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**International Conference on Agribusiness, Food, and Agro-Technology
ICAFAT (2018)**

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Website : <http://icafat.ust.ac.id>

Medan, 13 September 2018

Dear Prof. Dr. Ir. Y. Budi Widianarko, M.Sc, Inneke Hantoro, STP, M.Sc, Dr. A. Rika Pratiwi, M.Si

Congratulation! We are pleased to inform you that your abstract " Microplastics Contaminant in Coockles and Green Mussels Distributed in Local Markets in Semarang" has been accepted by the International Conference on Agribusiness, Food, and Agro-Technology 2018 (ICAFAT 2018). You are invited to orally present the paper at ICAFAT 2018 that will be held on 20 September 2018 in Grandhika Hotel, Medan, Indonesia.

Thank you for your contribution and submission of high quality of your abstract paper. We are looking forward to seeing you in Medan - Indonesia, on 19-21 September 2018. If you have further questions, please do not hesitate to contact us via e-mail to: rosatampubolon031969@gmail.com.

I am looking forward to seeing you in Medan!

Best regards,

Dr. Rosa Tampubolon
Chair of ICAFAT 2018

ICAFAT 2018

International Conference on
Agribusiness, Food & Agro-Technology

September 19 - 21, 2018
Grandhika Hotel
North Sumatra - Indonesia

PROGRAM & ABSTRACT



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**Fakultas Pertanian
Universitas Katolik
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Invited and Parallel Session Schedule

Time	Room 1 (Cendana 1-2) Agrotechnology	Room 2 (Kenari) Food Technology	Room 3 (Cemara) Agribusiness
13.00-13.20	Invited 1	Invited 3	Invited 5
13.20-13.40	Invited 2	Invited 4	Invited 6
13.40-13.55	1570484493	1570489203	1570465266
13.55-14.10	1570486737	1570489569	1570489862
14.10-14.25	1570488781	1570492443	1570494410
14.25-14.40	1570489088	1570489913	1570494569
14.40-14.55	1570489334	1570492225	1570489316
14.55-15.10	1570489614	1570489844	1570489317
15.10-15.25	1570489868	1570492707	1570489891
15.25-15.40	1570489888	1570492712	1570492580
15.40-16.00	Coffe Break		
16.00-16.10	1570489903	1570493709	1570489661
16.10-16.20	1570489916	1570489569	1570489927
16.20-16.30	1570489324	1570493765	1570482135
16.30-16.40	1570494399	1570494559	1570489320
16.40-16.50	1570493758	1570494561	1570493662
16.50-17.00	1570489327	1570493704	1570489572
17.10-17.20	1570489647	1570494416	1570489671
17.20-17.30	1570489667	1570489224	1570489677
17.30-17.40	1570489678	1570489686	1570489238
17.40-17.50	1570489672	1570493705	1570490515
17.50-18.00	1570489675	1570489230	1570489237

		(crude palm oil) using rubber fruit shell (<i>Hevea brasiliensis</i>) as biosorbent	
7	1570489913	Microplastics contamination in cockles and green mussels distributed in local markets in Semarang	I Hantoro, B Widianarko and A R Pratiwi
8	1570489844	Nanoemulsion preparation base on palm fiber mesocarp residue's oil and its application on dry noodle	H Manurung, J Silalahi, D Siahaan and E Julianti
9	1570493709	Antimicrobial activity of turmeric leaf extract against <i>Escherichia coli</i> , <i>Staphylococcus aureus</i> , <i>Shigella dysenteriae</i> , and <i>Lactobacillus acidophilus</i>	I L Azhari, H Rusmarilin, D Suryanto and D R Sihombing
10	1570489569	Safe processing method and storage time threshold for consuming of powdered-infant formula based on total plate count test	S Amelia, N D A Lubis, M F Rozi and I F F Nababan
11	1570493765	Antioxidant activity of tomato juice rich in lycopene antioxidant as degenerative chemopreventive agents using citrus aurantifolia juice as a preservative	R Z Tambunan
12	1570494559	Analysis of chemical parameters sourced from domestic waste and management efforts in Lake Toba region	S M Indirawati and A Muntaha
13	1570494561	Utilization of jasmine flower extract as antimicrobial in tempeh sausage	N W Sihite, H Rusmarilin and D Suryanto
14	1570493704	Characterize of DTODC ionophoric from DC azacrown for ion selective electrode membrane in potentiometry	E Sihombing, H Siagian and A Turnip
15	1570494416	Analysis of nitrite and nitrate in the corned beef and smoked beef by visible spectrophotometry method	J Silalahi, S D R Tampubolon, M R M Sagala, Y C E Silalahi, N S Matondang and Muchlisyam
16	1570489224	The role of tocopherol on photooxidation reactions palm oil emulsion in water	P Sibuea, S Raharjo, M Pandiangan and D Panjaitan
17	1570493705	Analysis of arsenic in raw and cooked rice by atomic absorption spectrophotometer	J Silalahi, S D R Tampubolon, M R M Sagala, I N Saraswati and Y C E Silalahi
18	1570493662	Fouling mitigation through maghemite particles in membrane bioreactor	S D R Tampubolon, G C Hermosa, D R Sihombing, S F Yanti and M Pandiangan
19	1570482135	Determining sea water intrusion in shallow aquifer using the chloride bicarbonate ratio method	D Panjaitan, J Tarigan, A Rauf and E S M Nababan
20	1570489230	Identify the position of omega 3 and 6 in sn-2 triacylglycerol mas fish oil with hydrolysis by using lipase immobilized of <i>Mucor miehei</i>	M Pandiangan, J Kaban, B Wirjosentono and J Silalahi
21	1570489320	The utilization of red seed guava and rosella flower as source of vitamin C	A Sitohang

