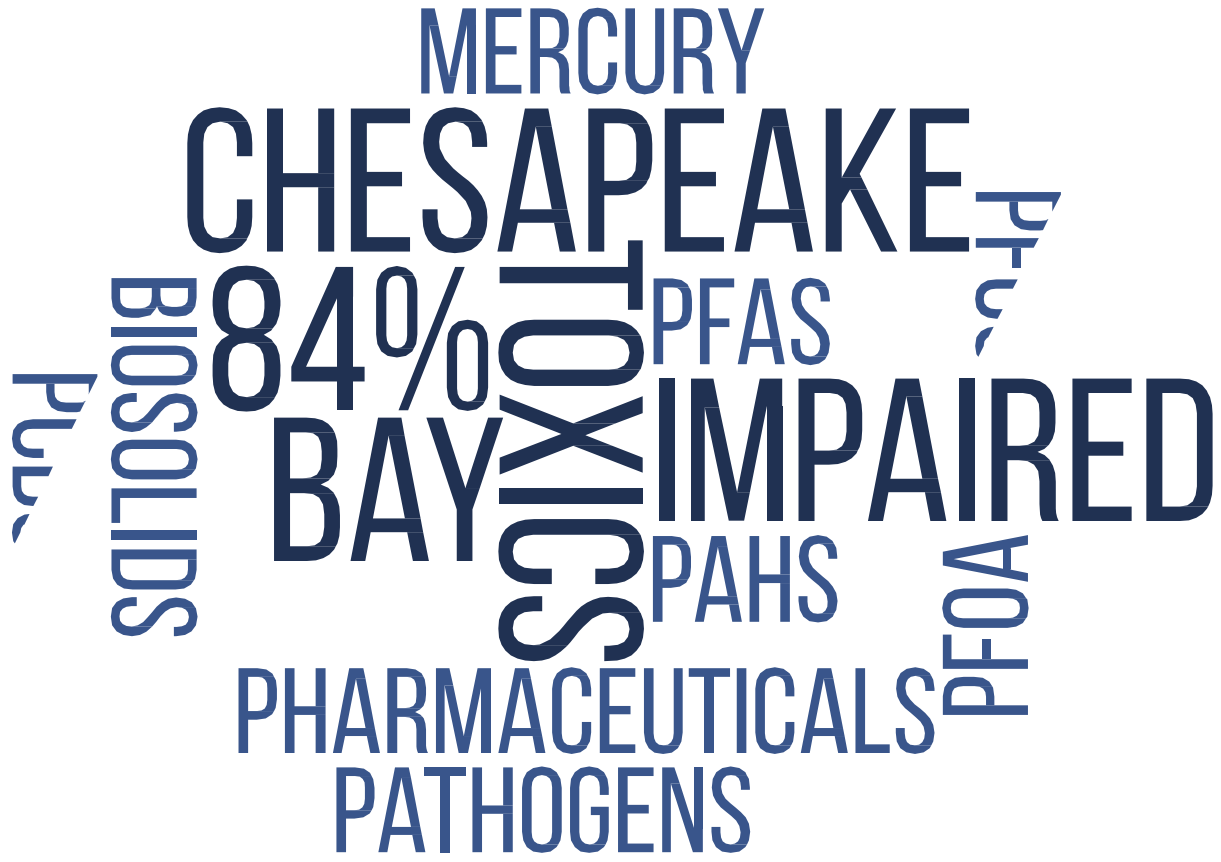
EMERGING & LEGACY TOXIC CONTAMINANTS

CHESAPEAKE BAY BIOCHAR STAC WORKGROUP

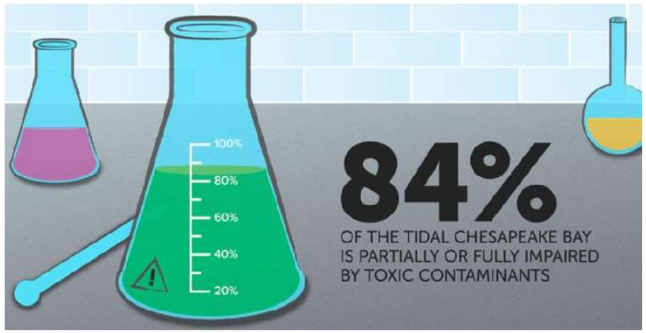
Blame it on Gizmo!


