

# RELEASE OF SYNTHETIC MICROFIBER DURING DOMESTIC WASHING: INVESTIGATION OF CONSUMER WASHING HABITS



Ugnė GLIAUDELŲTĖ, Virginija DAUKANTIENĖ  
 Faculty of Mechanical Engineering and Design  
 ✉ ugne.gliaudelyte@ktu.lt , virginija.daukantiene@ktu.lt

## INTRODUCTION

**Synthetic microfibers** – a type of microplastics (< 1 mm) shed by synthetic clothing and other textile products.

Synthetic microfibers are found everywhere in the world from rivers, oceans and shorelines to animals and human bodies. They are released into the environment during household washing of synthetic clothing (e.g., polyester, acrylic, etc.).

Results of various studies confirm that **domestic washing parameters have an impact** on microfiber release [1, 2].

**The aim of this study** – to determine under what conditions clothes made of synthetic materials are washed and what parameters are used most frequently during domestic washing.

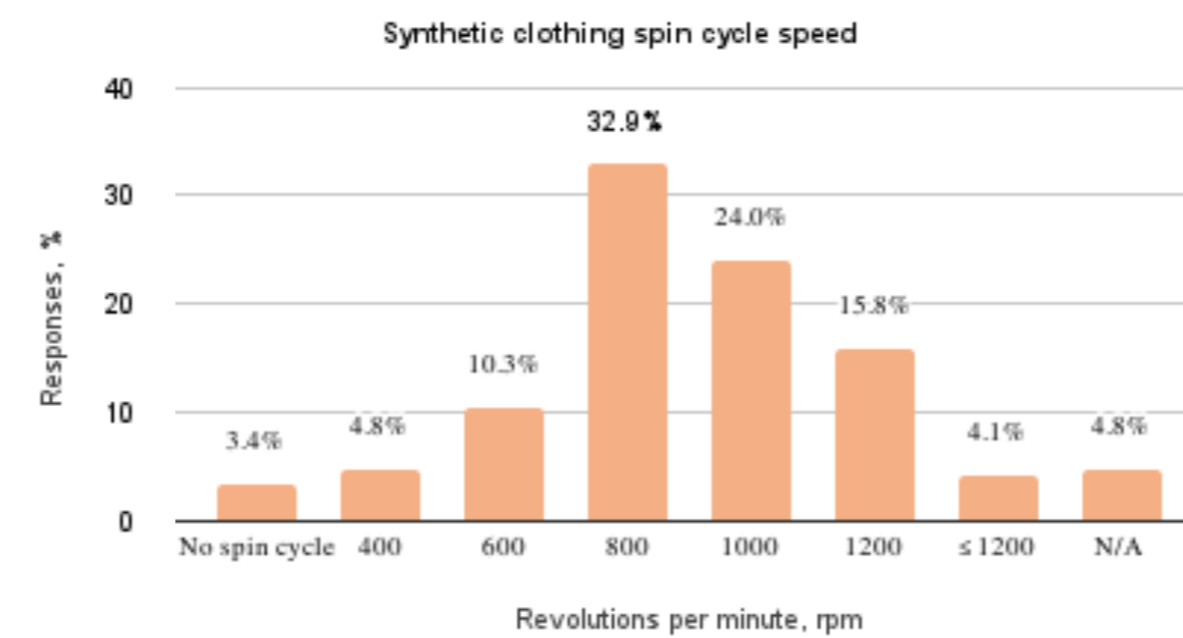
## METHODS

- **Quantitative method.**
- **Online survey** on social media platforms.
- 9 questions (open and possible answer options).
- Active from 24/03/2022 to 11/04/2022.
- **146 respondents.**

