Mikroplast på kjøkkenet

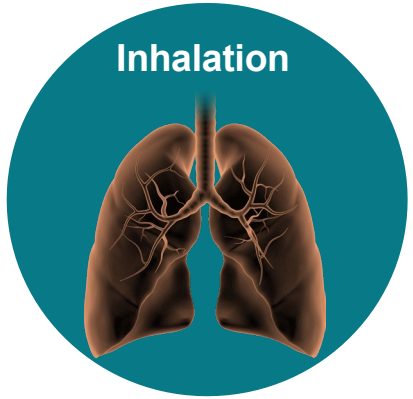
Alessio Gomiero - Norwegian Research Centre

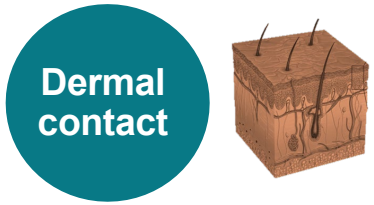
North Atlantic Microplastic Centre

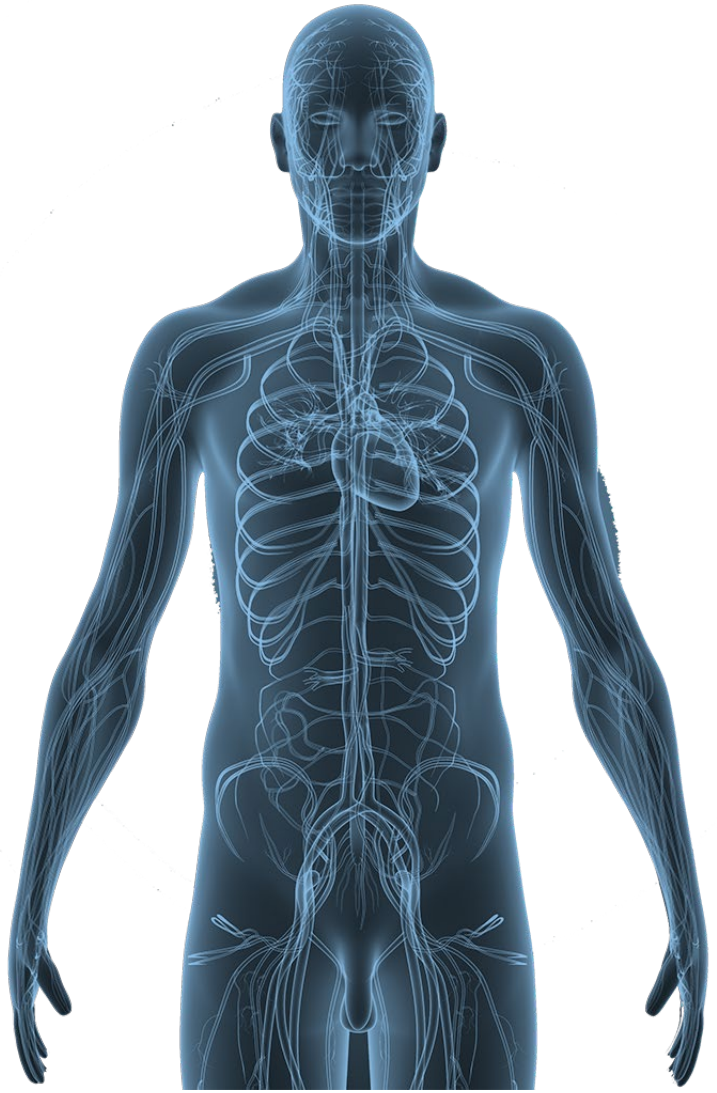
MPS contamination in humans

Humans are potentially exposed to microplastics through several exposure pathways including food, drink, and air.

So far little is known about the occurrence of microplastics in indoor environments especially in connection with industrial activities dealing with the use of raw materials potentially enriched with micron sized plastics.







