

# Química Orgânica Aplicada a Engenharia Geológica

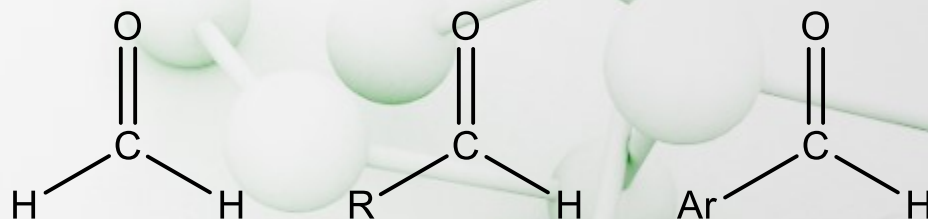
## Aula 13

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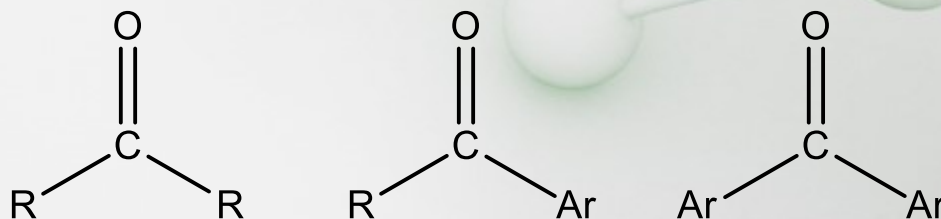
### Estudo das cetonas e aldeídos

# 1. Introdução

- Os aldeídos e cetonas são estruturalmente semelhantes, pois ambos possuem a **carbonila** como **grupo funcional**;
- A diferença é que nos **aldeídos** a **carbonila** está ligada a um **hidrogênio** e a um **grupo alquila ou arila**, enquanto nas **cetonas** a **carbonila** está ligada a **dois grupos alquila ou arila**;



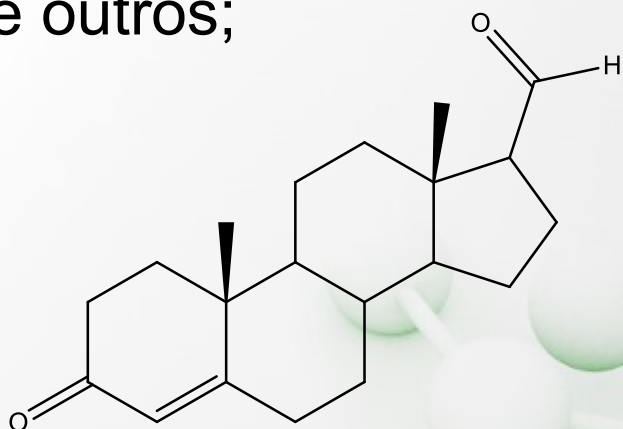
**Aldeídos**



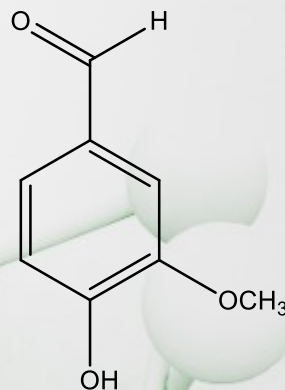
**Cetonas**

# 1. Introdução

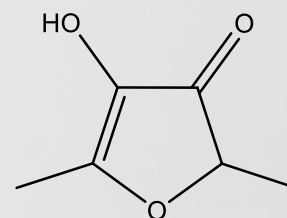
- Aldeídos e cetonas são amplamente encontrados na natureza, em fragrâncias, corantes, hormônios, açúcares, dentre outros;



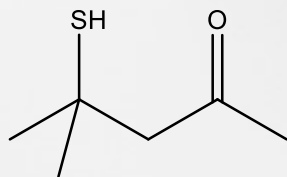
**Progesterona**  
(hormônio feminino)



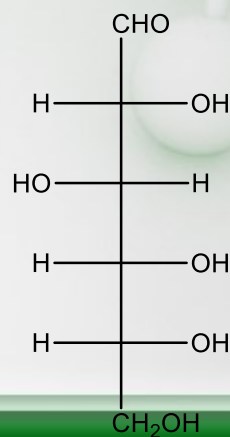
**Vanilina**  
(Aromatizante)