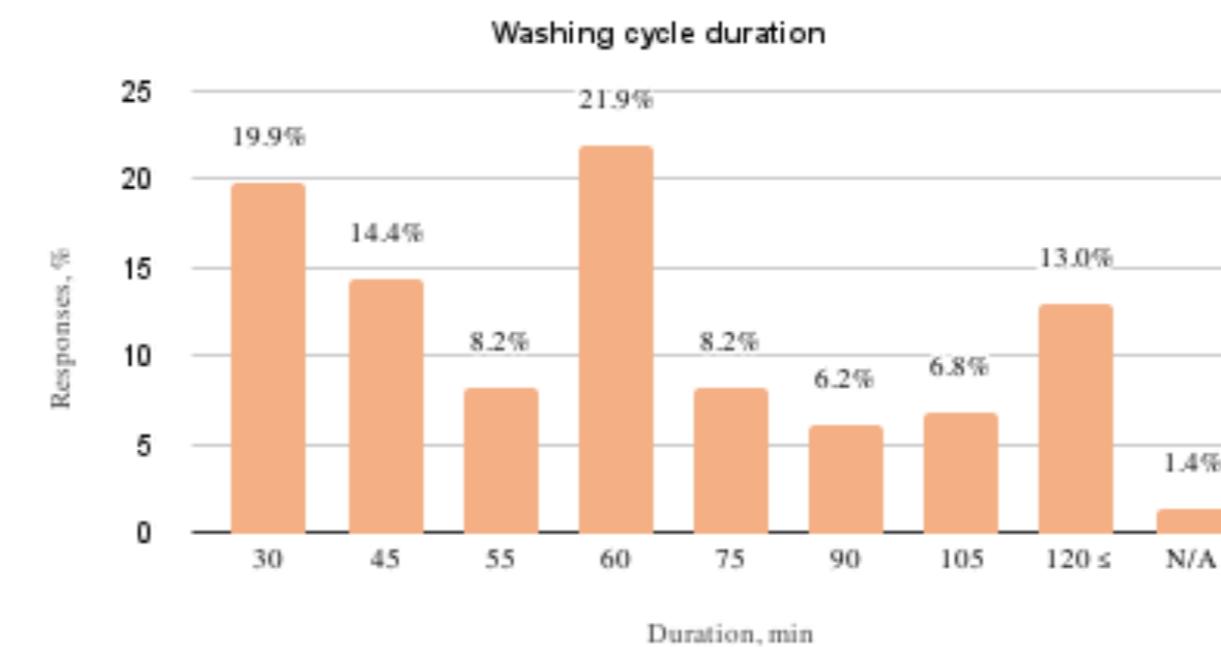
## REFERENCES

1. Lant, N. J., et al. (2020). Microfiber release from real soiled consumer laundry and the impact of fabric care products and washing conditions. *PLoS One*, 15 (6), e0233332.
2. Napper, I. E., Thomson, R.C. (2016). Release of synthetic microplastic plastic fibers from domestic washing machines: Effects of fabric type and washing conditions. *Marine Pollution Bulletin*, 112(1-2), 39-45.

