

# MİKRO-KİRLLETİCİLER: SENTETİK ORGANİKLER

# Yeni Tesisler: Mikro-Kirletici Giderilmesi

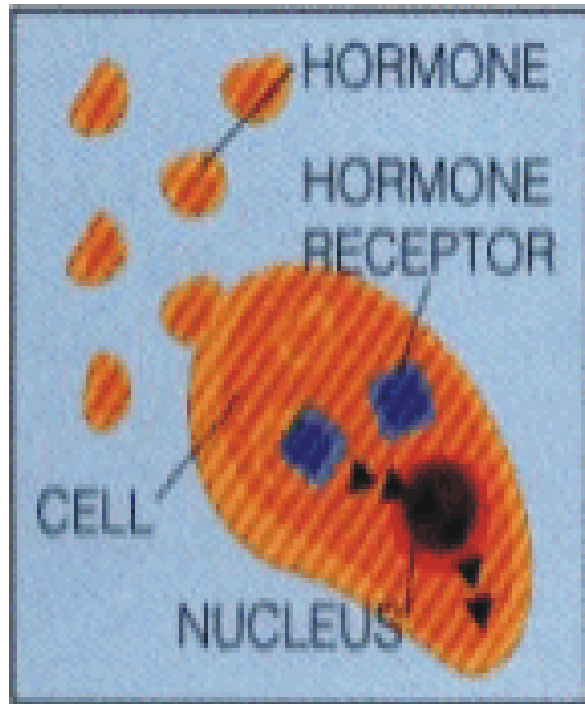
- Mikro Kirleticiler
  - mg/L ( $10^{-6}$ ) → Mikrogram/L ( $10^{-9}$ )
- THM: Tri Halo Metanlar → Kloroform (1970)
- Sentetik Organik Maddeler (EDS: Endocrine Disrupting Substances)
- Bulanıklık yerine TOK ( Toplam Organik Karbon ) ölçülerek kavanoz Testi: İleri Yumaklaşma: (Enhanced Coagulation)

# Sentetik Organikler

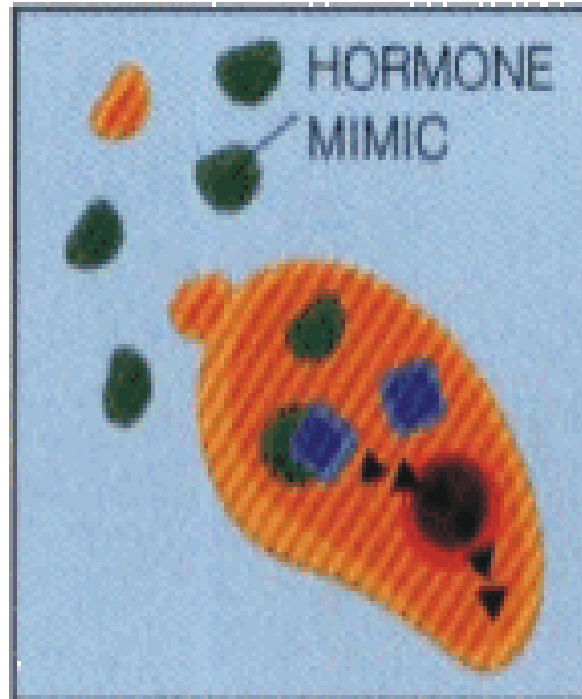
EDS (Endocrine Disruptive Substances)

- Endocrine Tesir Eden Maddeler (Östrojen Reseptörleri)
  - Doğum kontrol hapları (17 Alpha Ethinyloestradiol)
  - Steroids
  - Pestisitler
  - Alkofenolik Kimyasallar
  - Bisphenol

