

# Wastewater characteristics related to treatment processes

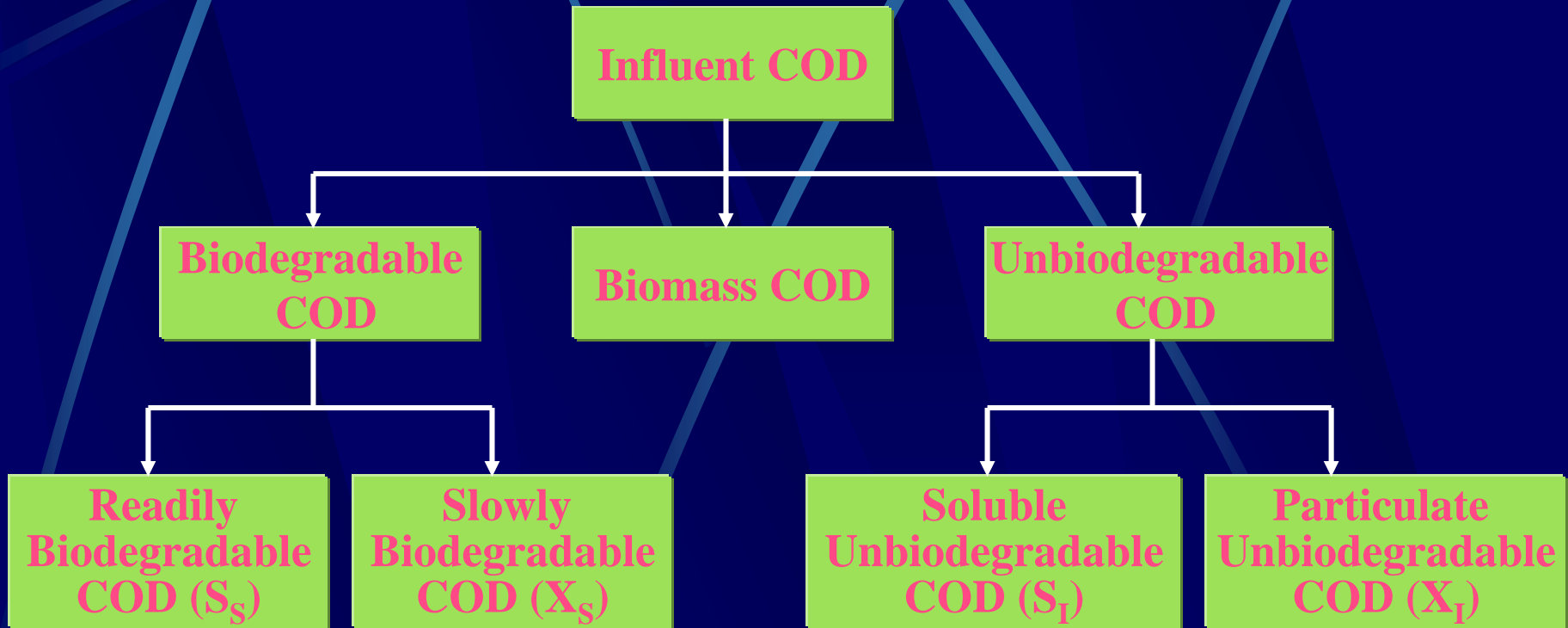


## Criteria to describe the characteristics

- Physical (SS, VSS, TSS.....)
- Chemical (pH, Heavy metals.....)
- Biochemical (COD, BOD, TOC.....)
- Hygienic (Strain No of *E. Coli*, .....

Understanding well the characteristics of wastewater to be treated is the first step towards a successful process design