MERCURY
CHESAPEAKE
84%
TOXICS
PFAS
IMPAIRED
BAY
BIOSOLIDS
PAHS
PFOA
PHARMACEUTICALS
PATHOGENS


The Chesapeake Bay Toxics Strategy
Includes the Following Actions:
1. Regulating industrial discharge.
2. Limiting the use of harmful pesticides.
3. Reducing runoff from urban and agricultural areas.
4. Monitoring the health of the watershed.
5. Addressing pollutants present in the environment.

PRIORITY TOXIC POLLUTANTS IN THE CHES BAY WATERSHED

According to data submitted to the U.S. Environmental Protection Agency in 2018, 84 percent of the Chesapeake Bay's tidal segments are partially or fully impaired by toxic contaminants. *(Source: Chesapeakebay.net)*



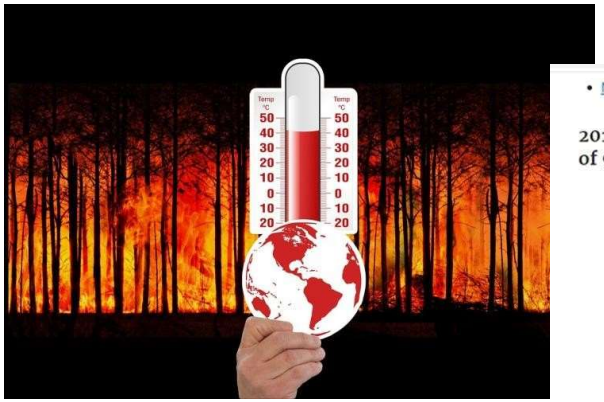
POLYCHLORINATED BIPHENYLS (PCBS)

MERCURY (HG) AND HEAVY METALS

PESTICIDES, PHARMACEUTICALS, PATHOGENS

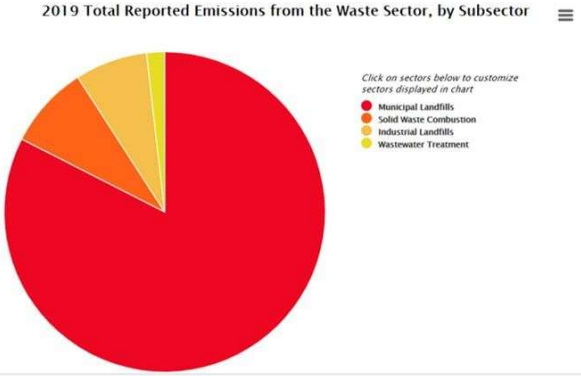
POLYAROMATIC HYDROCARBONS PAHS

PER- AND POLYFLUORINATED SUBSTANCES (PFAS)



- Number of reporters and emissions in the waste sector (as of 9/26/20)

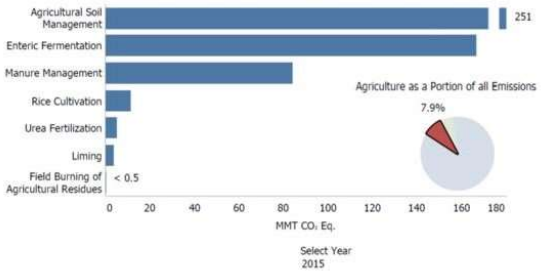
2019 Total Reported Direct Emissions from Waste, by Subsector (as of 9/26/20)

