Table S1. Main approaches used in plastisphere research and their relevance for ecological and microbial risk assessment.

Approach	Information provided	Strengths	Limitations	Relevance for risk assessment
Microscopy (SEM, CLSM, FISH)	Biofilm structure and colonization patterns	Direct visualization	Limited taxonomic and functional information	Biofilm establishment and architecture
Culture-based methods	Viable microorganisms	Viability and phenotypic characterization	Strong cultivation bias	Viable pathogens and resistant microorganisms
Amplicon sequencing	Community composition and diversity	Broad taxonomic overview	Functional traits inferred, not measured	Potential pathogen and ARG reservoirs
qPCR / ddPCR	ARGs, MGEs and virulence markers	Sensitive and quantitative	No information on viability or activity	Occurrence and enrichment of risk markers
Shotgun metagenomics	Resistome, mobilome and metabolic potential	High functional resolution	Costly and bioinformatically demanding	ARGs, MGEs and dissemination potential
Metatranscriptomics	Active genes and pathways	Functional activity assessment	Technically demanding	Active risk-related processes
Process-based approaches	Ecosystem processes and microbial activity	Direct functional evidence	Rarely applied	Links communities to ecosystem functioning