Evidence of MPs contamination in humans

Environment International 163 (2022) 107199

Contents lists available at ScienceDirect

Environment International

journal homepage: www.elsevier.com/locate/envint

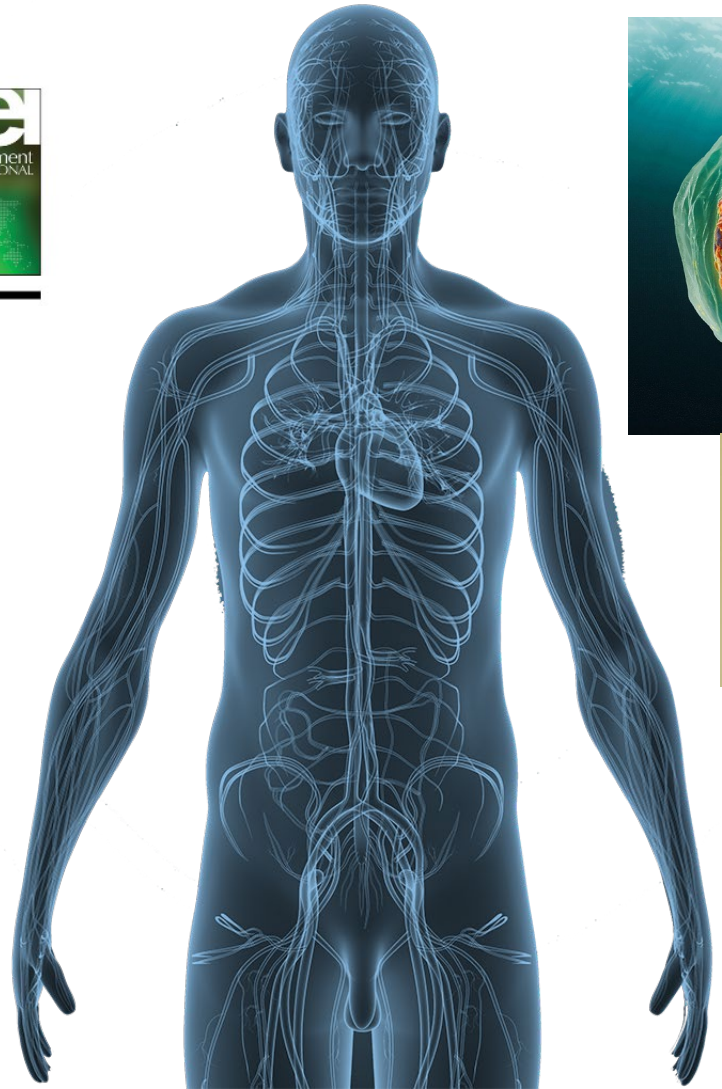
Full length article

Discovery and quantification of plastic particle pollution in human blood

Heather A. Leslie [a], Martin J.M. van Velzen [a], Sicco H. Brandsma [a], A. Dick Vethaak [a,b], Juan J. Garcia-Vallejo [c], Marja H. Lamoree [a,*]

A small set of donors were studied.

The mean of the sum quantifiable plastic particles in blood was 1.5 µg/g …



Evidence of MPs contamination in humans

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Microplastics and Nanoplastics in Atheromas and Cardiovascular Events

R. Marfella, F. Prattichizzo, C. Sardu, G. Fulgenzi, L. Graciotti, T. Spadoni,

304 patients – PE (polyethylene) detetected in arotid artery plaque of 150 patients

Mean level of 21.7±24.5 µg per milligram of plaque (which means that 2.17% of the plaque was plastic …)

31 patients had measurable amounts of PVC (polyvinyl chloride)

“Patients in whom MNPs were detected within the atheroma were at higher risk for a primary end-point event than those in whom these substances were not detected”

Evidence of MPs contamination in humans

Science of the Total Environment 831 (2022) 154907

Contents lists available at ScienceDirect

Science of the Total Environment

journal homepage: www.elsevier.com/locate/scitotenv

Detection of microplastics in human lung tissue using μFTIR spectroscopy

Lauren C. Jenner [a], Jeanette M. Rotchell [b], Robert T. Bennett [c], Michael Cowen [c], Vasileios Tentzeris [c], Laura R. Sadofsky [a,*]

[a] Hull York Medical School, University of Hull, Hull HU6 7RX, United Kingdom
[b] Department of Biological and Marine Sciences, University of Hull, Hull HU6 7RX, United Kingdom
[c] Department of Cardiothoracic Surgery, Castle Hill Hospital, Cottingham HU16 5JQ, United Kingdom

Environmental Science & Technology

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Article

Detection of Various Microplastics in Patients Undergoing Cardiac Surgery

Yunxiao Yang, Enzehua Xie, Zhiyong Du, Zhan Peng, Zhongyi Han, Linyi Li, Rui Zhao, Yanwen Qin, Mianqi Xue, Fengwang Li, Kun Hua,* and Xiubin Yang*

Cite This: Environ. Sci. Technol. 2023, 57, 10911−10918 Read Online

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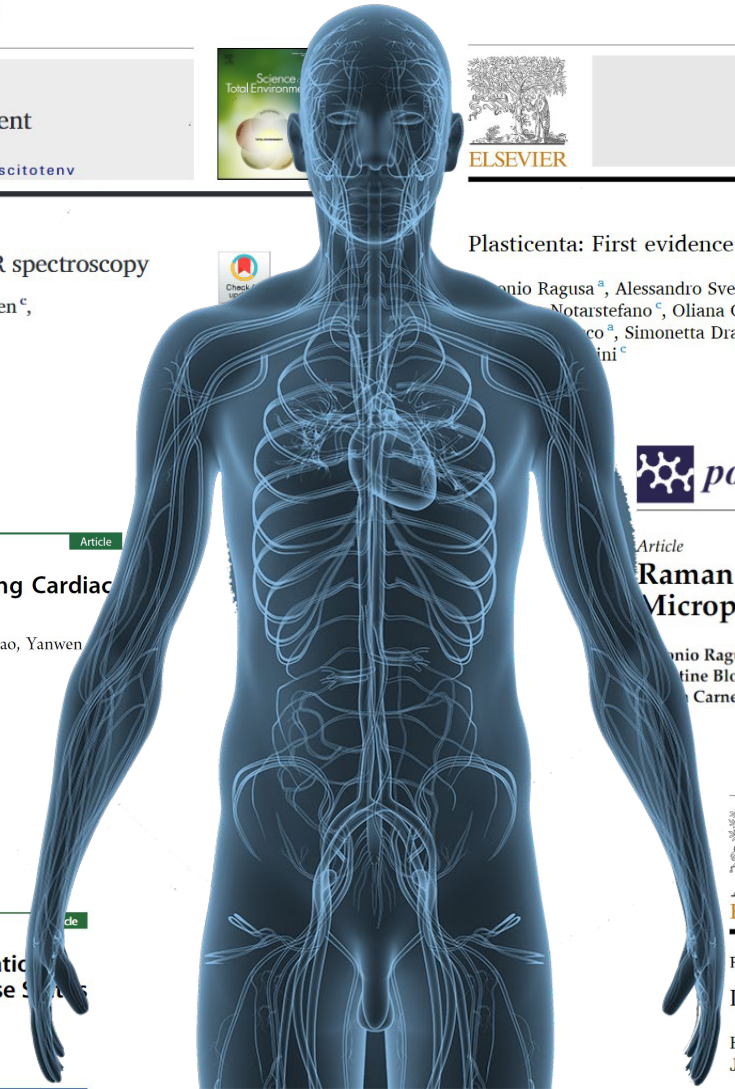
Analysis of Microplastics in Human Feces Reveals a Correlation between Fecal Microplastics and Inflammatory Bowel Disease Status