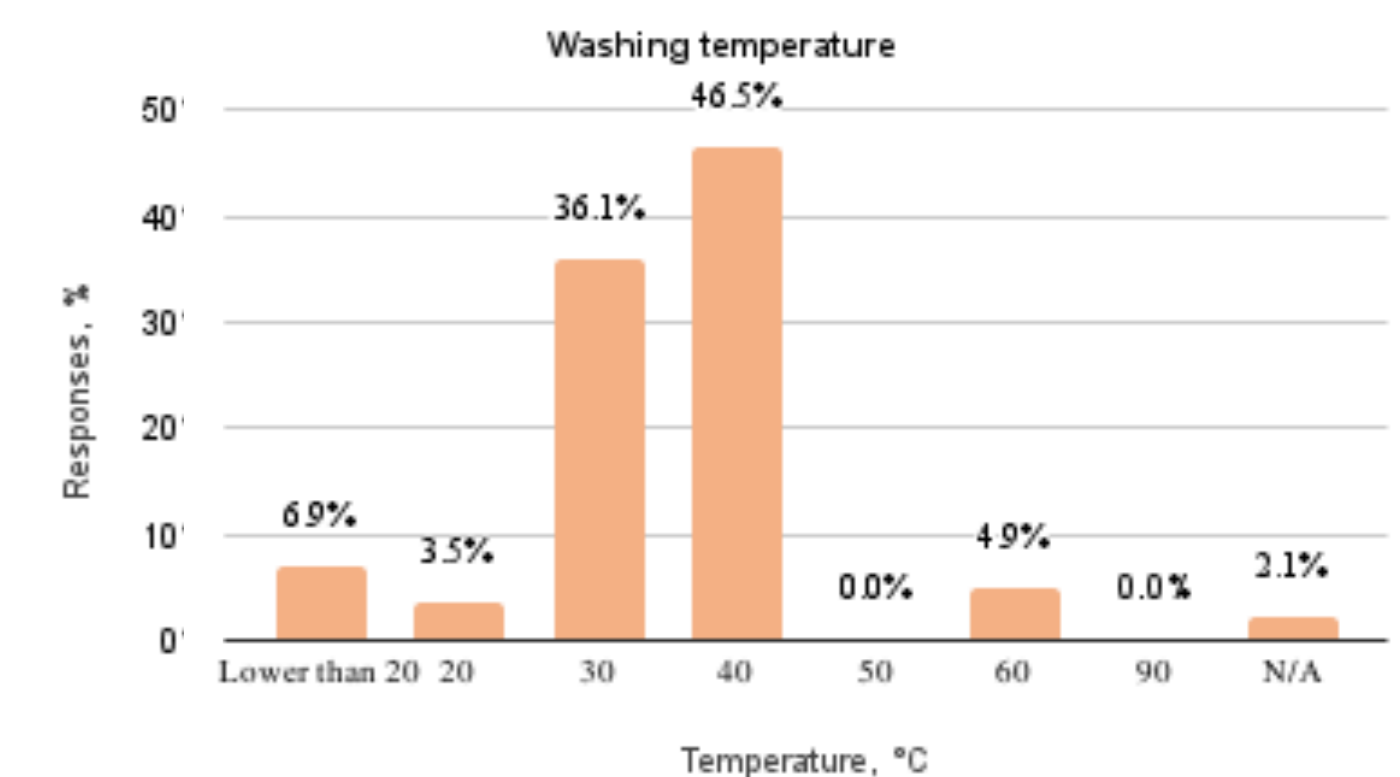
## RESULTS & DISCUSSION



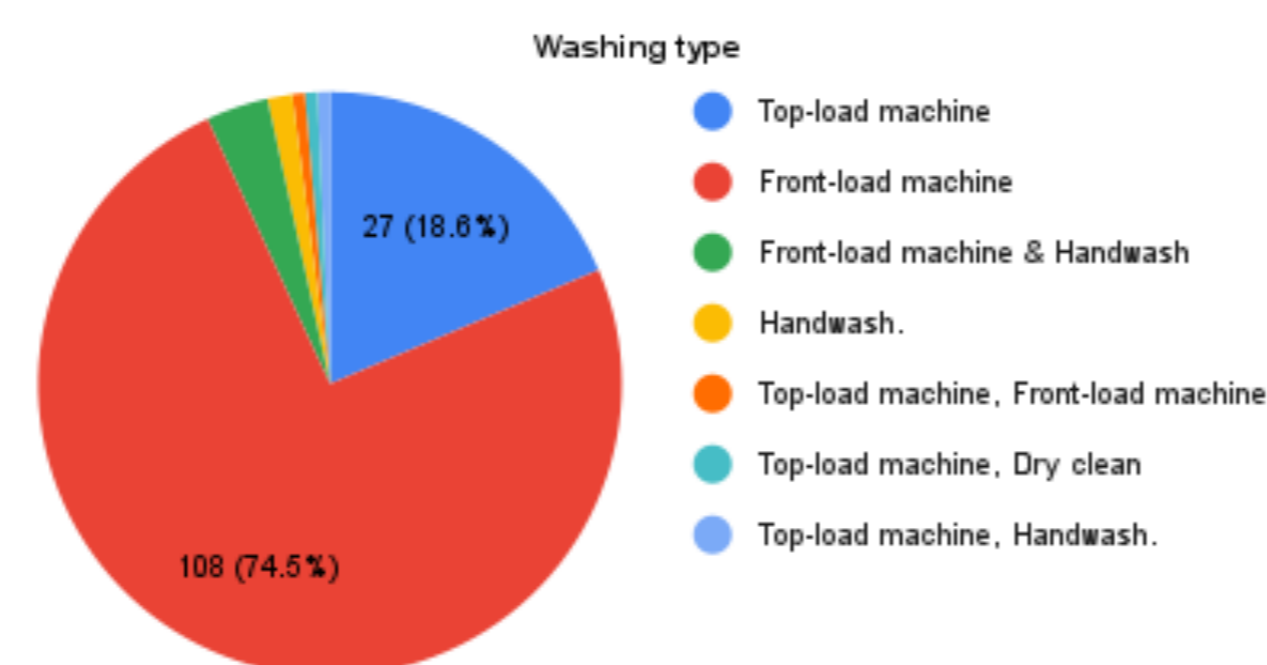
**Mechanical impact (higher spin cycle speed) can cause more shed.** Synthetic clothing dry faster and doesn't require high spin cycle speed.