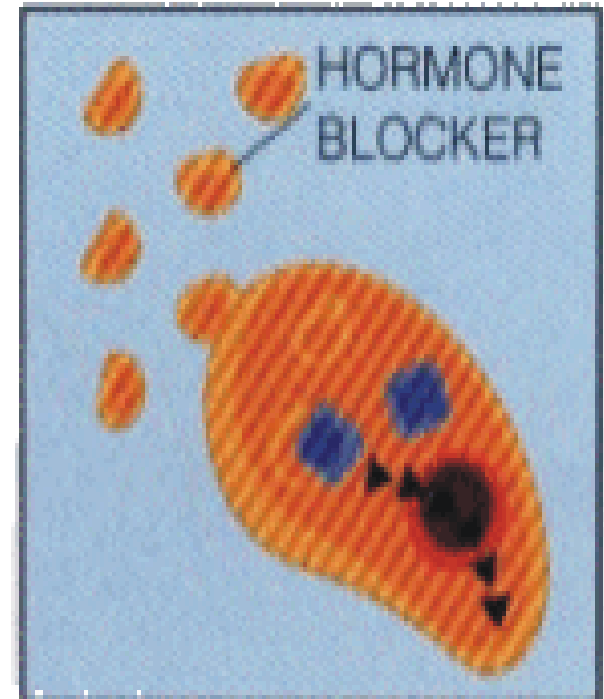
# EDS : Endoktrine Tesir Eden Maddeler



Normal response



Agonist response  
e.g. estogenic



Antagonist response normal  
response inhibited  
e.g. anti-estrogenic response

# EDS Maddeleri

- Katı Atık Depoları, Yakma Sistemleri: Poliklorlu Dioksinler, bifeniller
- Tarım ilaçları: DDT, dieldrin, lindane, atrazine
- Endüstriyel Atıklar: Dibutil-fitalat, butil benzil-fitalat.
- Evsel Atksu: 17-b-estadiol estrone (doğum kontrol hapları)

# EDS in Tesirleri

- Kuşlarda ve balıklarda embriyo ölümleri, deformasyonlar
- Balıkları yiyen kuşlarda tiroid ve immunitite bozuklukları
- Balıkların dişileşmesi (Thames Nehri)

# Sentetik Organikler

(DBPs) : Dezenfeksiyon Yan Ürünleri

**Klorlamanın yan ürünleri:**

THMs : Trihalo Metanlar

- $\text{CHCl}_3$ :Kloroform, Trichloromethane (TCM)
- $\text{CHCl}_2\text{Br}$  bromodichloromethane  
Dichlorobromomethane (DCBM),
- $\text{CHClBr}_2$  (DCBM), Dibromochloromethane
- $\text{CHBr}_3$ :Bromoform, Tribromomethane (TBM)
- Toplam THMs