Zehua Yan, Yafei Liu, Ting Zhang, Faming Zhang,* Hongqiang Ren, and Yan Zhang*

Cite This: Environ. Sci. Technol. 2022, 56, 414−421 Read Online



Environment International 146 (2021) 106274

Contents lists available at ScienceDirect

Environment International

journal homepage: www.elsevier.com/locate/envint

Plasticenta: First evidence of microplastics in human placenta

...onio Ragusa [a], Alessandro Svelato [a,*], Criselda Santacroce [b], Piera Catalano [b], ...Notarstefano [c], Oliana Carnevali [c], Fabrizio Papa [b], Mauro Ciro Antonio Rongioletti [b], ...co [a], Simonetta Draghi [a], Elisabetta D'Amore [a], Denise Rinaldo [d], Maria Matta [e], ...ini [c]

polymers

Article

Raman Microspectroscopy Detection and Characterisation of Microplastics in Human Breastmilk

...onio Ragusa [1], Valentina Notarstefano [2,*], Alessandro Svelato [3], Alessia Belloni [2], Giorgia Gi... ...tine Blondeel [3], Emma Zucchelli [3], Caterina De Luca [3], Sara D'Avino [3], Alessandra Gulotta [4], ... Carnevali [2] and Elisabetta Giorgini [2]

Environment International 163 (2022) 107199

Contents lists available at ScienceDirect

Environment International

journal homepage: www.elsevier.com/locate/envint

Full length article

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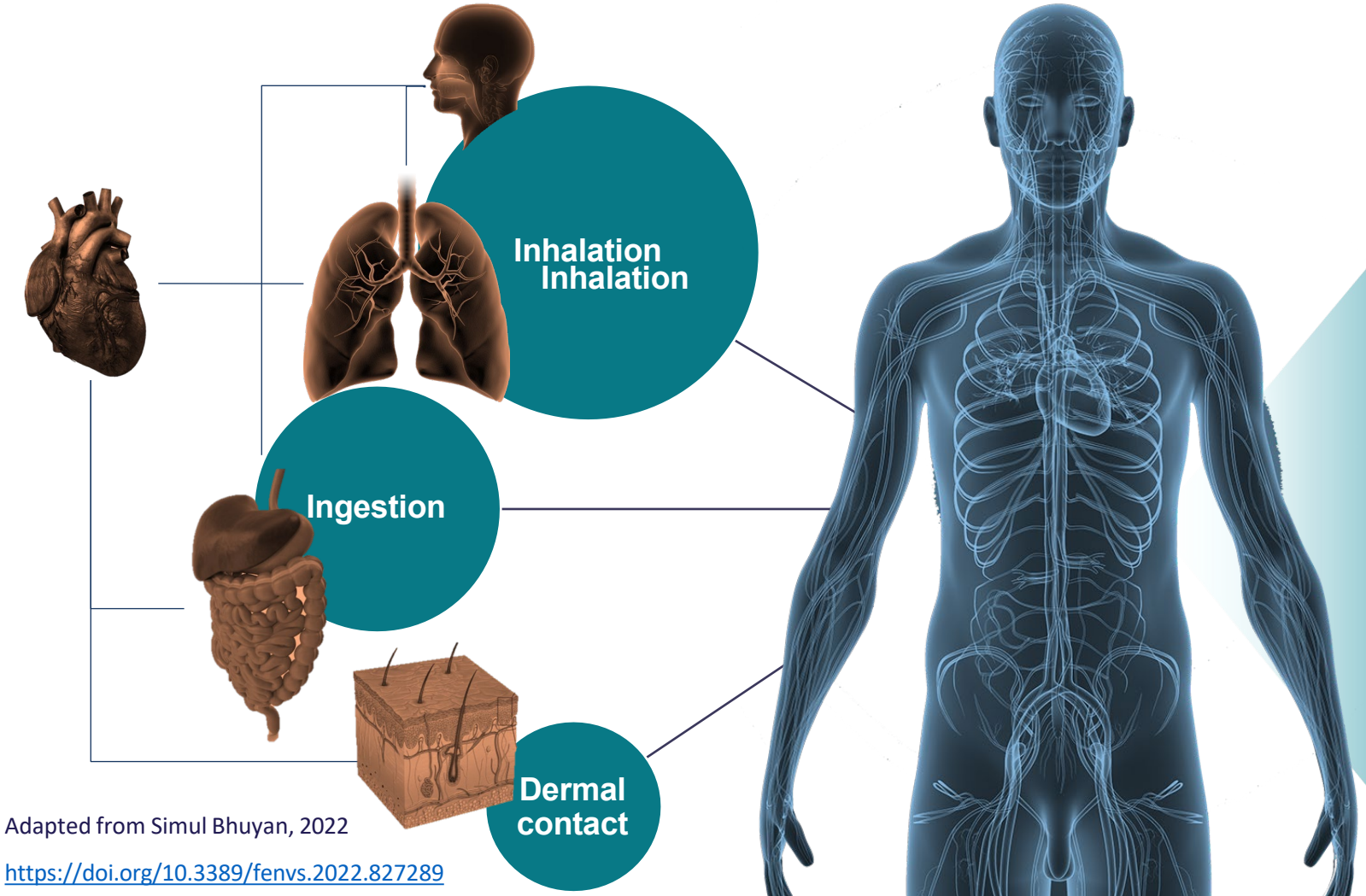
Heather A. Leslie [a], Martin J.M. van Velzen [a], Sicco H. Brandsma [a], A. Dick Vethaak [a,b], Juan J. Garcia-Vallejo [c], Marja H. Lamoree [a,*]