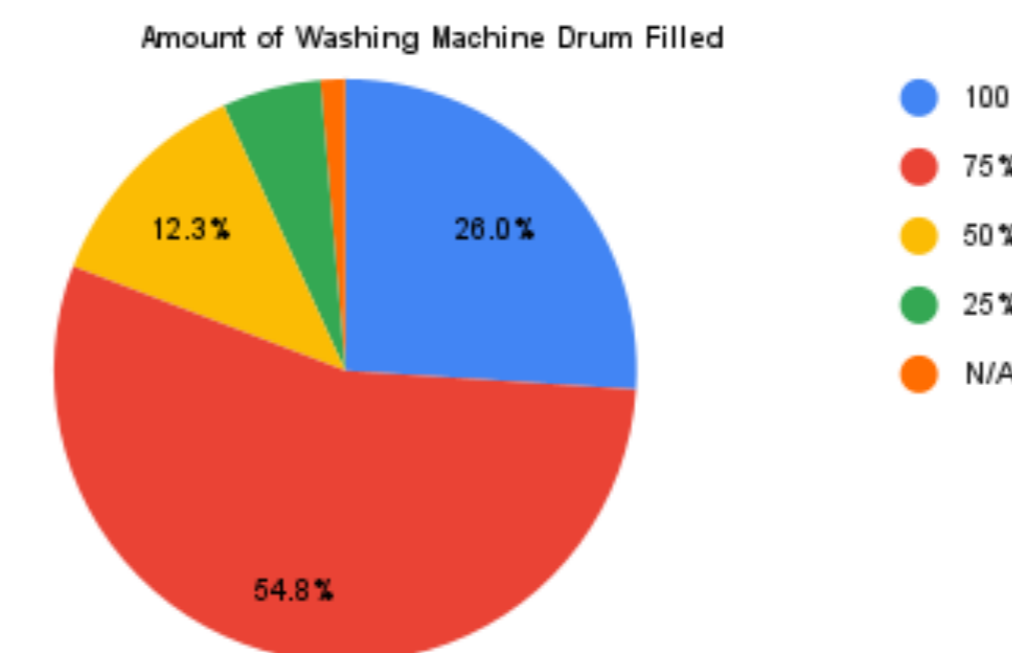
**Longer washing duration can cause more microfiber shed** and is not necessary to wash lightly soiled clothes.



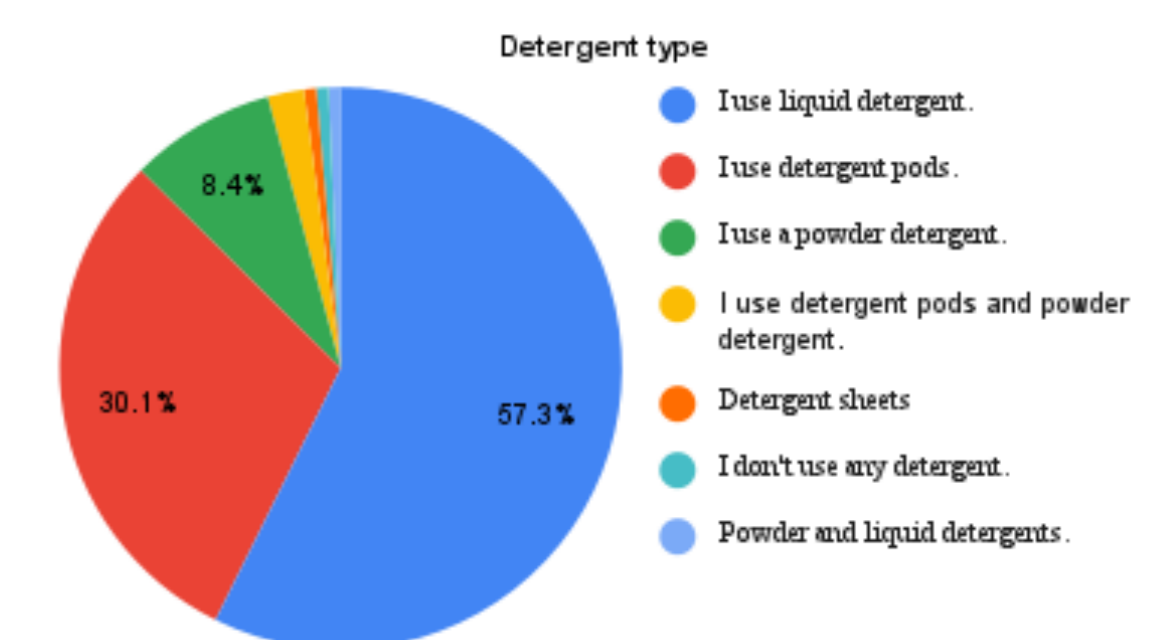
**Higher washing temperatures can cause more shed.** A cold water is sufficient to wash lightly soiled clothes.



