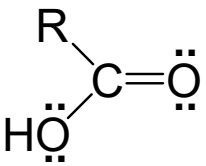
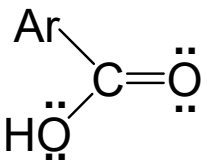
Acidi carbossilici

caratterizzati dal gruppo carbossilico **-COOH**

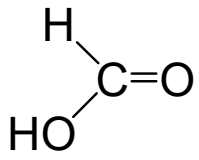


alifatici

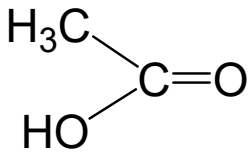


aromatici

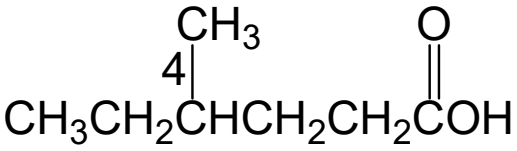
Catena più lunga contenente il gruppo -COOH al quale si dà il nome dell'alcano in cui la desinenza **-o** è sostituita con **-oico**



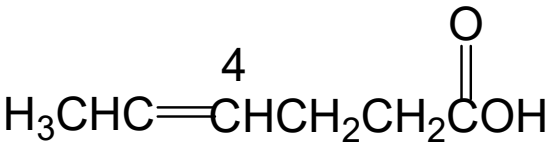
acido metanoico
acido formico



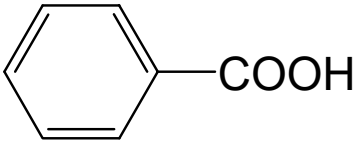
acido etanoico
acido acetico



acido 4-metilesanoico

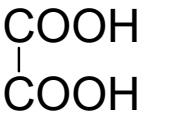


acido 4-esenoico

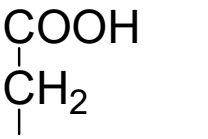


acido benzoico

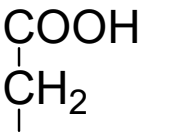
Acidi bicarbossilici



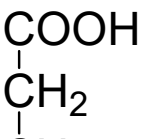
acido etandioico
acido ossalico



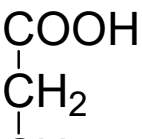
acido propandioico
acido malonico



acido butandioico
acido succinico

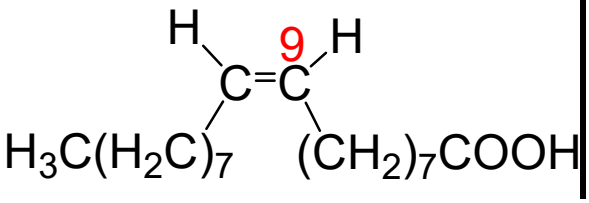


acido pentandioico
acido glutarico



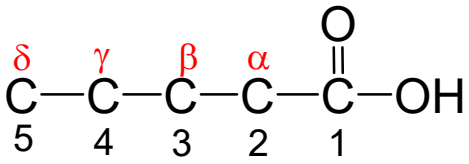
acido esandioico
acido adipico

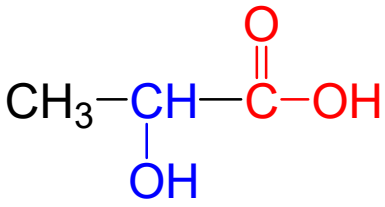
Alcuni acidi carbossilici alifatici

Struttura	IUPAC	Nome comune
	acido	**acido**
$HCOOH$	metanoico	formico
CH_3COOH	etanoico	acetico
CH_3CH_2COOH	propanoico	proprionico
$CH_3(CH_2)_2COOH$	butanoico	butirrico
$CH_3(CH_2)_3COOH$	pentanoico	valerianico
$CH_3(CH_2)_4COOH$	esanoico	capronico
$CH_3(CH_2)_6COOH$	ottanoico	caprilico
$CH_3(CH_2)_8COOH$	decanoico	caprico
$CH_3(CH_2)_{10}COOH$	dodecanoico	laurico
$CH_3(CH_2)_{12}COOH$	tetradecanoico	miristico
$CH_3(CH_2)_{14}COOH$	esadecanoico	palmitico
$CH_3(CH_2)_{16}COOH$	ottadecanoico	stearico
$CH_3(CH_2)_{18}COOH$	eicosanoico	arachidico
	*cis*-9-ottadecenoico	oleico

Acidi con un ulteriore gruppo funzionale

Quando si usano i nomi comuni si aggiungono spesso le lettere greche α, β, γ, δ, per indicare la posizione dei sostituenti