Different exposure pathways … several target organs … and potential effects in humans



Translocation to distant tissues

Metabolism alter

Oxidati

Cyt city

Neu city

Carcinogenity

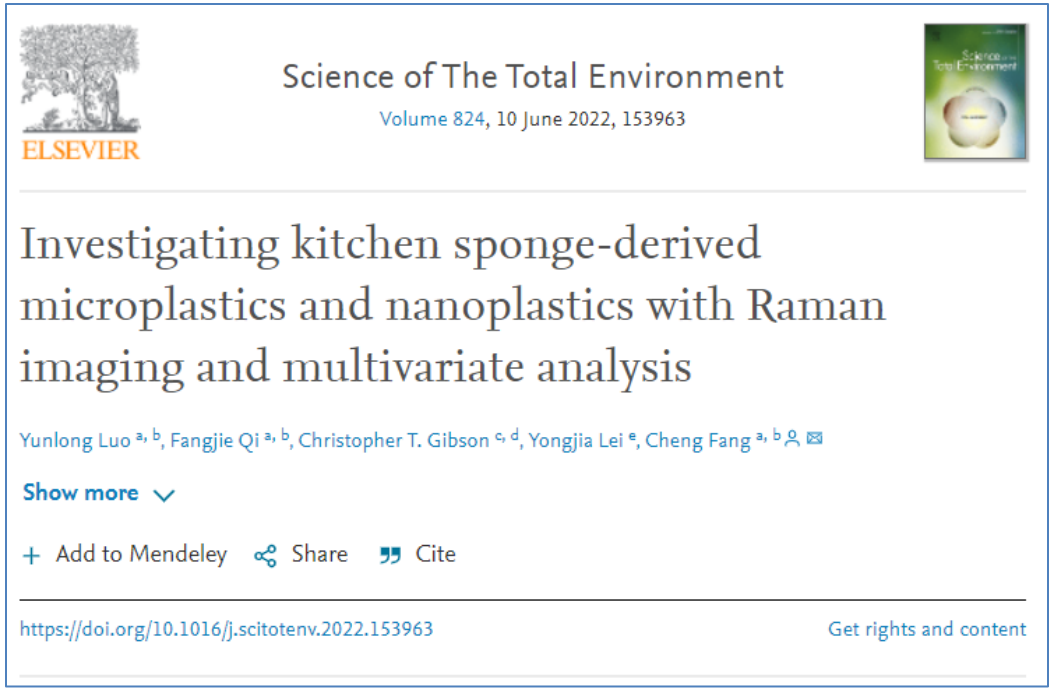
Reproductive toxicity

Adapted from Simul Bhuyan, 2022

https://doi.org/10.3389/fenvs.2022.827289

Human exposure to microplastics during food preparation

Does the cooking process introduce microplastics into food items?



ELSEVIER

Science of The Total Environment

Volume 824, 10 June 2022, 153963

Investigating kitchen sponge-derived microplastics and nanoplastics with Raman imaging and multivariate analysis

Yunlong Luo [a, b], Fangjie Qi [a, b], Christopher T. Gibson [c, d], Yongjia Lei [e], Cheng Fang [a, b]

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https://doi.org/10.1016/j.scitotenv.2022.153963 Get rights and content

Habib et al.(2022) Plastic cutting boards as a source of microplastics in meat, Food Additives & Contaminants: Part A, 39:3, 609-619, DOI: 10.1080/19440049.2021.2017002