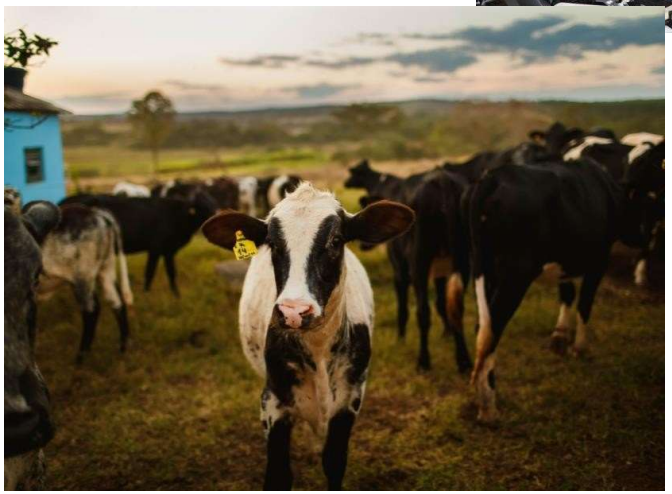


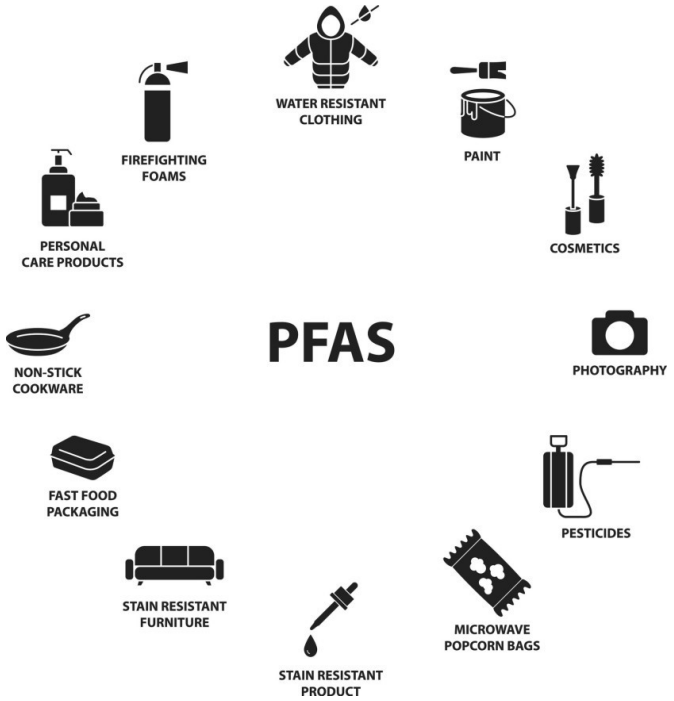
5. Agriculture

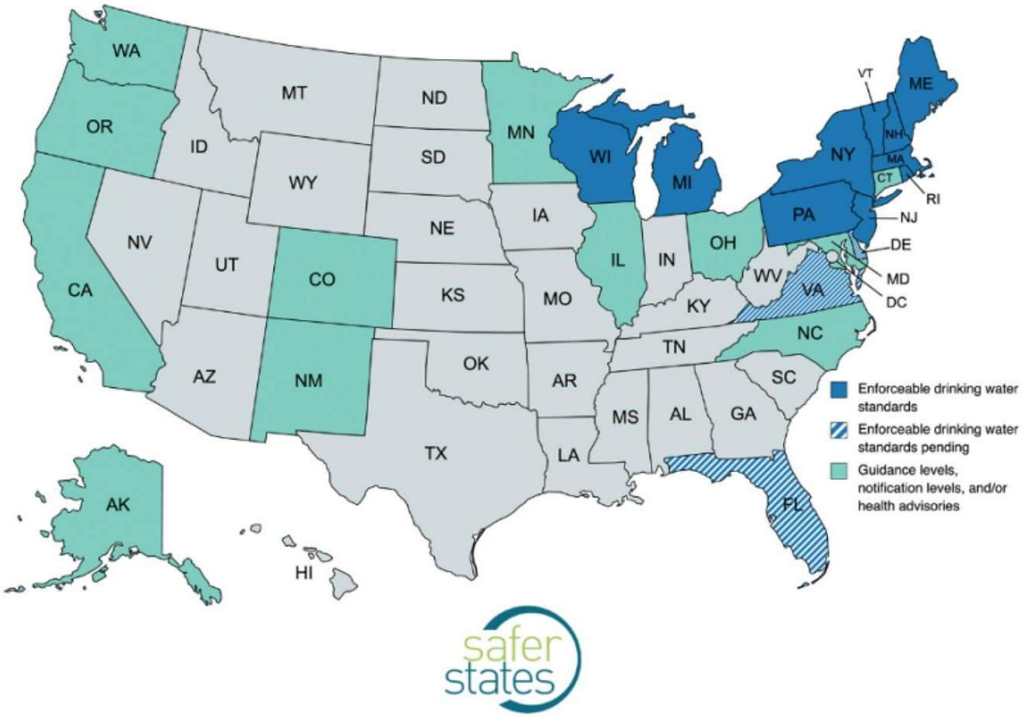
Agricultural activities contribute directly to emissions of greenhouse gases through a variety of processes. This chapter provides an assessment of methane (CH_4) and nitrous oxide (N_2O) emissions from the following source categories: enteric fermentation in domestic livestock, livestock manure management, rice cultivation, agricultural soil management, and field burning of agricultural residues, as well as CO_2 emissions from liming and urea fertilization (see Figure 5-1). Additional CO_2 emissions and removals from agriculture-related land-use and management activities, such as cultivation of cropland and conversion of grassland to cropland, are presented in the Land Use, Land-Use Change, and Forestry chapter. Carbon dioxide emissions from on-farm energy use are reported in the Energy chapter.