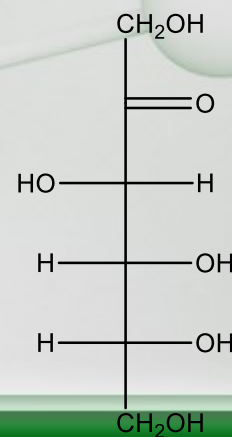
**Furaneol**  
(Aroma artificial de morango)



**Responsável pelo odor**  
**da urina dos gatos**

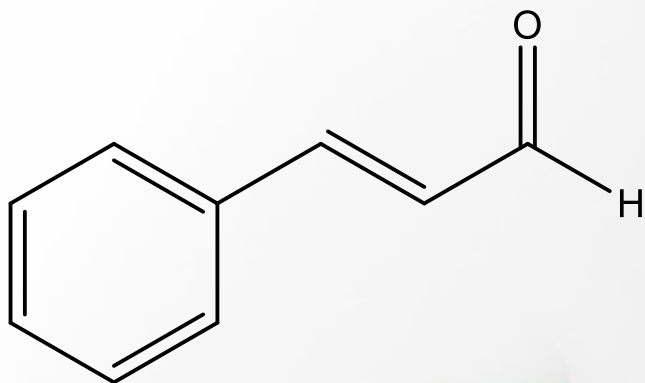


**D-Glicose**

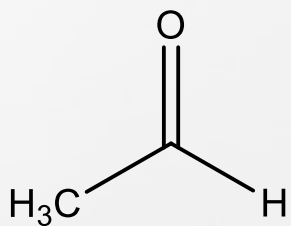


**D-Frutose**

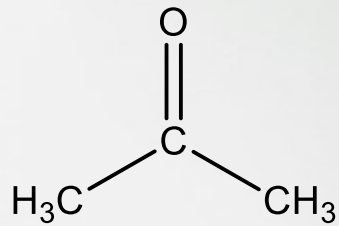
# 1. Introdução



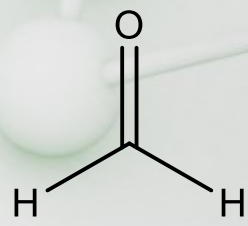
**Cinamaldeído**  
(Odor da canela)



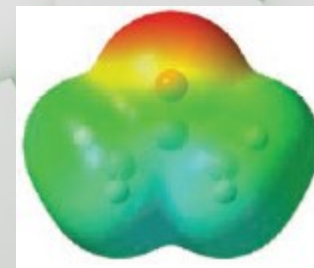
**Acetaldeído**



**Acetona**

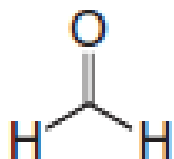


**Formaldeído**

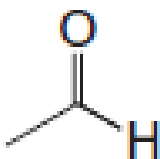


**Acetona**

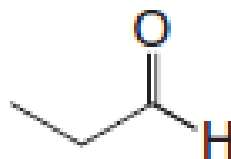
## 2. Nomenclatura: Aldeídos



**Metanal**  
**(Formaldeído)**



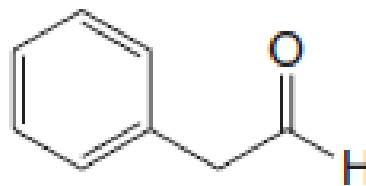
**Etanal**  
**(Acetaldeído)**



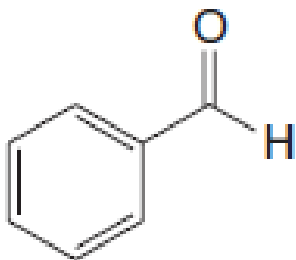
**Propanal**  
**(Propionaldeído)**



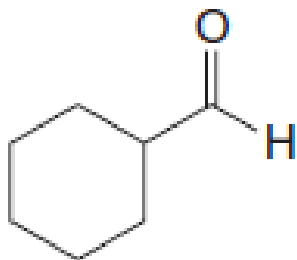
**5-Cloropentanal**



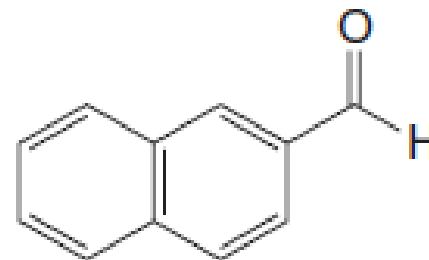
**Feniletanal**  
**(Fenilacetaldeído)**