Whisking

Chopping

Mixing

Frying

Analysis

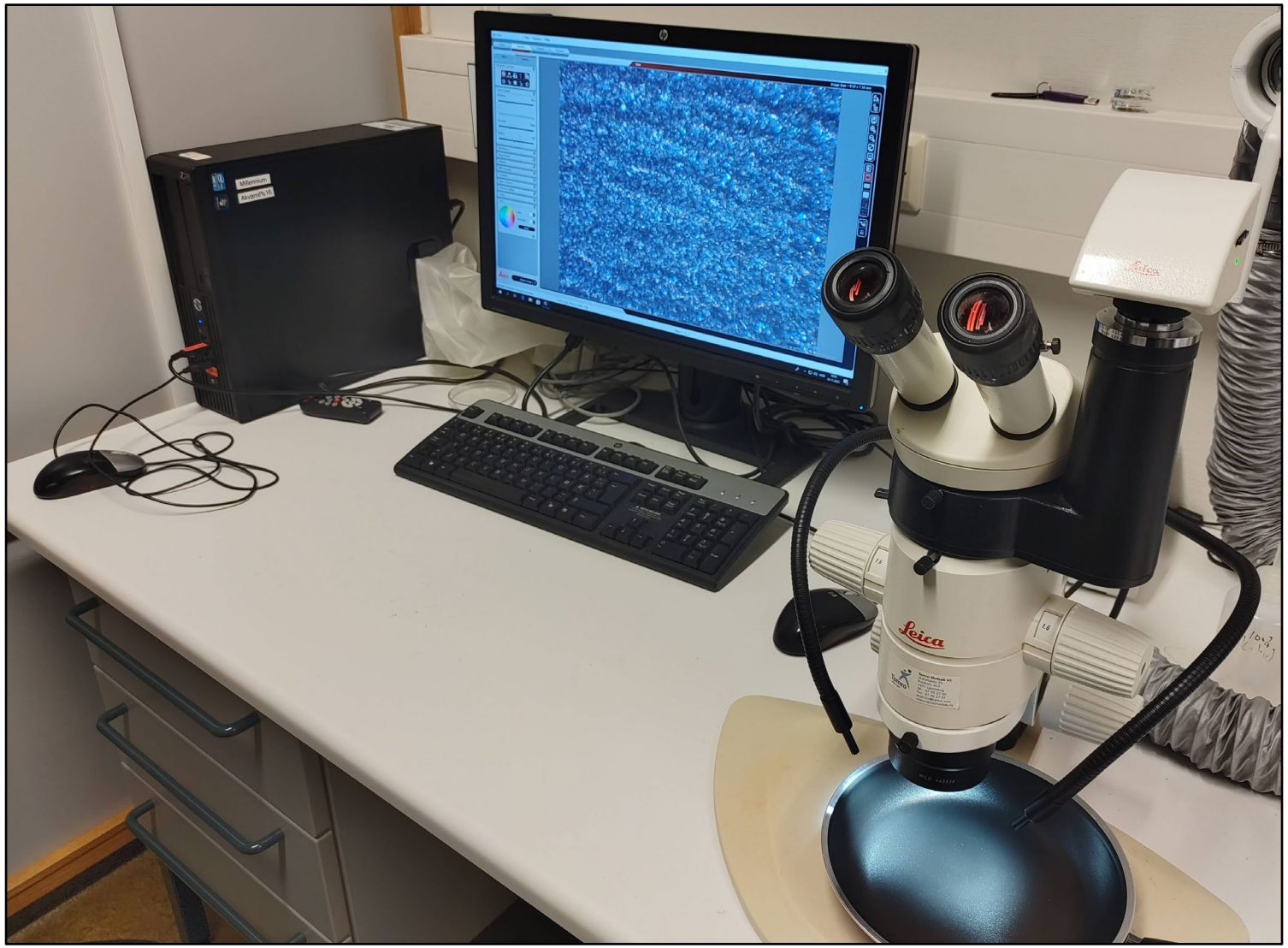
Selection of kitchen tools

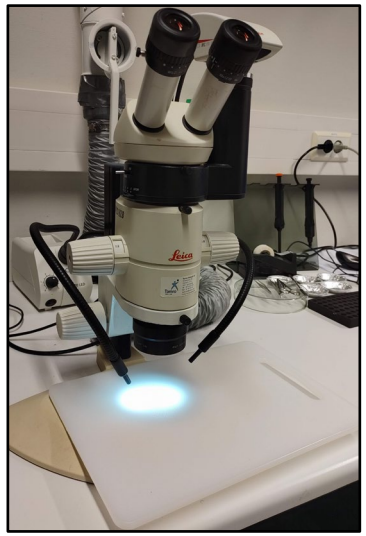
Wood, glass and metal cooking equipment

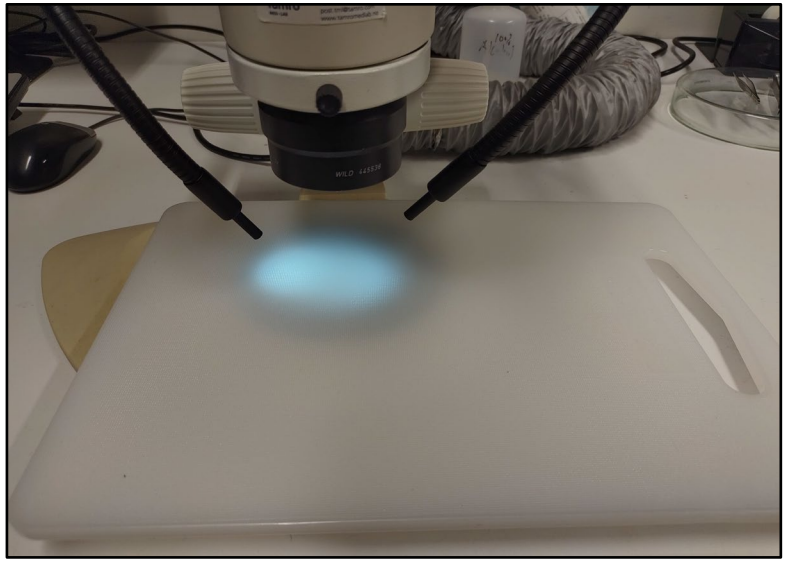
New plastic and Teflon cooking equipment