Figure 5-1: 2015 Agriculture Chapter Greenhouse Gas Emission Sources (MMT CO_2 Eq.)






PFAS
WATER RESISTANT CLOTHING
FIREFIGHTING FOAMS
PAINT
PERSONAL CARE PRODUCTS
COSMETICS
NON-STICK COOKWARE
PHOTOGRAPHY
FAST FOOD PACKAGING
PESTICIDES
STAIN RESISTANT FURNITURE
MICROWAVE POPCORN BAGS
STAIN RESISTANT PRODUCT


WA
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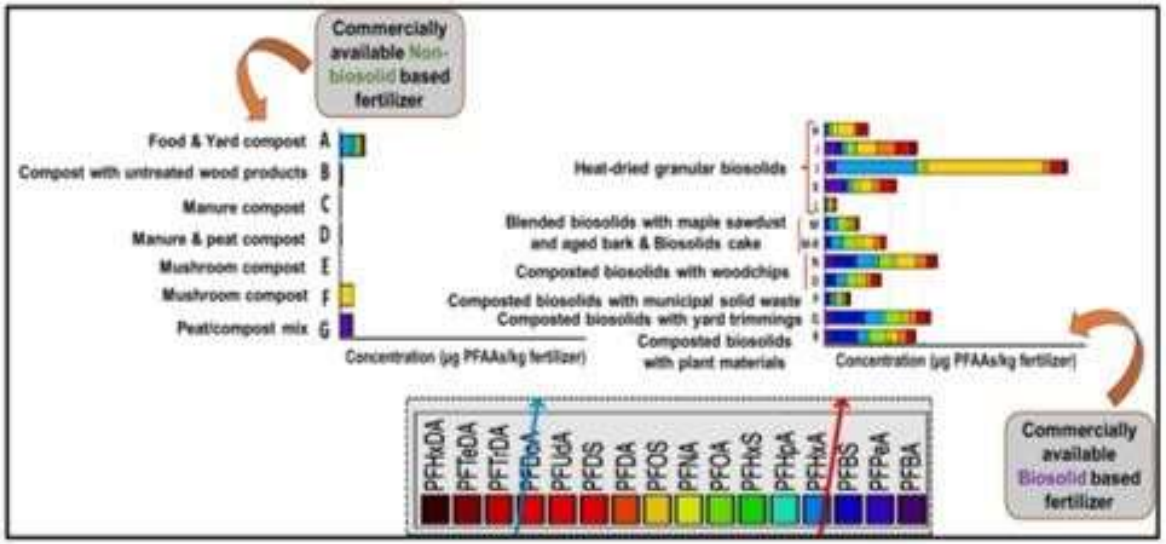
TN
AL
OH
WV
GA
FL
SC
NC
VA
PA
NY
VT
NH
ME
MA
CT
RI
NJ
DE
MD
DC
AK
HI
Enforceable drinking water standards
Enforceable drinking water standards pending
Guidance levels, notification levels, and/or health advisories
safer states

