



MICROPLASTIC IMPACT ON HUMAN HEALTH IN AMBIKAPUR SURGUJA CHHATTISGARH

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ABSTRACT:

The study examines the concentration of microplastic in relation to human health in food and water samples collected from Ambikapur, Chhattisgarh. This study looks into microplastics found in food and water samples collected from Ambikapur with respect to its concentration and human impact. Microplastics are collected from different samples across various locations. There are issues associated with microplastics pertaining to the construct of a circular sustainable.

Keywords: Microplastics, Hydrogen Peroxide (H₂O₂), Sodium hydroxide (NaOH), Zinc Chloride (ZnCl₂).

Introduction :

Microplastics are plastic particles that are less than 5mm in diameter and can be as small as or smaller than sesame seeds. Initially, microplastic studies concentrated on personal care products containing microbeads and on larger plastics and broken fragments from discarded items. Research shows that one person could consume anywhere between dozens to over one hundred thousand microplastics each day. Microplastics pose challenges from primary sources like microbeads in cosmetics to secondary sources like the breakdown of larger plastics. These compounds permeate everything including soil and water. The world's food system has the microplastics problem that starts from the environment and ends in human biology; for ecosystems as well as humans, there is a risk of bioavailable food web.

Objectives

- . To determine the microplastic concentration in various samples collected from Ambikapur in Chhattisgarh To examine the sample for microplastics.
- To propose how microplastics could impact human health

Review of Literature

- Visual Identification method
- Sampling method (water sampling)
- Microscopy
- Size fraction
- Pyrolysis
- Raman spectroscopy
- Sensor

Regional Context and Need for Study:

Research from Bilaspur, Chhattisgarh focuses on the microplastic concentration in different samples taken from the greater Ambikapur region as well as examining the impact of microplastics on the human body.

- Study Area : Area focus includes the entire region of Ambikapur..

Location Overview

- Ambikapur: Different Samples collected from different areas.

Materials and Methods

- Sampling and Equipment Food and Water samples are collected from different sources

Analytical Methods

The food's organic composition is microplastic using solvents which bio chemically oxidize organic material, for example, H₂O₂ or NaOH. The sample is then passed through a filter with a fine mesh or paper to capture the plastic debris.

Sampling Conditions

Duration: 24 Hrs Per Samples

Environmental data: (temperature, humidity) Normal under sampling.

Calibration and QA/QC

Instrument and Apparatus should be cleaned and calibrated.

Multiple replicates of the same sample may be analyzed to ensure the accuracy and reproducibility of the results.

Results and Analysis

Concentration Values

Food source	Polymer type	Dominant particle, shape	Level of mps.
Tea	Nylon PET	Fibers	200-500 mg
Sugar	Nylon PET	Fibers, fragment	40-660 fiber 1 kg
Table salt	PET, PE, PP	Fibers	32 fragment 1 kg
Chocolate	PP, PS	Fibers, fragments	2.79 fiber/l

Polymer type	Dominant particle, shape	Particle size	Level of mps.	Water source
PET, PE, Butadiene	Fibers, fragments	<5um	3074-6295 particle/l	Glass
Cellulose, PS, PP, PE	Fibers, fragments	>25um	4889 particle/l	Bottle
PE	Fibers, fragments, films	>25um	6.5-100 particle/l	Bottle
PET, PS, PP	Fibers, fragments	>25um	8.5 particle/l	Bottle

Health and Environmental Impact:

Synthesized plastics, like polyethylene (PE), appear to be long-lasting in soil. In one study, scientists observed no greater than 0.4% weight degradation in 800 days of being buried in soil. Another study shows that polypropylene (PP) does slightly better, achieving around 0.4% weight loss, but still only after one year. PVC showed no degradation for even 10 to 35 years. The type of soil also will change the result; clay soils contain greater amounts of organisms which lead to faster degradation of plastics compared to sandy soils. Microplastics can disrupt the equilibrium between soil and water by affecting relationships like the bulk density and water-holding capacity, damaging the soil's structure as well as the life residing in it.

Discussion :

There are multiple means through which microplastics can enter the environment such as through the land-based source, roadways, air transportation including artificial turf and fertilizers, atmospheric deposition, textiles, tourism, aquaculture, and marine vessels.

The plastic particles undergo degradation and break down into microplastics and nanoplastics through a physiochemical process, UV radiation, and bacterial action depending on the surrounding environment.

Conclusion:

Microplastics are now a serious threat to the environment and public health. It is almost impossible to avoid these microscopic plastic particles, which can be found in food, water, air, and even human tissue. Evidence currently available indicates that microplastics can enter the human body through ingestion, inhalation, and possibly skin contact, though research is still ongoing. This could result in oxidative stress, cellular disruption, and inflammatory reactions.

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