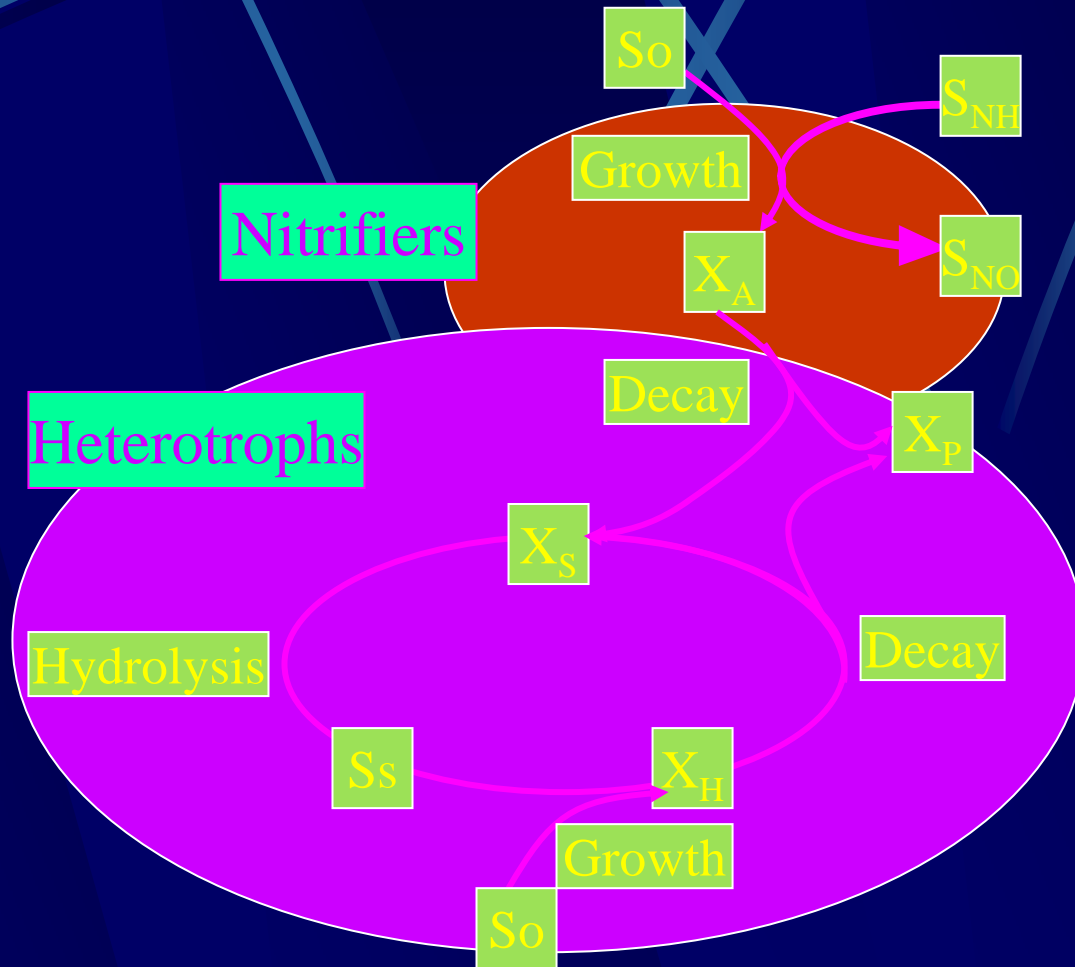
# Constitution of Influent COD



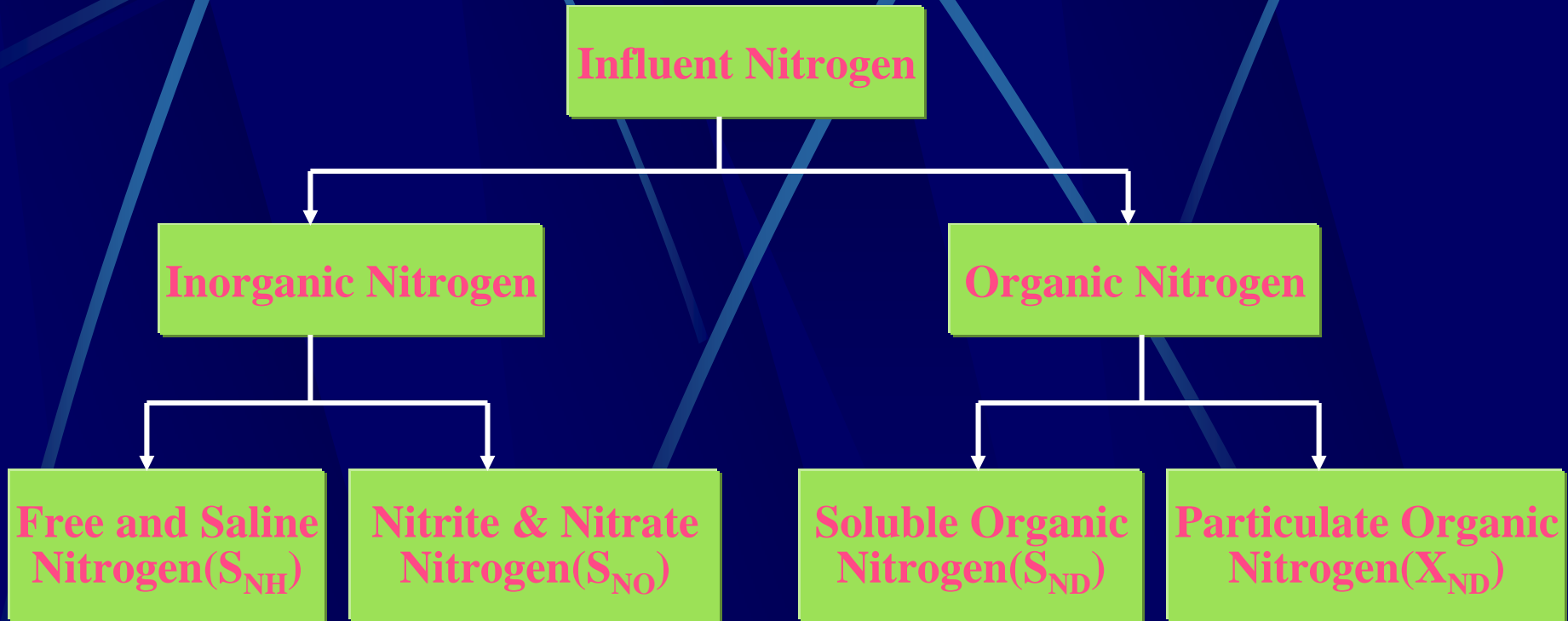
## Carbonaceous compounds behavior in biological activated sludge process