Old plastic and Teflon cooking equipment

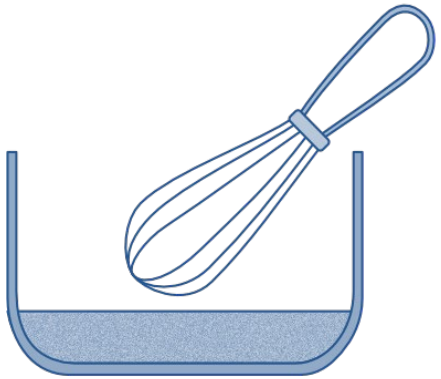
Charaterisation of tools



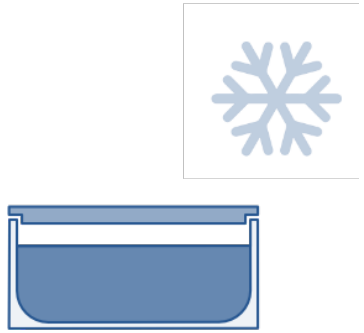




Harmonised process



Jelly (powder) mixed with ultrapure water and heated in **pan** at 100°C; stirred with **whisk** at set rate for given time.

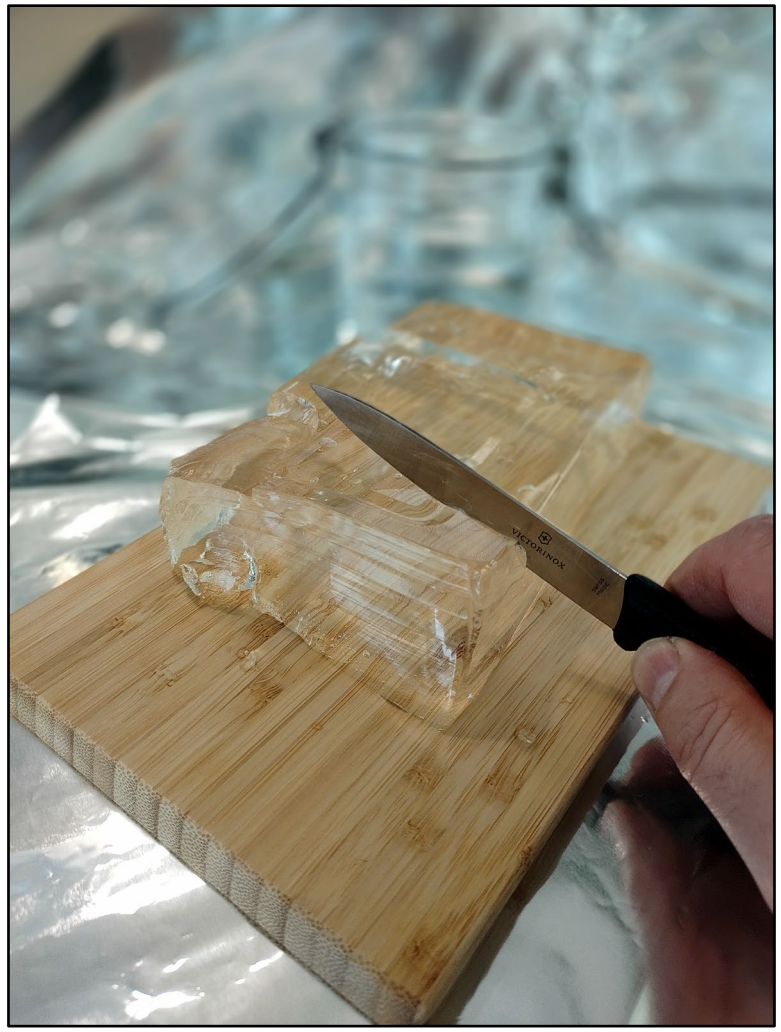


Jelly (liquid) poured into **Tupperware** and chilled for 24 hours in refridgerator.

Jelly (set) cut using **sharp knife** on a **chopping board** for a set amount of slices.

Jelly (diced) heated in **bowl** in microwave for set time, stirring at halfway point with **spatula** for set number of stirs.

Cooking and chopping simulation – teflon pan / wooden board



Contamination Control

All sample preparation and analysis was performed in ultra clean labs

- Equipped with high efficiency low penetration HEPA filtration with an efficiency of over 99.9% for particles of 0.2-0.5 µm
- Overpressure and an airlock prevent dust entry
- The laboratory is entered with dedicated low-abrasion shoes and a cotton laboratory coat
- To reduce sample contamination during sample digestion and analysis equipment in contact with the sample or solutions were made of glass or stainless steel
- MilliQ water was used to prepare all solutions, and all final solutions were filtered using 0.7 µm glass fiber filters (VWR International) before use.