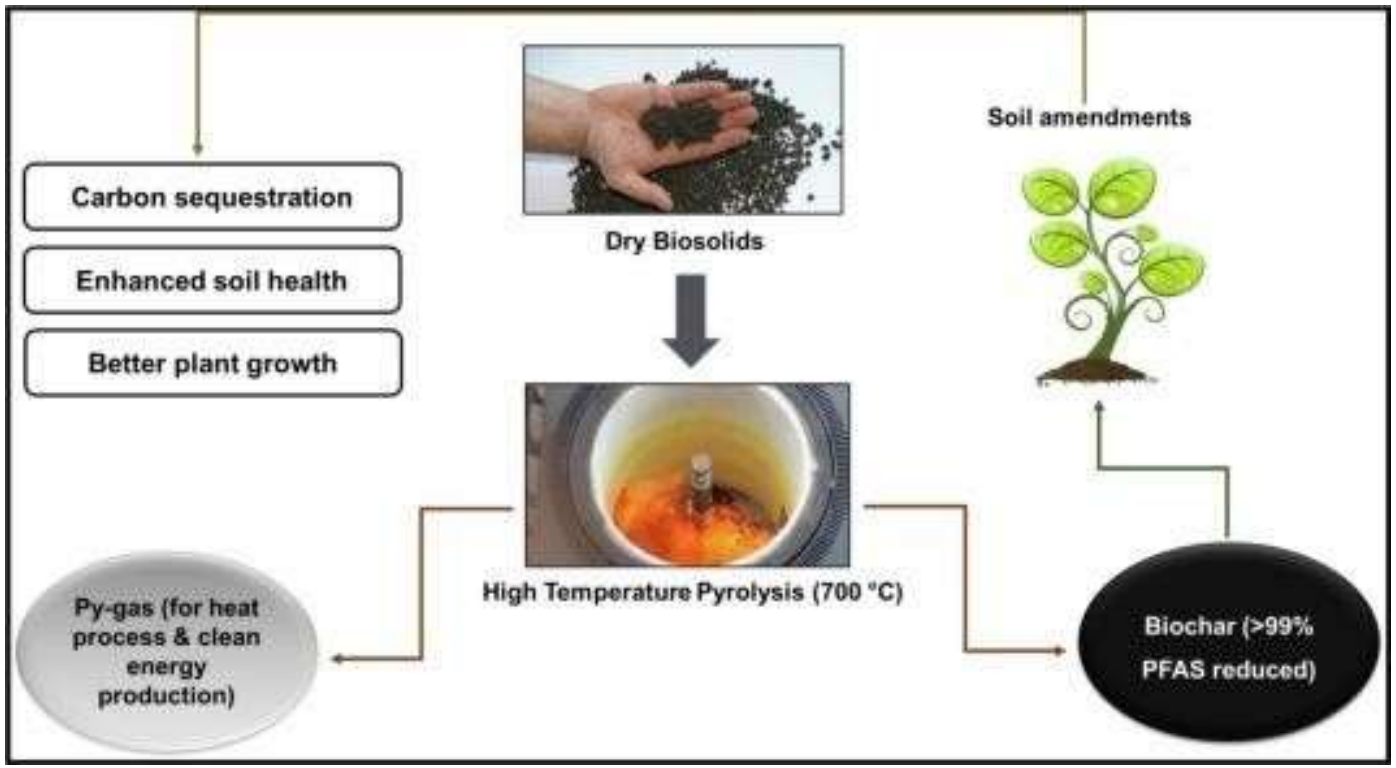
DISTRIBUTION OF COMMERCIALLY ACCESSIBLE FERTILIZERS BASED ON BIOSOLID AND NON-BIOSOLID AS A BASIS FOR PFAS

© AMERICAN CHEMICAL SOCIETY).



