4. The Transformation

The plates review process includes a group of young adult with a college academic back ground. This type of group is chosen as a representative of future Indonesian consumer behaviour. In the future Indonesia will have a demographic bonus as young and educated citizen will be the largest percentage of all Indonesian citizen[18]. They will assess the tebakak leaf plates using organoleptic approach in comparison of teak leaf plates, plastic plates, styrofoam plates and paper (paper with hdpe plastic lamination) plates. They will also be asked for their perspective of using the plates.

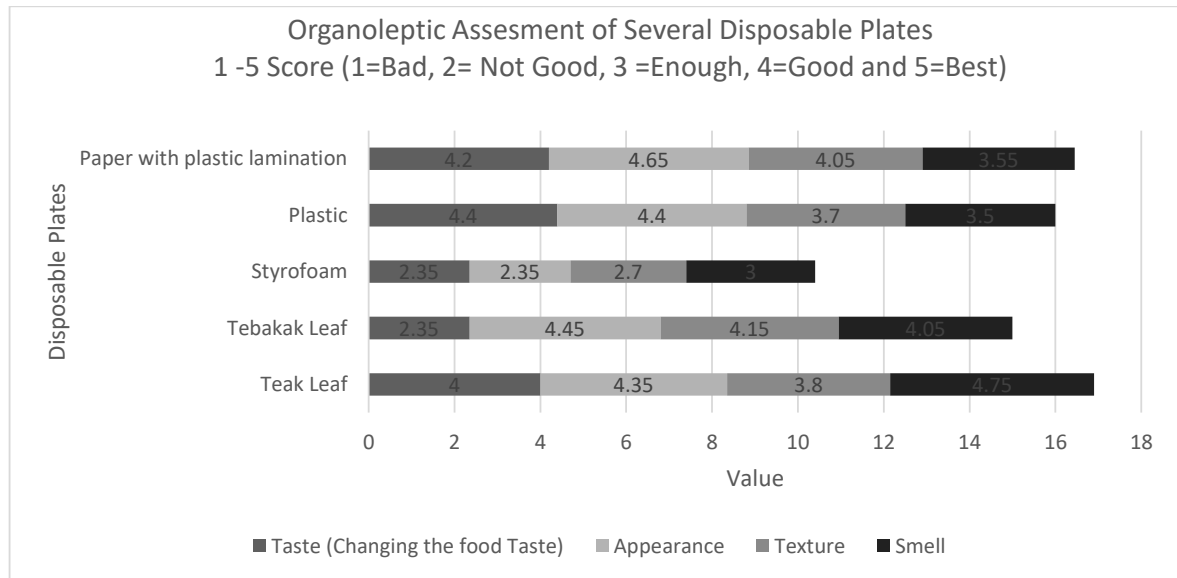


Figure 4. Organoleptic Assessment of Disposable Plates

Taste will become the enemy of leafy food container as shown on above figure because there are not as inert as the other disposable plates (plastic plates, styrofoam plates and paper plates). As the leaf when contact with food tends to alter the food taste. But this result can be view both ways (negatively or positively). Negatively,

both of tebakak leaf plates and teak leaf plates can alter the food taste. But Positively, the altered taste might be just fine and not worsen the food taste. The argument also shown support on how the plates smell. Both leaf plates (tebakak and teak) smell quite nice better that other disposable plate (plastic plates, styrofoam plates

and paper plates). As usually taste and smell tied positively in food. From figure 4, we learn that both leaf plates (tebakak leaf plates and teak leaf plates) can be

contender for plastic plates and paper plates while styrofoam plates has the lowest value.

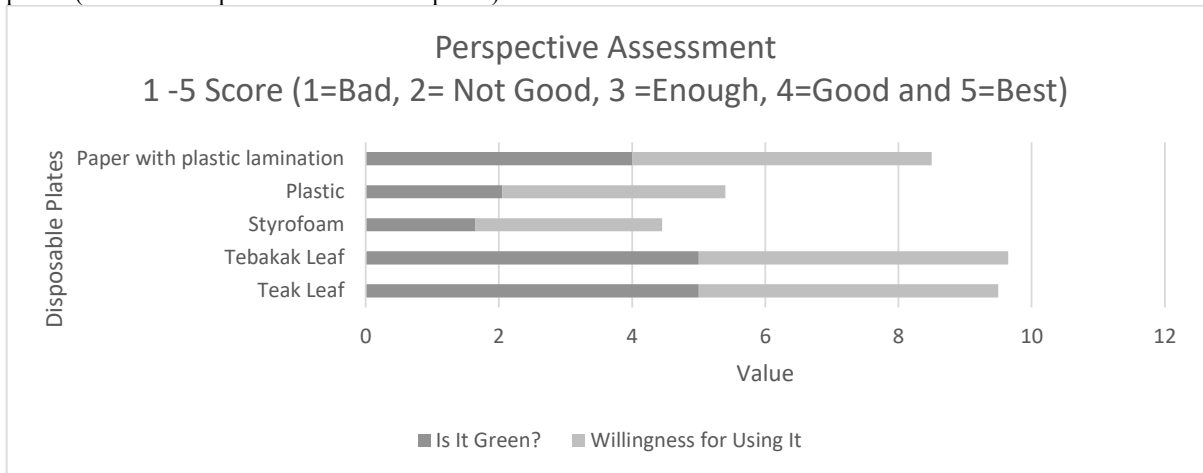


Figure 5. Perspective View on Disposable Plates

Perceptively there is no down arguments for how green is both for the tebakak leaf plates and the teak leaf plates. And the group also agrees that they want to use the tebakak leaf plates and the teak leaf plates. The main hindrance of using the plates is the availability on the market and its higher price. From Table 2. Product Comparison, we learn that the leaf plate machine capacity is quite low compared to other plates machine. If we can push the capacity of the leaf plate machine, then we can lower the leaf plate price and also flooding the market with plastic alternative product. More people will aware there are eco-friendly leaf plate products.

Total assessment form both test shown that future consumer tries to avoid styrofoam plates and plastic plates. And they agree that tebakak leaf plates, teak leaf plates and paper plates is best for them. In the end food taste changing by the leaf plates is not really a turn away for the consumer. The biggest challenge for the leaf pates is can we push the capacity of the leaf plate machine, if so then we can lower the leaf plate price and also flooding the market with plastic alternative product.

Table 2. Total Assessment

Organoleptic and Perspective Assessment					
	Teak leaf plate	Tebakak leaf plate	Styrofoam plate	Plastic plate	Paper with plastic lamination plate
Taste (Changing the food Taste)	4	2.35	2.35	4.4	4.2
Appearance	4.35	4.45	2.35	4.4	4.65
Texture	3.8	4.15	2.7	3.7	4.05
Smell	4.75	4.05	3	3.5	3.55
Is It Green?	5	5	1.65	2.05	4
Willingness for Using It	4.5	4.65	2.8	3.35	4.5
Total	4.4	4.1083333	2.475	3.567	4.1583

4. CONCLUSIONS

We learn that both leaf plates (tebakak leaf plates and teak leaf plates) can be contender for plastic plates and paper plates while styrofoam plates has the lowest value. And the group also agrees that tebakak leaf plates and the teak leaf plates are green and they want to use them. The main hindrance of using the plates is the

availability on the market and its higher price. If we can push the capacity of the leaf plate machine, then we can lower the leaf plate price and also flooding the market with plastic alternative product. Total assessment form both tests shown that future consumer tries to avoid styrofoam plates and plastic plates. And they agree that tebakak leaf plates, teak leaf plates and paper plates is

best for them. In the end food taste changing by the leaf plates is not really a turn away for the consumer.

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