1570489913

Microplastics contamination in cockles and green mussels distributed in local markets in Semarang

I Hantoro, B Widianarko and A R Pratiwi

Food Technology Department Soegijapranata Catholic University Semarang Indonesia

**Corresponding author: inneke.hantoro@unika.ac.id*

Abstract. Indonesia has been indicated as the second largest contributor of mismanaged plastic waste ending up in the ocean. Java, as the most populated island in Indonesia, contributes 0.116 – 0.145 million tonnes plastics waste per year. This may lead to massive accumulation of microplastics in this coastal area and through thropic transfer these pollutants may contaminate commonly consumed seafood species. Our previous study revealed the presence of microplastics in some seafood species collected from coastal areas in Semarang. In this study, we investigated microplastics contamination in widely consumed bivalves that are distributed in Semarang. Cockles (*Anadara granosa*) and green mussels (*Perna viridis*) were taken from three local markets in Semarang. The microplastic materials were extracted using alkaline digestion and followed by NaI treatment to isolate the particles. The microscope observation was performed to detect microplastic particles. The result showed that both cockles and green mussels taken from the local markets in Semarang contained microplastics in the form of fragment, fiber, spheres, and film. These findings highlight that microplastics have been contaminated our daily food. Further investigation on the risk of ingested microplastics to human health will be urgently needed.

Keywords: microplastics, cockles, mussels, Semarang.

Microplastics Contamination in Blood Cockles and Green Mussels Distributed in Local Markets in Semarang

INNEKE HANTORO, BUDI WIDIANARKO, A. RIKA PRATIWI

SOEGIJAPRANATA CATHOLIC UNIVERSITY

INTERNATIONAL CONFERENCE ON FOOD AND AGRO-TECHNOLOGY

20 SEPTEMBER 2018

GRANDHIKA HOTEL, MEDAN

INTRODUCTION

Indonesia is **the 2nd largest contributor** of plastic waste dumped into the sea, 0.48 – 12.9 MMT/year.

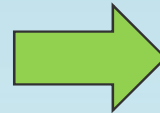
(Jambeck *et al.*, 2015)

4 rivers in Indonesia (Brantas, Bengawan Solo, Serayu, and Progo) are **grouped in the top 20 rivers causing the highest pollution** of plastic waste in the world.

(Lebreton *et al.*, 2017)

The level of plastic pollution seems alarming, but the studies on microplastics in Indonesia is still very limited.

Plastic waste can be degraded and fragmented to be **MICROPLASTICS**, due to UV, abrasion, etc.



Microplastic: plastic particle with size < 5 mm



Nanoplastics gevaarlijker dan microplastics

Tekst: Ingrid Zengere
Foto's: Dick Verbaak, Delftse - Bart Koelmans, WUR

Vermoedelijk bestaat de plastic soep op zee uit een bouillon van micro- en nanoplastics. Zeker weten doen we het niet, want goede meetmethodes ontbreken nog. Eén ding is wel duidelijk: microplastics en nanoplastics hangen onderling samen. De grootte van de deeltjes bepaalt de ernst van het effect. Daarom mag het onderzoek naar zwerfvuil op zee niet stoppen bij microplastics. *Size matters.*

Na de succesvolle campagne *Stief the microbeest* van Stichting Noordzee en de Plastic Soup Foundation (2015) kreeg de plasticsoep nog meer aandacht. Het thema drong ook door tot de politiek. Om aandacht te krijgen werd er naar microplastics.

Wetenschappers definiëren microplastics als alle deeltjes kleiner dan 5 millimeter. Nanoplastics zijn minder dan 100 nanometer groot, en hebben vele andere eigenschappen. Er is een andere aanpak nodig om nanoplastics te kunnen meten. Toch is het nog maar de vraag of onderzoekers en beleidsmakers ook nanoplastics hebben. Daar zijn geen afspraken over gemaakt. Het gelukt er al beter dat het probleem rond de microplastics meestal verschuift dan ook het thema nanoplastics van de agenda?

Trouw! Europa richt nog druk meer op plastic zakjes, flesjes en microplastics op zee, daarom hoop ik dat Dick Verbaak en Bart Koelmans en Europeanen aan de J-dijk Meritex verder in op het probleem. Aan hen de vraag: wat weten we inmiddels van nanoplastics?

Onderzoek naar nanoplastics in het milieu. Een onderzoek van Dick Verbaak wordt bij Delftse en is verbonden aan de Vrije Universiteit. In 2015 publiceerde hij samen met onderzoekers van de TU Delft een studie naar de loading van microplastics door huishoudelijke afvalstoffen. Zij namen daarbij ook de laatste nanoplastics mee.

Verbaak: 'Veel van het experimentele onderzoek naar de effecten van plastic deeltjes wordt uitgevoerd met supermicroscopische nanoplastics (precies dat de industrie geproduceerde nanodeeltjes, ml.)