**Benzenocarbaldeído**  
**(Benzenaldeído)**

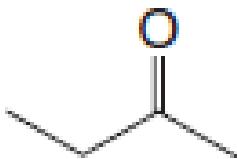


**Cicloexanocarbaldeído**

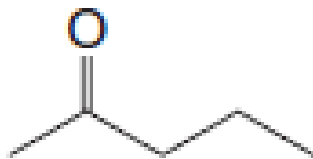


**2-Nafatalenocarbaldeído**

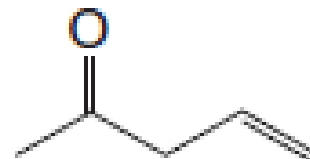
## 2. Nomenclatura: Cetonas



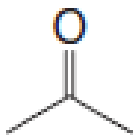
**2-Butanona**  
(Etil metil cetona)



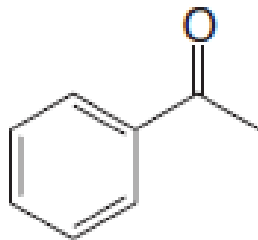
**2-Pentanona**  
(Metil propil cetona)



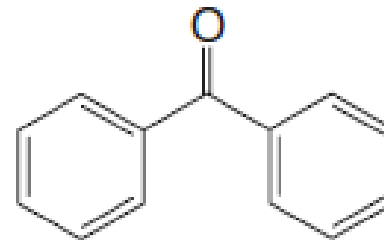
**Pent-4-en-2-ona**  
(Alil metil cetona)



**Acetona**  
(Propanona)



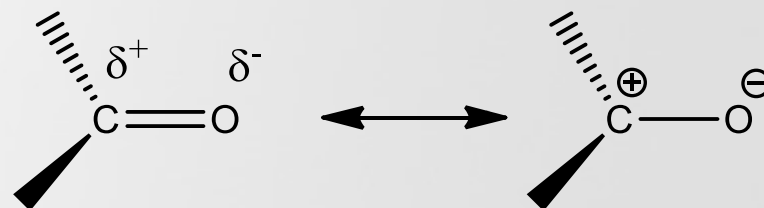
**Acetofenona**  
(1-Feniletanona)



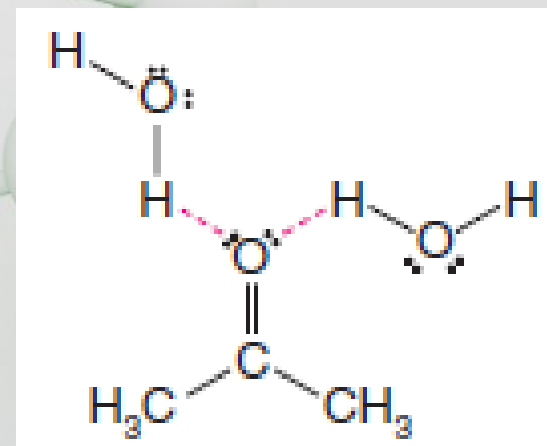
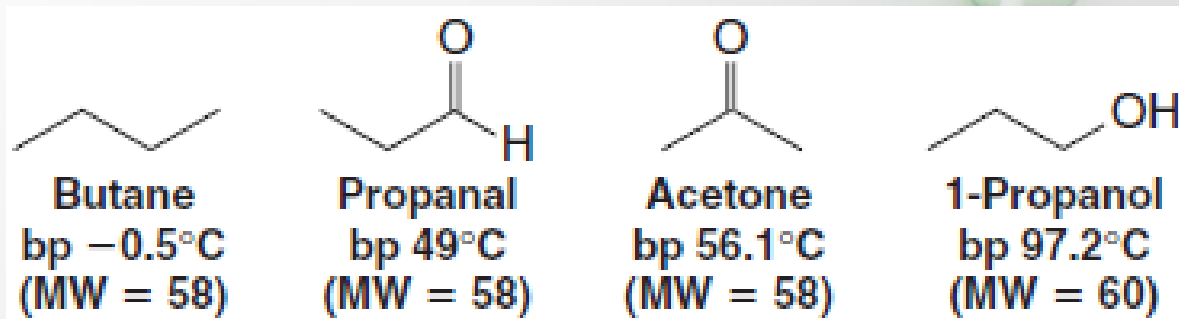
**Benzofenona**  
(Difenilmetanona)