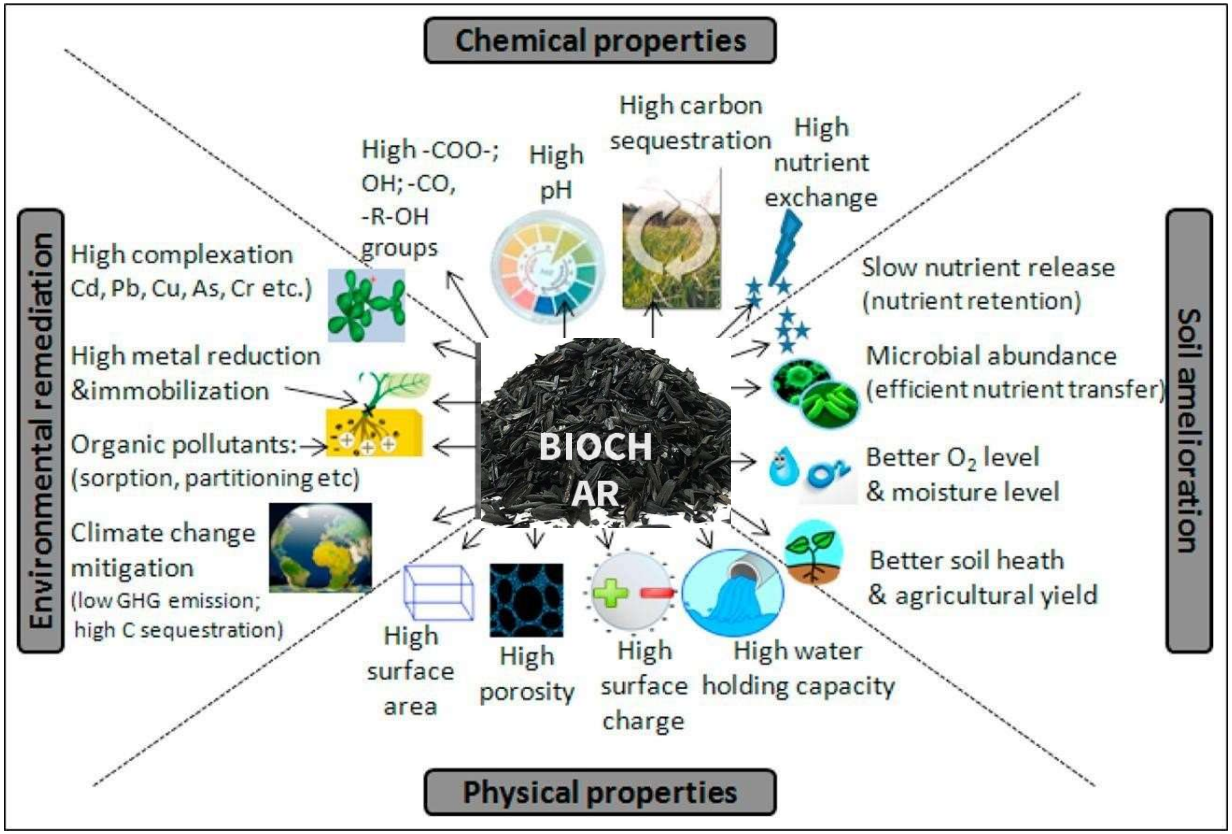
ribution of commercially accessible fertilizers based on biosolid and non-biosolid as a basis for PFAS [24] (Reprinted with permission from ciety).

HIGH-TEMPERATURE PYROLYSIS SYSTEM FOR PFAS DESTRUCTION IN BIOSOLIDS AND GENERATION OF VALUE-ADDED PRODUCTS.