**Ozonun yan ürünleri**

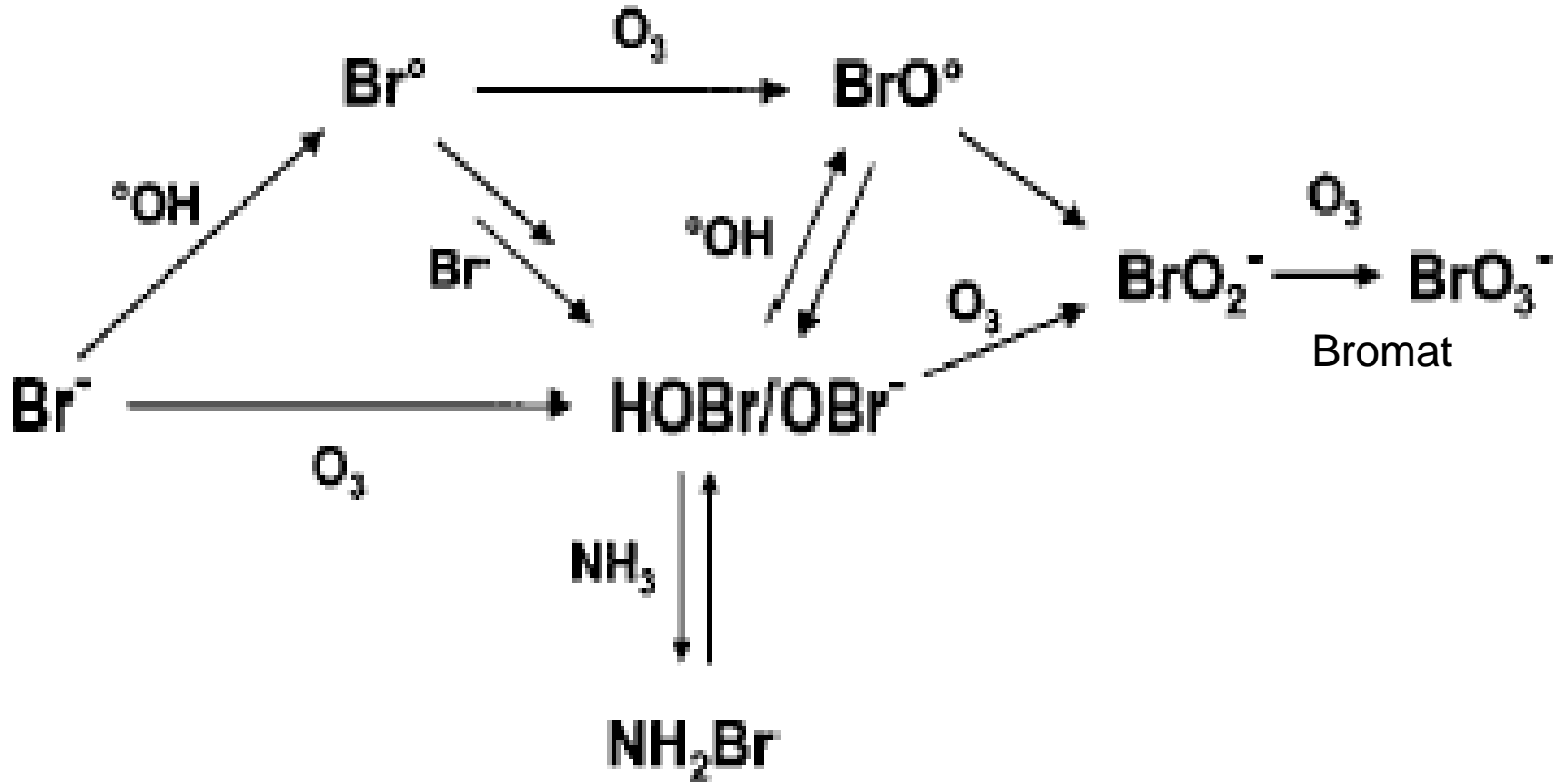
**TABLE 1**

*Occurrence of Organic Micropollutants in Rivers and Reservoirs*

Organic Micropollutant Group	River		Reservoir	
	Number of Compounds	Total concentration $\mu\text{g/L}$	Number of Compounds	Total Concentration $\mu\text{g/L}$
Fatty acids	7	3.6	10	3.5
Steroids	3	5.3	1	0.6
Ester (pesticides)	12	3.3	9	1.4
Phenols	12	4.8	4	0.8
Aromatic compounds	54	6.6	2	0.5
Miscellaneous	8	2.4	6	1.5
<b>Total number of compounds</b>	<b>96</b>		<b>32</b>	



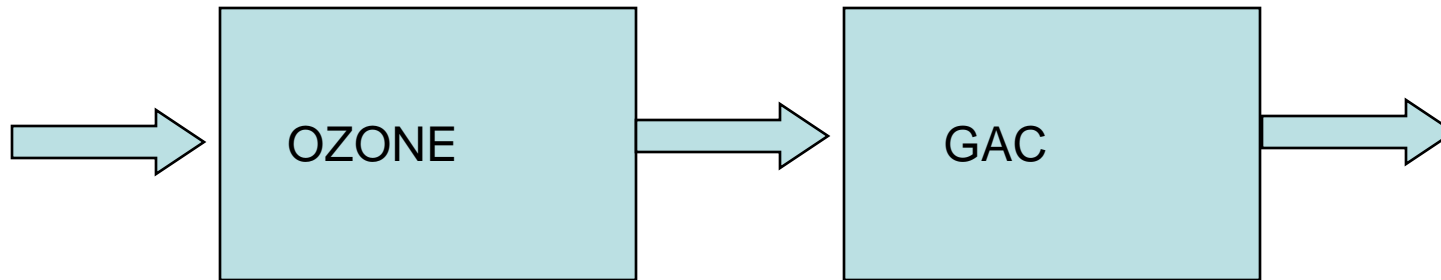
# Bromlu Sularda Ozonlama Sonucu Bromat oluşması