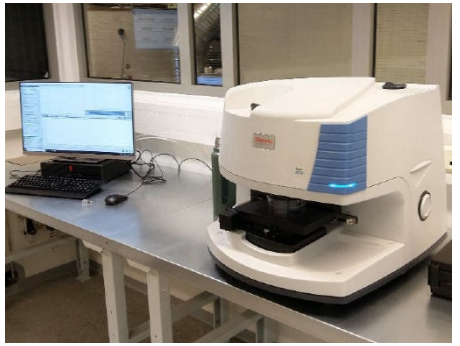
NORCE Ultra Clean Plast Lab, Mekjarvik

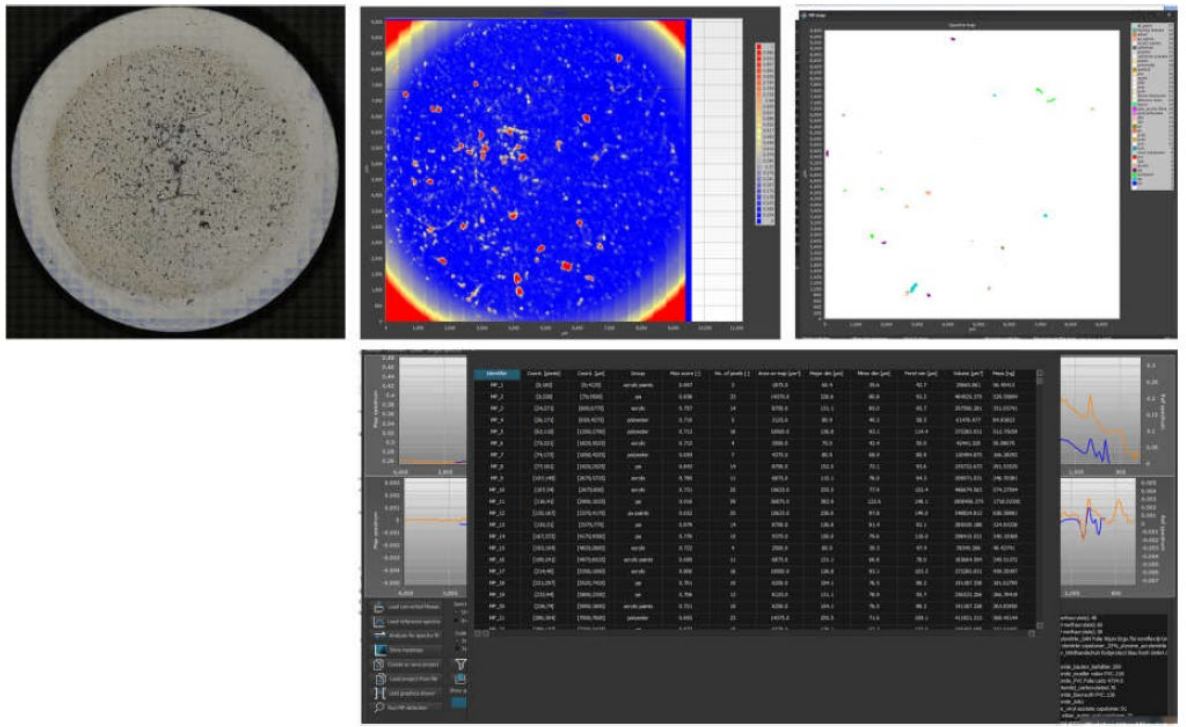
Analysis steps

Jelly (liquid)

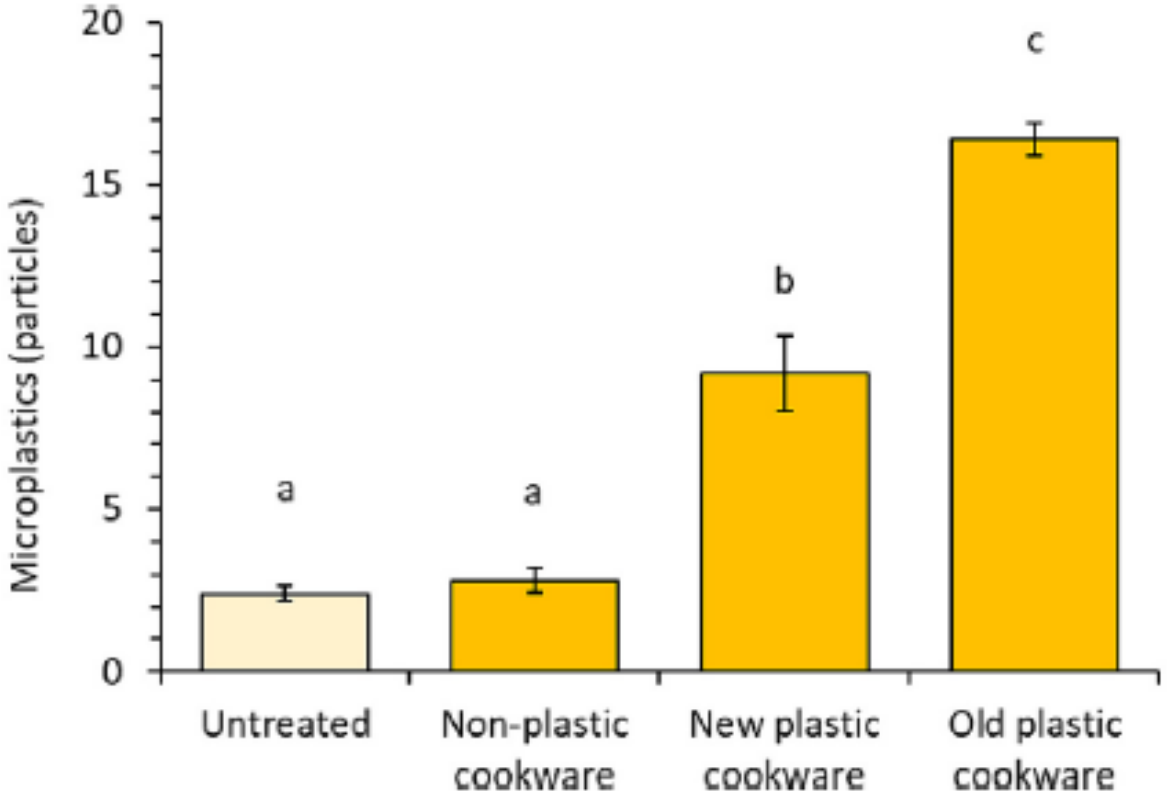
Particles trapped on stainless steel mesh filter