Greater amount of **microfiber is released when top-loading washing machines** are used.



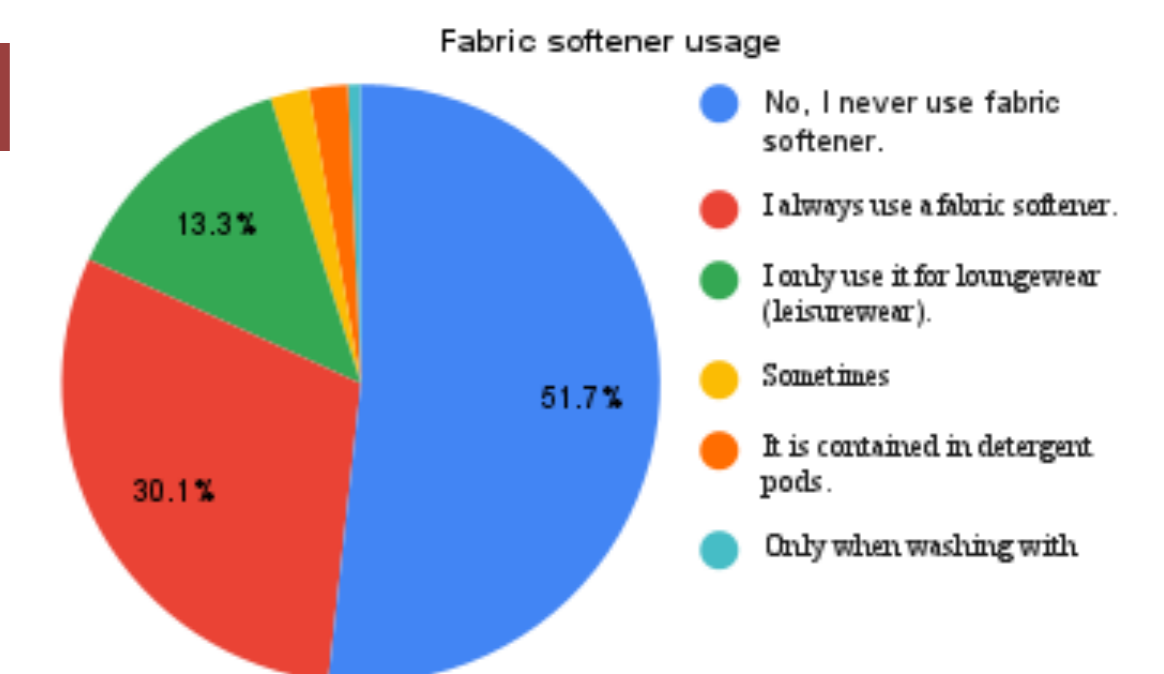
A less filled drum (**higher water and laundry ratio**) causes more microfibers to shed, but a fully filled washing machine drum might affect washing quality.



Higher pH (**detergent use**) can cause **microfiber release**. Powder detergent has the highest pH.

## CONCLUSIONS

- The most frequently used spin cycle speed: 800 rpm, 1000 rpm and 1200 rpm.
- The most popular washing cycle durations: 60 min, 30 min, 45 and 120 min.
- The most popular washing temperatures: 30°C and 40°C.
- 74.0 % of respondents use front-load washing machines.
- 54.8 % of the respondents fill about 75 % of the maximum capacity of the washing machine's drum. 45.2 % of the respondents overfill or underfill it.
- Most popular detergent: liquid and detergent pods. Least popular detergent: powder.
- 51.7 % of respondents never use fabric softener.



**Fabric softener reduces the friction** between fibers (mechanical impact).