Bromürlü Suların Ozonlanmasıyla Bromat Oluşumu

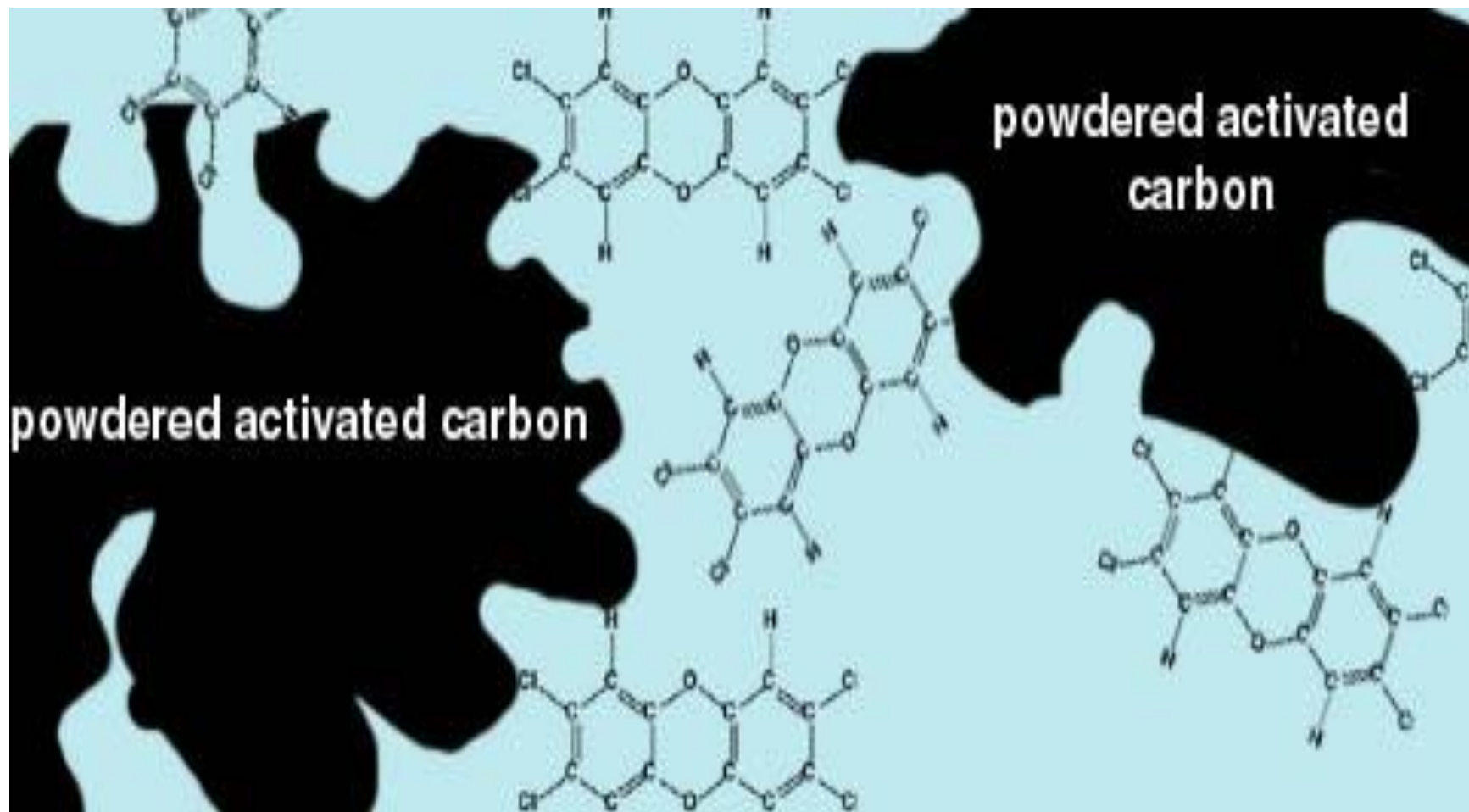
# EDS Arıtma

- Ozonlama
- Granüle Aktif Karbon Filtreleri



# GRANÜLE AKTİF KARBON

(GAK)