Quantify and characterise **microplastics** using microscopy and FT-IR





Results



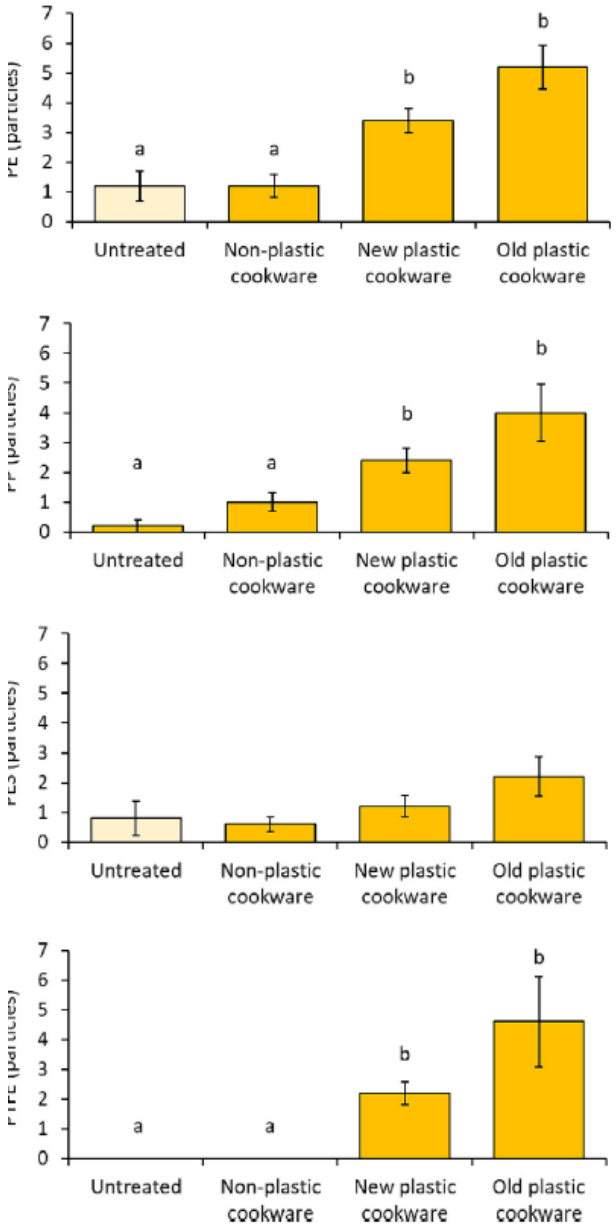
The **unprocessed food** simulant contained **2.4 ± 0.2** microplastics.

Prepared with **non-plastic cookware**, the food simulant **contained 2.8 ± 0.4 MPS** (not significantly different from the unprocessed food simulant).

Food simulant prepared with **new plastic cookware** contained **9.2 ± 1.2 MPs** (significantly greater than observed in unprocessed food stimulant and food stimulant prepared with non-plastic cookware)

Food simulant prepared with **old plastic cookware** contained the highest microplastic load of **16.4 ± 0.5 MPs** (significantly greater than observed in all other treatments).

Plastic type composition



Preparing the food simulant with plastic cookware resulted in significant increases in polyethylene, polypropylene and polytetrafluoroethylene particles contaminating the food simulant.

Conclusion

This study provides an estimation of the release of >10 µm microplastics from plastic cookware used to prepare food in a real-world scenario.

Microplastic contamination was significantly affected by the material and age of cookware used to prepare the food simulant

The release of microplastics stem from thermal and mechanical degradation

Thank you

Matthew Cole – Plymouth Marine Laboratory
Adrian Jaen-Gil - NORCE
Marte Haave- SALT
Amy Lusher - NIVA

North Atlanic Microplastic Centre – NAMC, Pillar 3 “”