

Microplastic analysis for Sun Salt Services by the North West University (NWU) Microplastic Lab

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Background

Recent studies have found microplastic in all sea salt brands tested. Sun Salt Services is looking to establish a microplastic-free (MP-free) salt range. In order to produce MP-free salt, the brine from which it is produced must be free from MP and contamination during the production process should be eliminated. This study is based on the samples collected from the salt pans of Sun Salt Services based in Upington.

Methodology

To assess the viability to produce MP-free sea salt, freshly pumped brine samples were sampled and tested from the Konga site and Groot Wit Pan (GWP) site for microplastic contamination.

Liquid samples were taken by sieving 90 litres of brine through a pre-cleaned 25 µm stainless steel mesh sieve. Filtrate was discarded and filter residue stored in a glass container and transported to the NWU Microplastic lab.

Preparation for analysis was done by drying samples over-night at 55 °C and removing organic material with a Fenton digestion (Hydrogen Peroxide digestion using Iron(II) as catalyst). Samples were then placed in density separation funnels using a Sodium Iodide solution as separation medium (approx. 4 - 6 g/cm³) and left over-night. Precipitate was removed and inspected for residual plastic. Top layer of the separation medium was then filtered through a 25 µm stainless steel sieve and visually inspected for microplastic using Nikon AZ 100 multi-zoom compound binocular microscope. The process was repeated with a blank sample to quantify contamination during sample preparation.

Results

Microplastic particles of the samples and control were counted according to morphotype (fragments and fibres), size, and colour.

Counts of MPs in Litre units

Site		Number of MPs per 24L (no control correction)	Per 24L with control correction	Per 1L with control correction
Konga	Dampan 2	5	0	0
	Pump	7	2	0.08
	Borehole 1	2.5	0	0
GWP	Pan 10	5.3	0	0
	Pump 1	5.3	0	0

Discussion

The low MP count found in the Groot Wit Pan Brine sample is due to background effect. The brine used for salt production is therefore as free of MP as one would find. However, pipes pumping up brine from aquifers and parts of pumps are made of plastic; wear and tear over time could contaminate the brine.

Counts from the Upington salt pan samples are similar to that of salt samples from previous analysis with higher amounts of fibres. The profile of the MPs is typical of atmospheric fallout that is the most likely source of MP contamination in the Konga, GWP and final product salt. If Sun Salt Services would like to produce MP-free salt, the drying process will have to be protected from atmospheric fallout.

It can be safely assumed that the source material is free from plastic.

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