RISK of ingestion in marine ecosystem

- Macroplastic* ➡ whale, seal, dolphin, turtle & bird
- Mesoplastic* ➡ bird, fish & invertebrate
- Microplastic* ➡ fish, invertebrate & other filter feeders
- Nanoplastic* ➡ invertebrate & other filter feeders

GESAMP (2015)

3 food safety risks

1. *microplastics as carrier for toxic chemicals*
2. chemical components of plastics can be released and adsorbed by tissues
3. ***microplastics & nanoplastics can directly enter animal tissues***

THE AIM OF RESEARCH

To identify and quantify the occurrence of microplastic contaminant in blood cockles (*Anadara granosa*) and green mussels (*Perna viridis*) collected from several traditional markets in Semarang.

MATERIALS & METHODS

Samples:

- Blood cockles (*Anadara granosa*)



- Green mussels (*Perna viridis*)



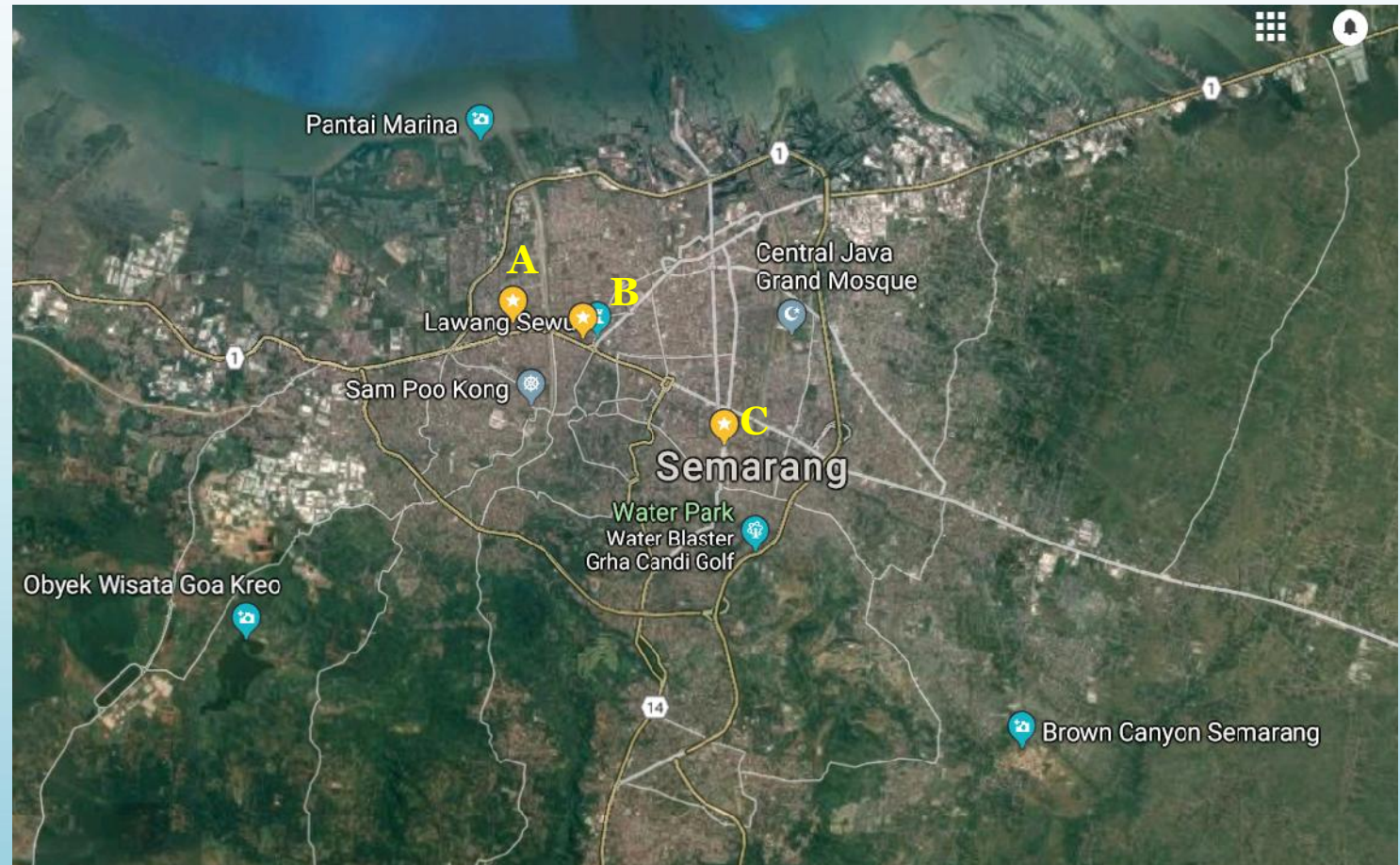
SAMPLING LOCATION

LOCATION:

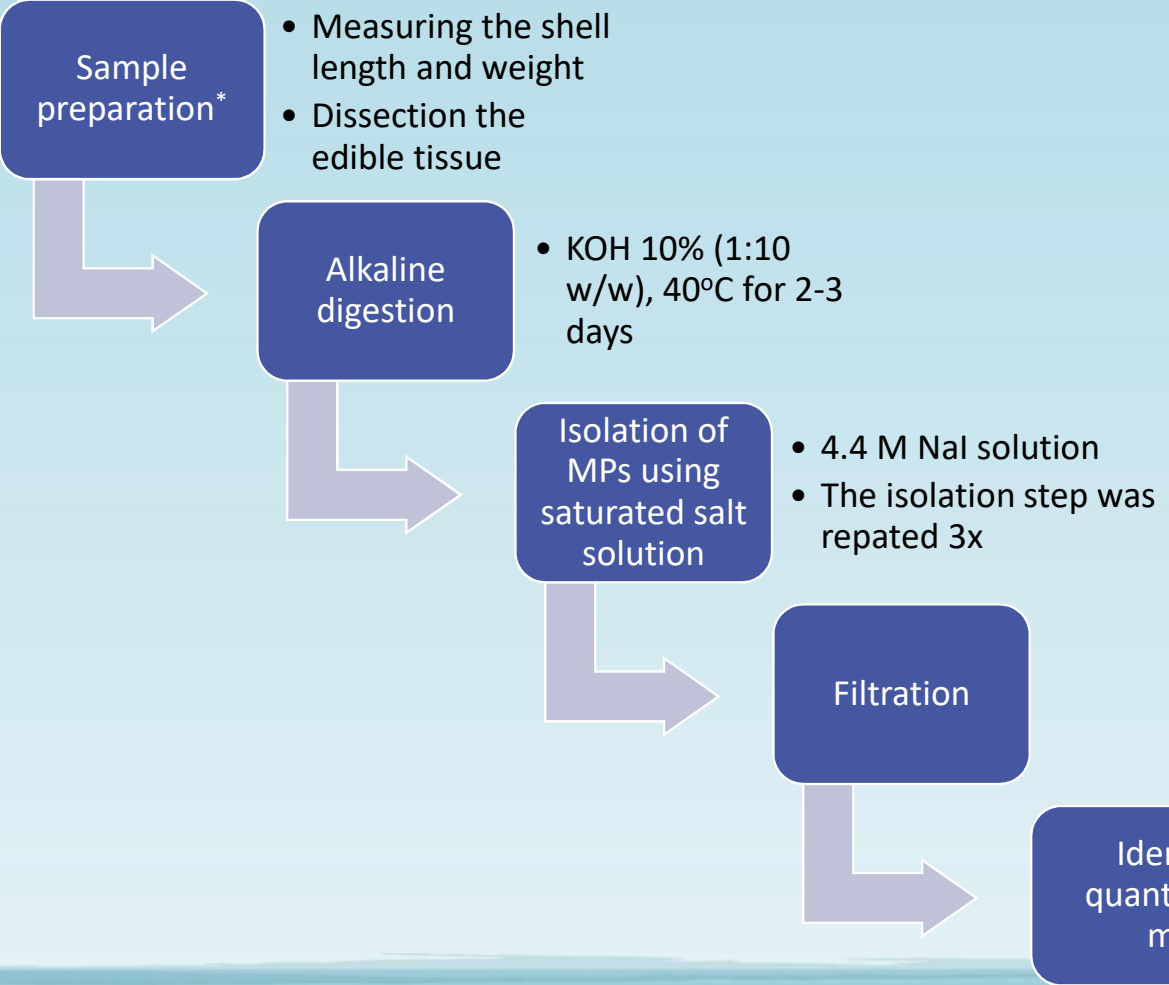
- A. Karang Ayu market
- B. Bulu market
- C. Peterongan market

SAMPLING:

- 3 kg of green mussels and 3 kg of blood cockles were collected from each market
- 30 muscles/cockles with similar size were taken as replicates from each market