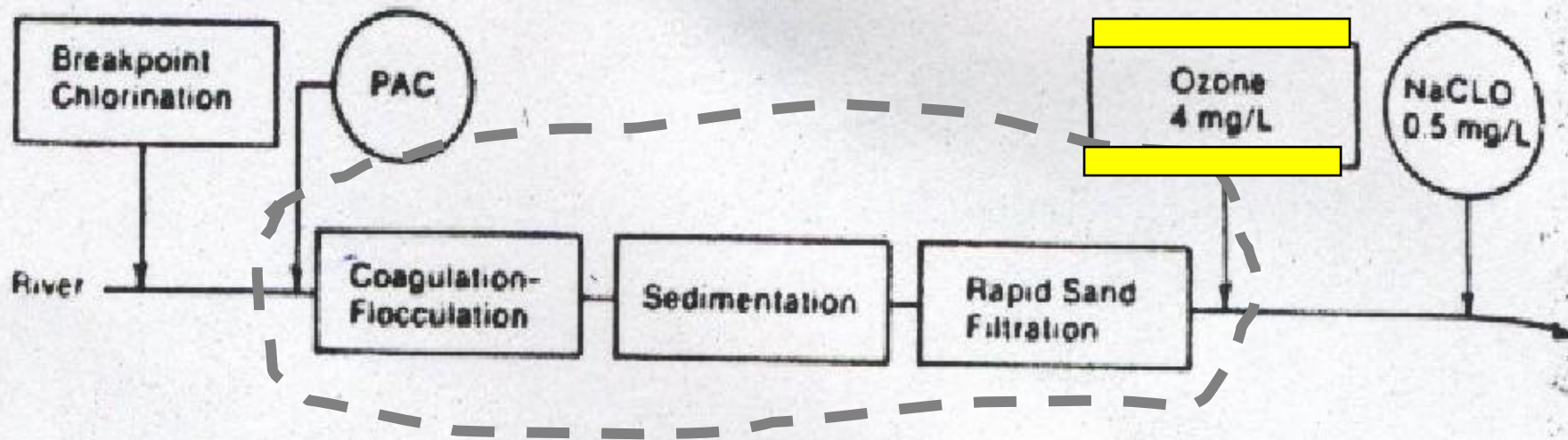


**BAK : Biyolojik Aktif Karbon**

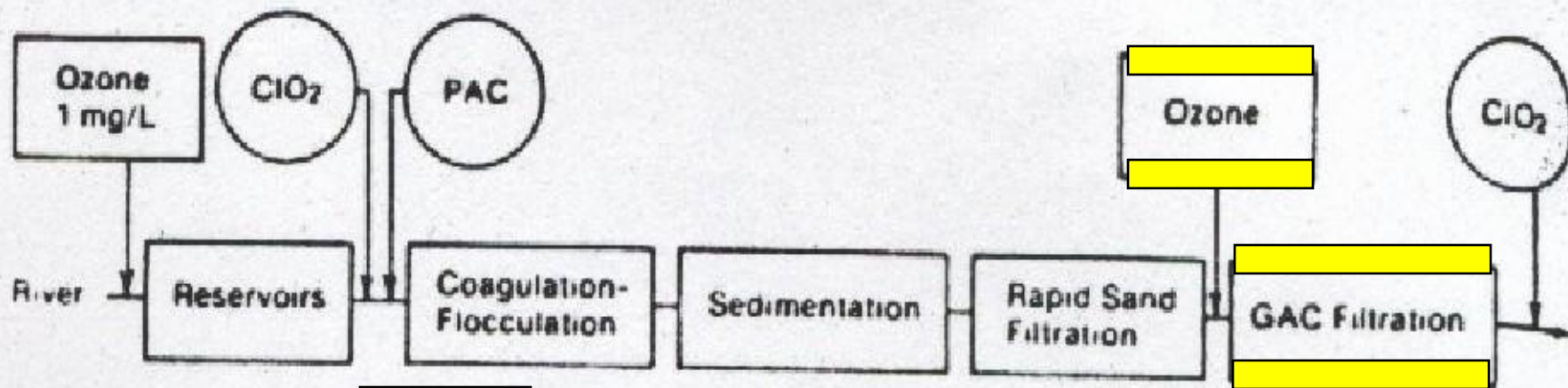
**OZONE → GAK FİLTRESİ**

# Méry-sur-Oise Plant, France

## Current Process



## Future Process Under Construction



**Méry-sur-Oise plant, France**