- $S_1$  will pass through the treatment process and be discharged with the effluent.
- $X_1$  is enmeshed in the activated sludge. The mass of  $X_1$  entering the system will equal the mass leaving the system via activated sludge wasting. Thus,  $X_1$  has the principal effect of increasing the mixed liquor suspended solid (MLSS) concentration.
- $S_5$  is taken up by activated sludge in a matter of minutes and metabolized, giving rise to a high unit rate of oxygen demand for synthesis.
- $X_5$  must first be absorbed onto the microorganisms, and broken down to simple chemical units ( $S_5$ ) by extracellular enzymes before finally being metabolized by the microorganisms.

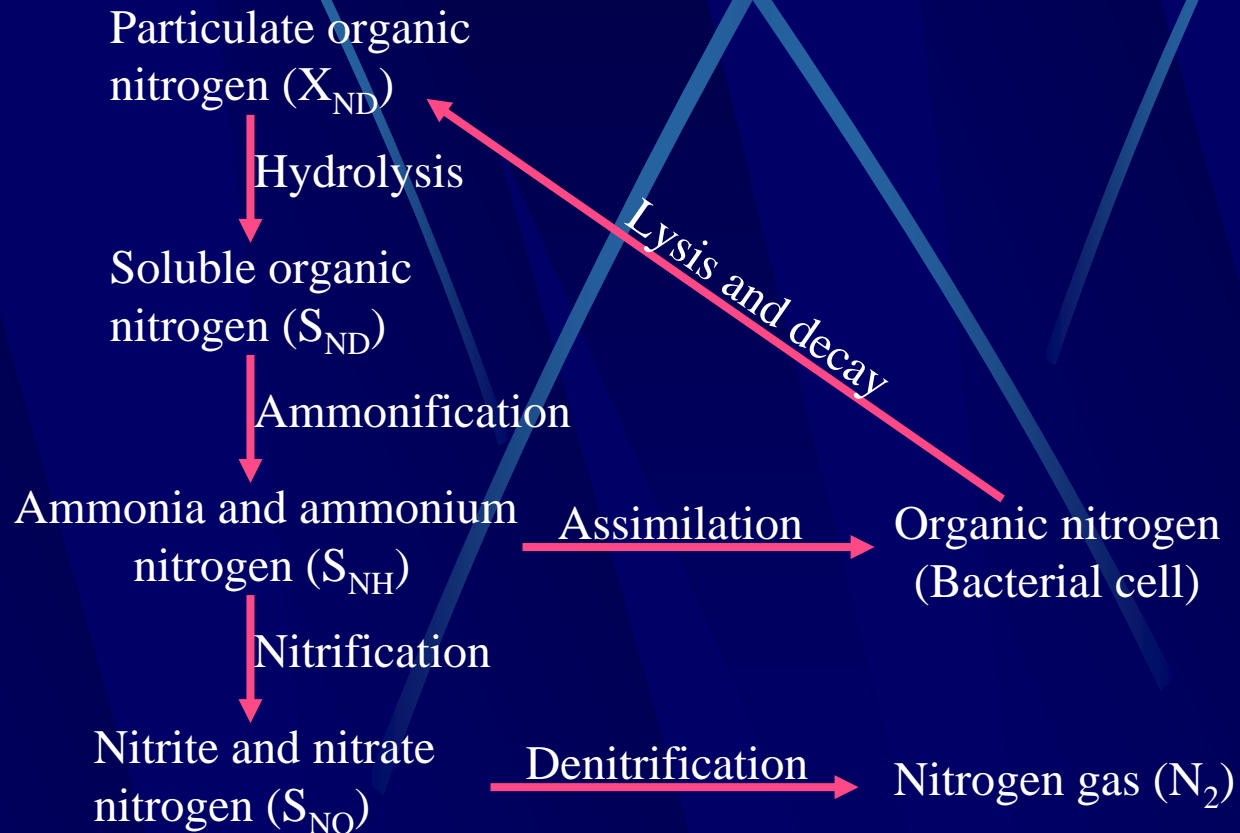
# COD flow in activated sludge process



# Constitution of influent Nitrogen



# Nitrogen flow in activated sludge process





## Nitrogen compounds behavior in biological activated sludge process

- SNH can be used directly as a nutrient for bacteria growth, or nitrified into SNO by autotrophic bacteria;
- SND must be firstly decomposed into SNH (Ammonification), then participates in the SNH material flow;
- XND must be firstly hydrolyzed into SND, then participates in the SND material flow.