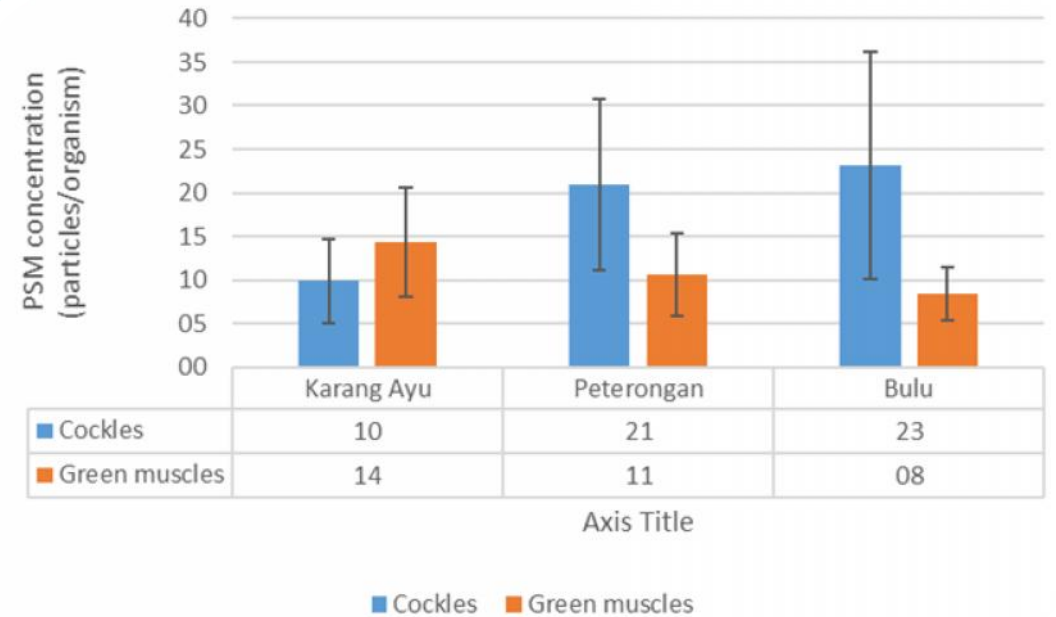
Microplastics analysis



RESULTS



The proportion of bivalves contaminated with PSM

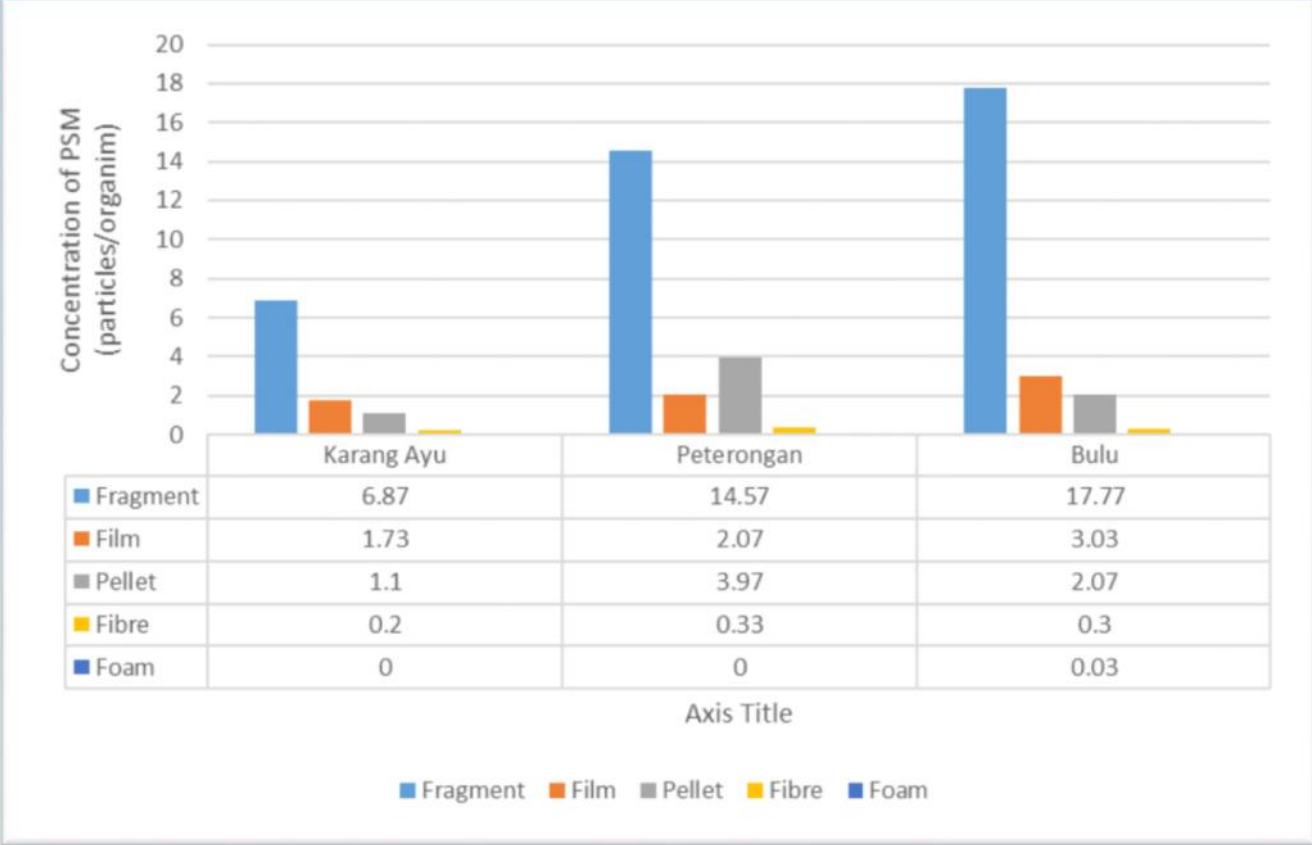


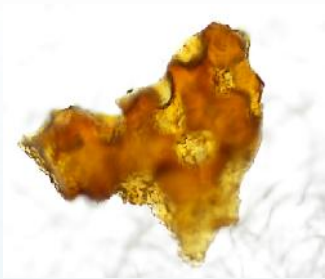
The PSM (particles/ organism) in bivalves from markets in Semarang

PSM*: particle suspected as microplastic

The average PSM concentration of cockles is 18 particles/organism and green mussels is 11 particles/organism

The PSM (particles/ organism) in blood cockles based on the shape

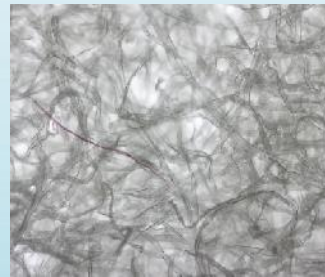
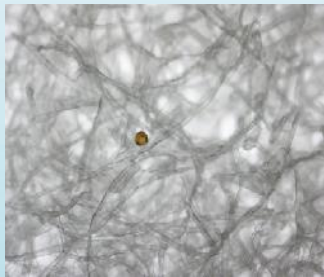
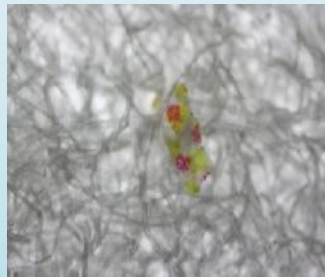




Karang Ayu market



Peterongan market



Bulu market

(a)