### 3. Propriedades Físicas

- Devido a diferença de eletronegatividade entre o **C** e o **O**, a ligação dupla é **polarizada**;



- Este fator faz com que as interações intermoleculares sejam do tipo **dipolo-dipolo**, **mais fraca** comparativamente à **ligação de hidrogênio**;



### 3. Propriedades Físicas

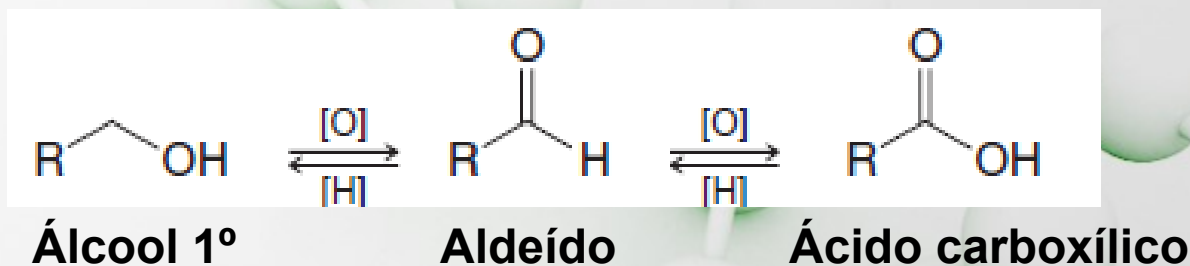
**TABLE 16.1** Physical Properties of Aldehydes and Ketones

Formula	Name	mp (°C)	bp (°C)	Solubility in Water
HCHO	Formaldehyde	-92	-21	Very soluble
CH <sub>3</sub> CHO	Acetaldehyde	-125	21	∞
CH <sub>3</sub> CH <sub>2</sub> CHO	Propanal	-81	49	Very soluble
CH <sub>3</sub> (CH <sub>2</sub> ) <sub>2</sub> CHO	Butanal	-99	76	Soluble
CH <sub>3</sub> (CH <sub>2</sub> ) <sub>3</sub> CHO	Pentanal	-91.5	102	Slightly soluble
CH <sub>3</sub> (CH <sub>2</sub> ) <sub>4</sub> CHO	Hexanal	-51	131	Slightly soluble
C <sub>6</sub> H <sub>5</sub> CHO	Benzaldehyde	-26	178	Slightly soluble
C <sub>6</sub> H <sub>5</sub> CH <sub>2</sub> CHO	Phenylacetaldehyde	33	193	Slightly soluble
CH <sub>3</sub> COCH <sub>3</sub>	Acetone	-95	56.1	∞
CH <sub>3</sub> COCH <sub>2</sub> CH <sub>3</sub>	Butanone	-86	79.6	Very soluble
CH <sub>3</sub> COCH <sub>2</sub> CH <sub>2</sub> CH <sub>3</sub>	2-Pentanone	-78	102	Soluble
CH <sub>3</sub> CH <sub>2</sub> COCH <sub>2</sub> CH <sub>3</sub>	3-Pentanone	-39	102	Soluble
C <sub>6</sub> H <sub>5</sub> COCH <sub>3</sub>	Acetophenone	21	202	Insoluble
C <sub>6</sub> H <sub>5</sub> COC <sub>6</sub> H <sub>5</sub>	Benzophenone	48	306	Insoluble



## 5.1. Reações de oxidação

- Os **aldeídos** são facilmente oxidados a **ácidos carboxílicos**, mesmo na presença de oxidantes brandos (reagente de Tollens, ácido crômico –  $\text{H}_2\text{CrO}_4$ , permanganato de potássio –  $\text{KMnO}_4$  em meio ácido);



## 5.2. Redução

- Os aldeídos e cetonas são reduzidos facilmente, respectivamente, a alcoóis primários e secundários, pelo tratamento com boridreto de sódio:

