

UNIVERSITI TEKNOLOGI MARA

**RISK ASSESSMENT OF MICROPLASTIC IN
COMMERCIAL SALT SOLD IN MALAYSIA**

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In the name of Allah, The Most Gracious, The Most Merciful.

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ABSTRACT

Commercial salt sold in Malaysia may be viewed as a source of microplastics in human daily life because salt is the main food ingredient that has been used every day, especially as the food seasoning. During the production of salt, microplastic may enter to the seawater due to their smaller size and difficult to be filter. Processed of sea salt from polluted seawater increase the presence of microplastic in table salt. The presence of microplastic may give adverse effect on human health. The main objective of this study is to conduct the risk assessment of microplastics in commercial salt sold from Malaysia since there is not many studies accesses to the risk assessment in commercial salt. 17 type of salt packaging were chosen as the study material where the type of salt used are sea salts and rock salt by random sampling. The material bought from random supermarket. It was a cross-sectional study and lab-based project. Using a stereomicroscope, microplastics were visually quantified according to their size, shape, and color of microplastics, and then they were categorized according to their physical attributes. FTIR is used to identify the polymer of microplastics. Statistical analysis was performed using SPSS 28.0.0.0. The risk assessment used in this study are Estimation Daily Intake (EDI) for health risk assessment and Ecological Risk Index for ecological risk assessment. Most of microplastics found are in the shape of a fibre and fragment, which is fragment is the dominant shape than fibre in this study. The size of microplastics that are frequently found in this study is between 35 and 300 μm . The particles count recorded between 11.7 ± 16.1 to 123.3 ± 22.5 particles/kg. Polyethylene Terephthalate (PET), Poly-1-butene (PB), Polystyrene (PES) and polyethylene (PE) were identified as the most frequent types of polymers in this study. The type of polymer found in the sample is an important indicator of the presence of microplastics. EDI when 5g/day portion is ingested 0.15-1.68 particles/day. The category level for Ecological Risk Index poses under minor and medium danger. It is important to take care of our health by minimize the intake of salt because it will give a negative impact on our health, and it is suggested for other researcher added Raman spectroscopies as a future method because it is considered have a better resolution, wider spectral coverage, and lower water interference. To the best of our knowledge, this is the study on risk assessment of microplastic pollution in commercial salt sold in Malaysia. Thus, more details about MPs pollution in the Malaysia, environmental research, and food safety were provided by this study.

Keywords: Microplastics Pollution, Commercial Salt, Risk Assessment

CHAPTER 1

INTRODUCTION

1.1 Background of the study

Plastic pollution is caused by the build-up of plastic and plastic-made items in the environment, which poses a risk to animals and the human food chain. Based on Peixoto et al., (2019) due to their low production cost, versatility, lightweight, and durability, among many other properties, plastics are widely and intensively utilized in society, of extensively applied to a wide range of industries. Plastics have a chemical design that makes them resistant to environmental deterioration ranging from corrosion to elevated levels of pollutants caused by gradual breakdown. Plastic pollution is determined by the process of polymerization as well as the mechanism of natural degradation and once in the environment, plastic objects and fragments harm coastal, oceanic, and riverine ecosystems in both visual and structural ways, which has a negative impact on tourism, (Chamas et al., 2020). They also harm and kill animals by ingesting them or tying them up, and eventually degrade into meso-, micro-, and nanoplastic particles that can either directly enter the food chain or contaminate it by leaching out their chemical and frequently toxic ingredients (Lee et al., 2019).

Microplastics' persistence in the environment is a new challenge for scientists, the public, authorities, and non-governmental organizations. Microplastics are little fragments of plastic that are smaller than 5 mm (0.2 inches) in length and are found in the environment because of plastic pollution. Microplastics may be found in a wide range of items, including cosmetics, synthetic garments, food, and plastic bags and bottles. Many of these materials are easily released into the environment as garbage (Rogers, 2018). Microplastics are not biodegradable. Thus, once in the environment, primary and secondary microplastics accumulate and persist (Rogers, 2018). Microplastics have been found in a variety of environments, including oceans and freshwater ecosystems, and ended up in the ocean because