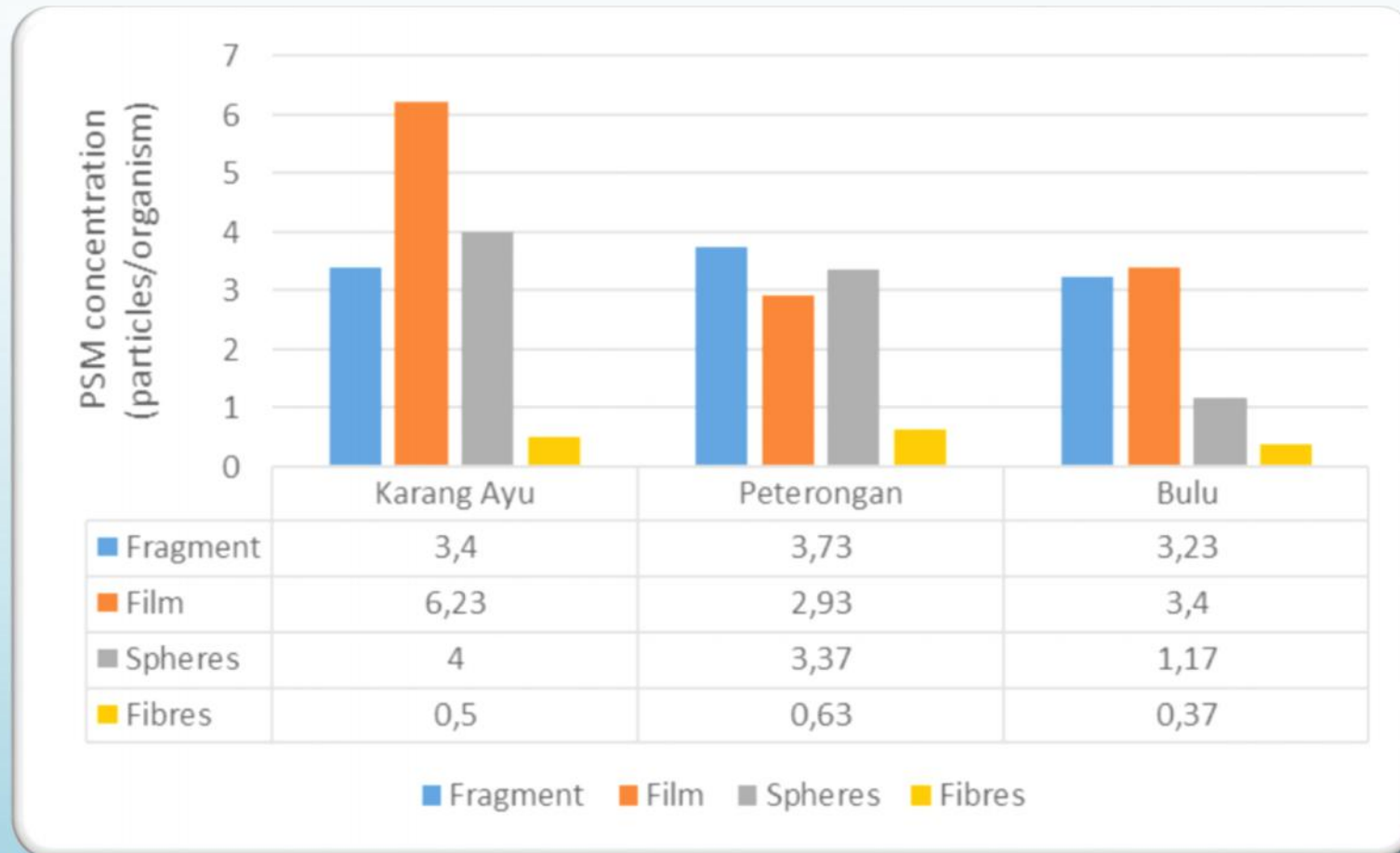
(b)

(c)

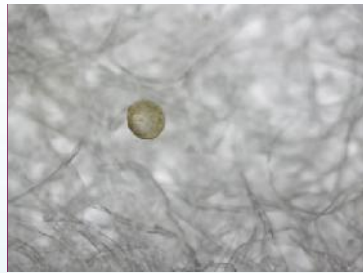
(d)

**The shape of PSM found in blood cockles collected from traditional market in Semarang
(a) fragment, (b) film, (c) pellet, (d) fibre**

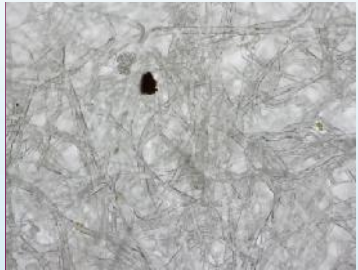
The PSM (particles/ organism) in green mussels based on the shape



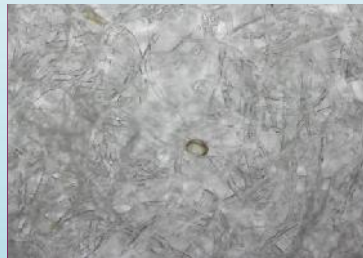
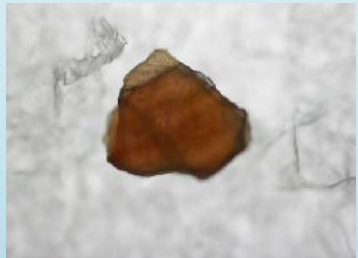
■ Fragment ■ Film ■ Spheres ■ Fibres



Karang Ayu market



Peterongan market



Bulu market

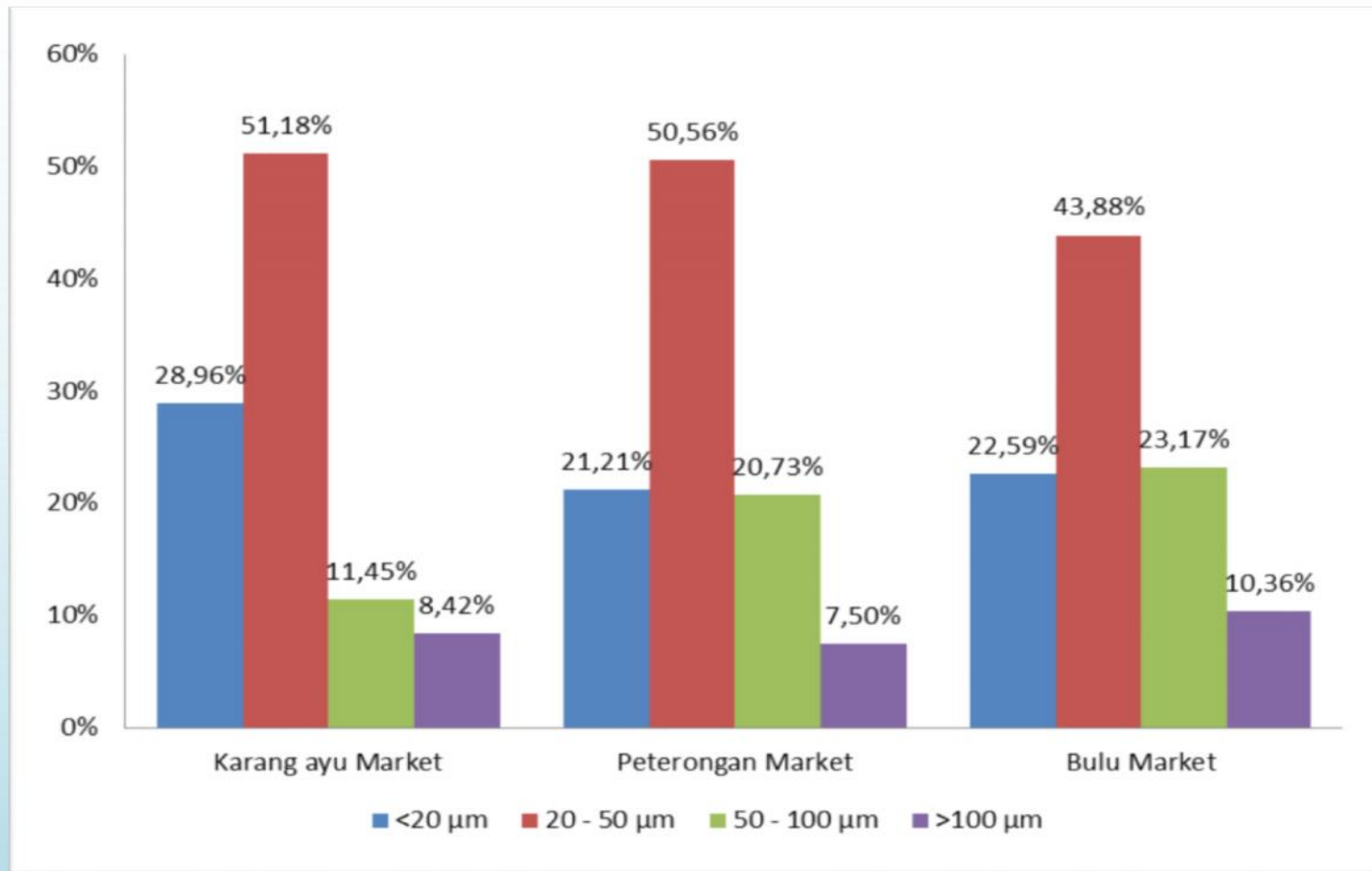
(a)

(b)

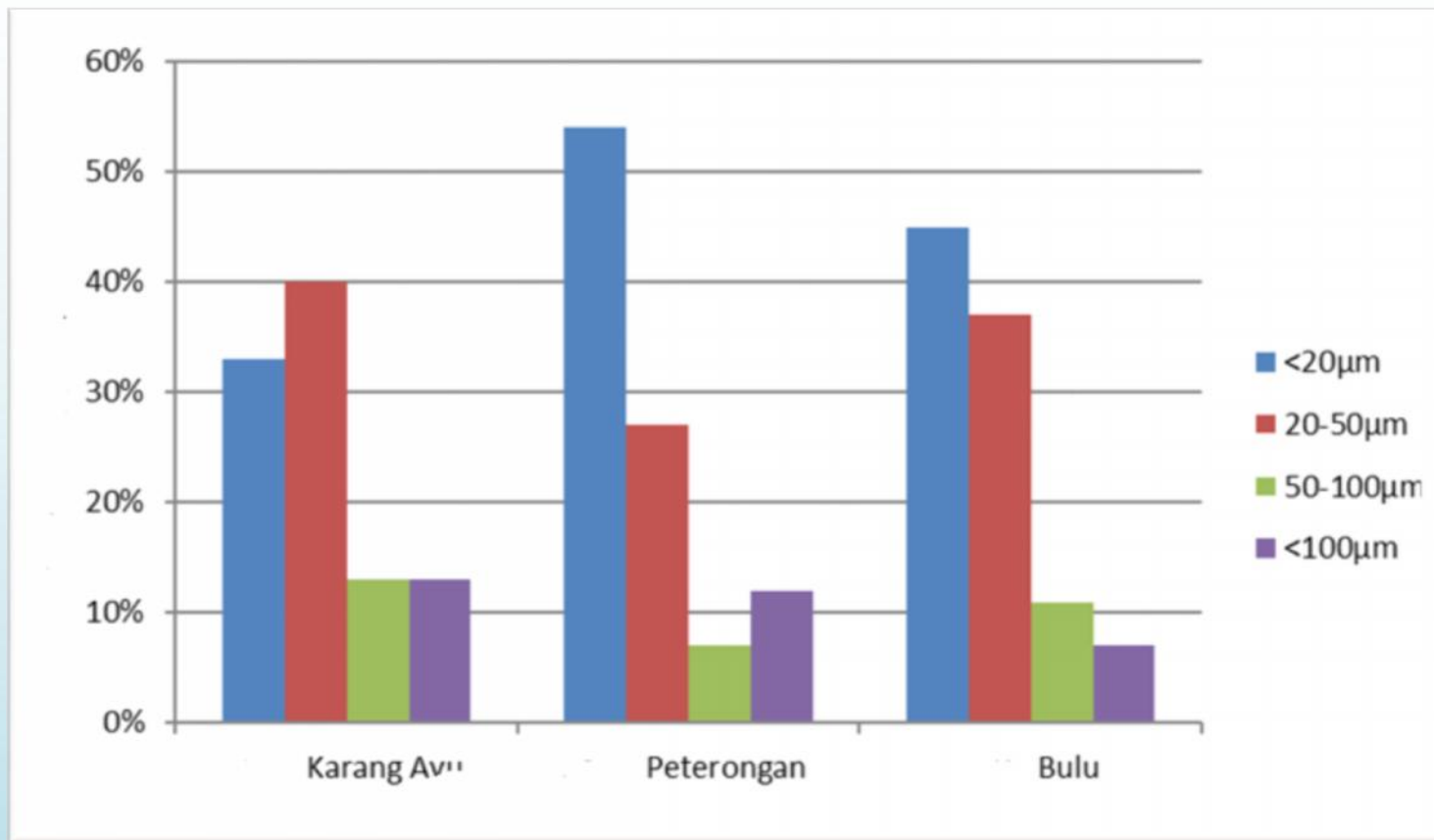
(c)

(d)

**The shape of PSM found in green mussels collected from traditional market in Semarang
(a) fragment, (b) film, (c) sphere, (d) fibre**



The proportion of PSM (%) based on size group in cockles from different markets



The proportion of PSM (%) based on size group in green mussels from different markets

Toxicity ?



INGESTION

Confined to the gut lumen?

OR

Translocation across the gut barrier?

Exposure microplastics to internal organs & tissues

Microplastics 0.1 – 150 μm

(Bouwmeester et al. 2015)

- All blood cockle and green mussel samples taken from Karang Ayu, Peterongan and Bulu markets are positively contaminated by PSM.
- The average of PSM found in cockles and green mussels are 18 particles/organism and 11 particles/organism respectively.
- Different shapes of PSM are found both in cockles and green mussels, including fragment, film, sphere, pellet, and fibre.
- The size of PSM found in cockles is mostly in the range of 20 – 50 micrometer, while in green mussels the mostly found size of PSM is <20 micrometer.

CONCLUSION

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Presented to

Inneke Hantoro

In Recognition and Appreciation of being a

PRESENTER

at the

INTERNATIONAL CONFERENCE ON

AGRIBUSINESS, FOOD & AGRO-TECHNOLOGY (ICAFAT) 2018

Grandhika Hotel, Medan - Indonesia

September 20, 2018

General Chair



Rosa Tampubolon, Ph.D

Universitas Katolik Santo Thomas

Rector,



Dr. Prietz R. Tambunan

SURAT TUGAS

nomor: 00046/A.1.5/ST-FTP/09/2018

Dekan Fakultas Teknologi Pertanian Universitas Katolik Soegijapranata, Semarang dengan ini memberikan tugas kepada:

- Nama : Prof. Dr. Ir. Budi Widianarko, M.Sc.
Inneke Hantoro, S.TP., M.Sc
Dr. A. Rika Pratiwi, M.Si.
- Status : Dosen Fakultas Teknologi Pertanian
Universitas Katolik Soegijapranata, Semarang
- Tugas : Sebagai Pembicara untuk *Oral Presentation* pada *the International Conference On Agribusiness, Food and Agro-Technology ICAFAT (2018)*.
- Tempat : Hotel Grandhika
Medan
- Waktu : 19 – 21 September 2018
- Lain- lain : Harap melaksanakan tugas dengan sebaik-baiknya dan penuh tanggungjawab, serta memberikan laporan setelah selesai melaksanakan tugas.

Semarang, 13 September 2018



Dr. R. Probo Y. Nugrahedhi, S.TP, M.Sc.

NPP 058102001244

Telah melaksanakan tugas


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Rosa Tampubolon, Ph.D.
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