## Characteristics of sewage composition in Xi'an

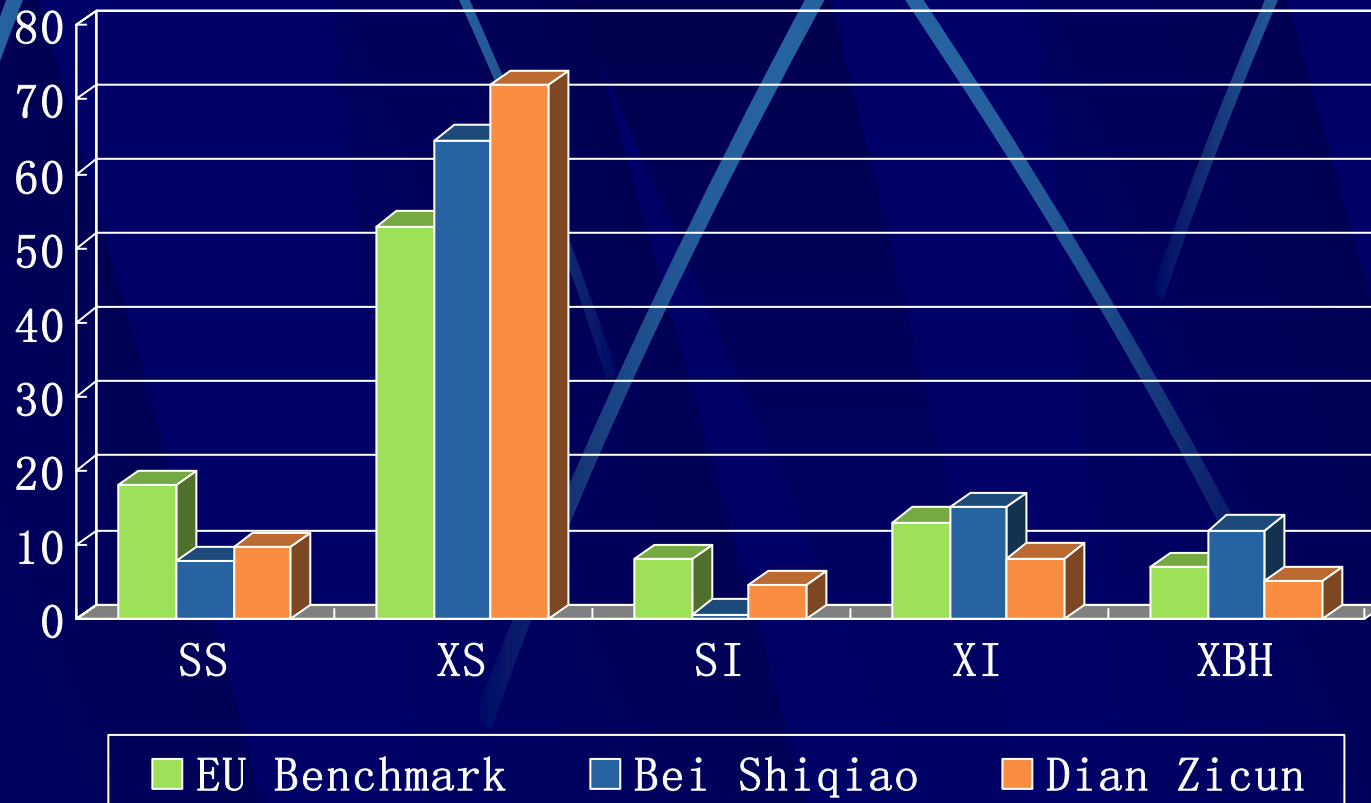
	$COD_T$	$COD_f$	$BOD_5$	$S_s$	$S_I$	$X_s$	$X_I$	$X_{BH}$	$S_{ND}$	$S_{NH}$	$S_{NO}$	$X_{ND}$
<i>BEI SHIQIAO*</i>	649	51	314		2.7					23	0.63	
<i>BEI SHIQIAO**</i>	626	51.41	320	48	3.41	405	107	62.6	2.17	15.3	0.56	18.3
<i>DIAN ZICUN**</i>	400	57	203	38.9	18.2	290	13	40	2.7	25	0	20.1

\* Monthly average data

\*\* Data obtained by the University

\*\*\* Data obtained by the University

# Carbonaceous composition (%)



# Nitrogen Composition (%)