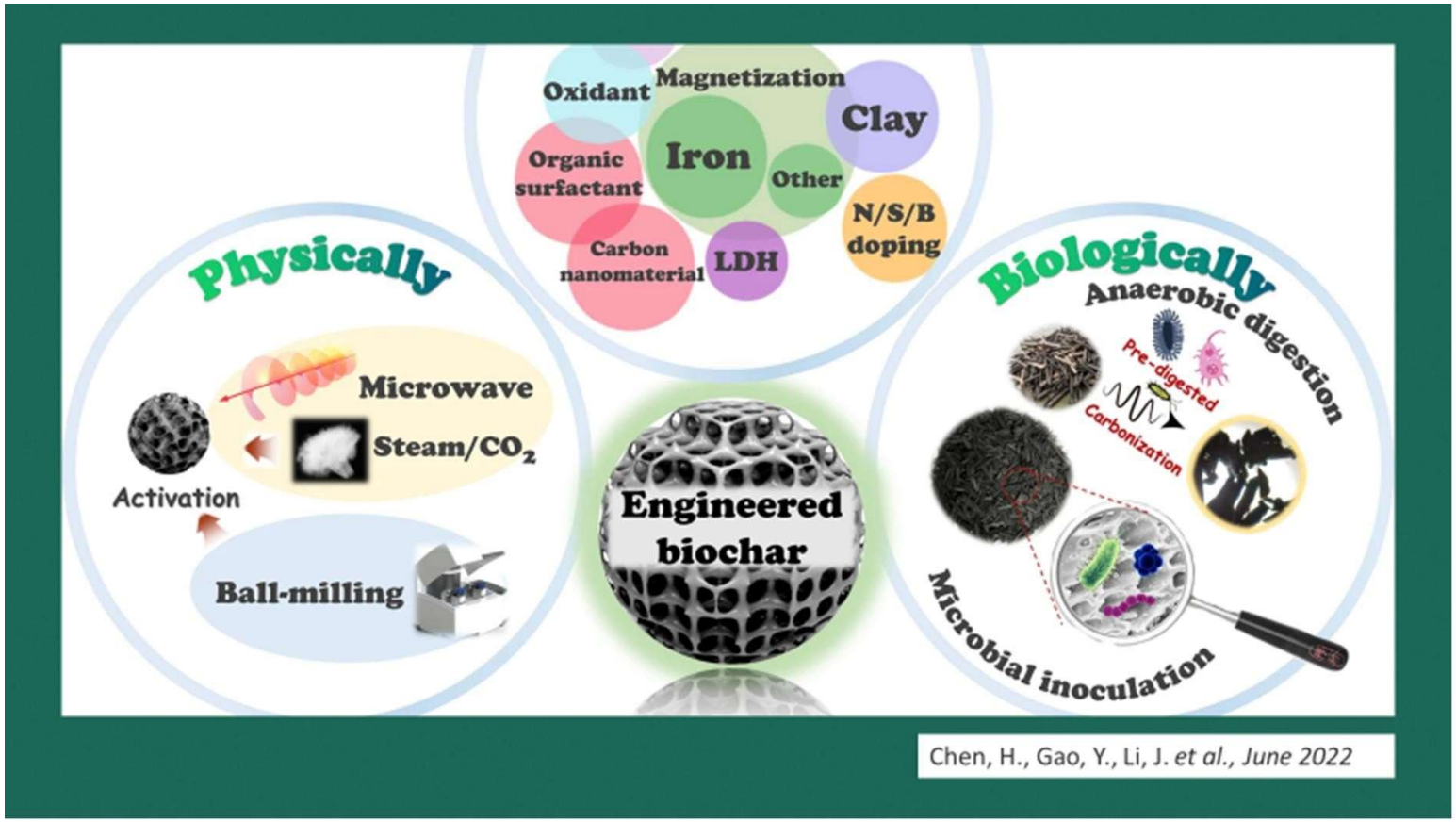


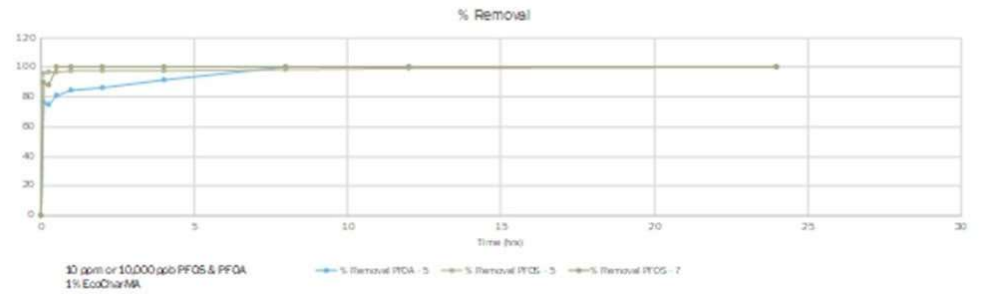
Anushka Garg, Nagaraj P. Shetti, Soumen Basu, Mallikarjuna N. Nadagouda, Tejraj M. Aminabhavi, Treatment technologies for removal of per- and polyfluoroalkyl substances (PFAS) in biosolids, Chemical Engineering Journal, Volume 453, Part 2, 2023,

BIOCHAR HAS EXCELLENT ADSORPTION PROPERTIES FOR TOXIC SUBSTANCES.



ENGINEERED BIOCHAR





PFOA PFOS RESULTS 1% Activated Ecochar

ECOCHAR TOXICS ADSORPTION EFFICIENCIES Heavy Metals & PFAS

Manure-based biochars have removed 98.6-100% of PFAS, in addition to heavy metals.

ECOCHAR
ENVIRONMENTAL SOLUTIONS