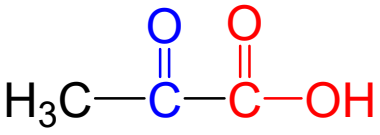




α–idrossiacido

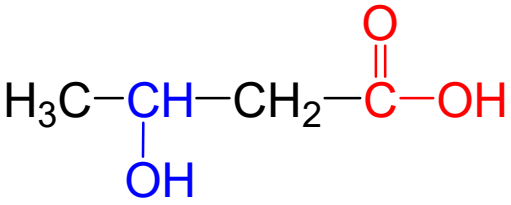
acido α-idrossipropanoico

acido lattico



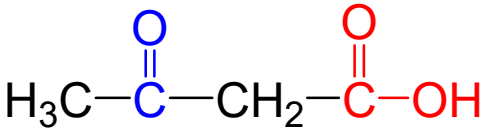
α-cheto acido

acido α-ossopropionico



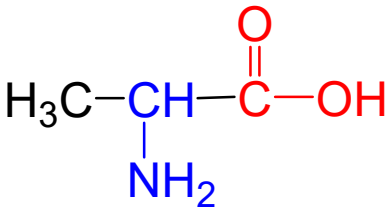
β–idrossiacido

acido β-idrossibutirrico



β-cheto acido

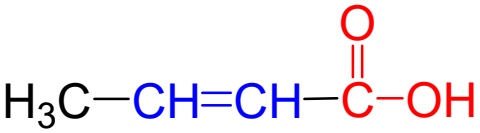
acido β-ossobutirrico



α–amminoacido

acido α-amminopropanoico

alanina

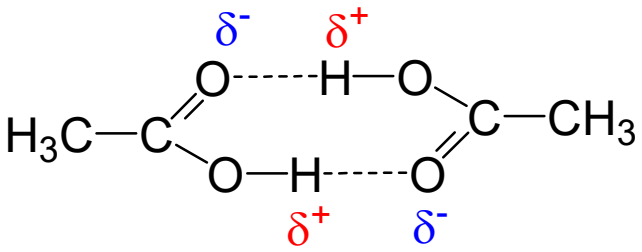


acido α,β-insaturo

acido 2-butenoico

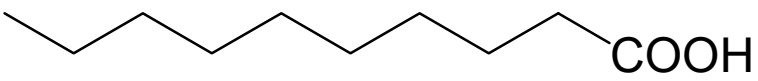
Proprietà degli acidi carbossilici

Gli acidi carbossilici formano legami idrogeno intermolecolari molto forti per cui hanno temperatura di ebollizione più alte di aldeidi e chetoni di pari peso molecolare



Inoltre formano legami idrogeno anche con l'H_2O per cui i composti a minor numero di carbonio sono solubili in acqua. Aumentando le dimensioni diminuisce la solubilità

coda idrofobica (non polare) *testa polare*



acido decanoico
acido caprico

Acidità degli acidi carbossilici

Gli acidi carbossilici sono i composti organici più acidi. Sono tuttavia molto più deboli degli acidi minerali (acido solforico, cloridrico, etc.)

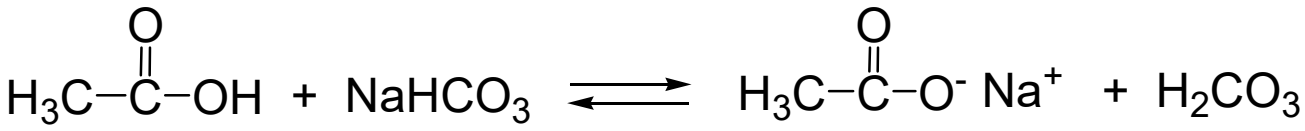
CH_3-COOH < CH_2Cl-COOH < $CHCl_2$-COOH < CCl_3-COOH

acido	acetico	cloroacetico	dicloroacetico	tricloroacetico
pKa	4,76	2,86	1,48	0,70

fenoli pKa 9-10

alcoli pKa 16-18

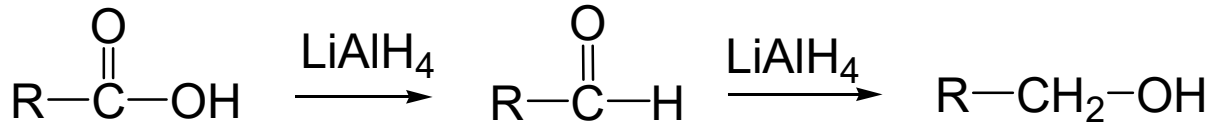
Gli acidi carbossilici sono in grado di formare sali con basi forti come NaOH e anche con basi deboli come $NaHCO_3$



acido acetico — acetato di sodio

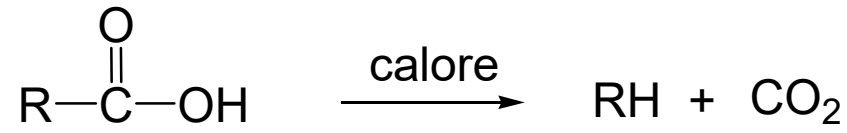
I sali degli acidi carbossilici sono solubili in acqua

Riduzione degli acidi carbossilici



acido carbossilico — aldeide — alcol primario

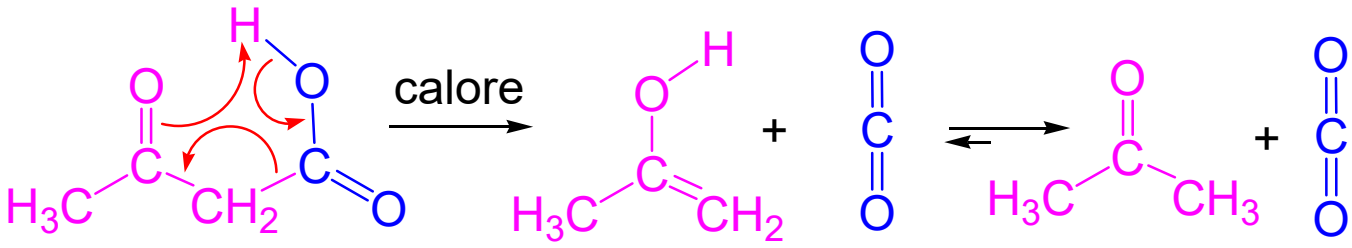
Decarbossilazione degli acidi carbossilici



acido carbossilico — alcano

I β-chetoacidi e gli acidi β-dicarbossilici decarbossilano più velocemente degli acidi carbossilici

Decarbossilazione di β-chetoacidi



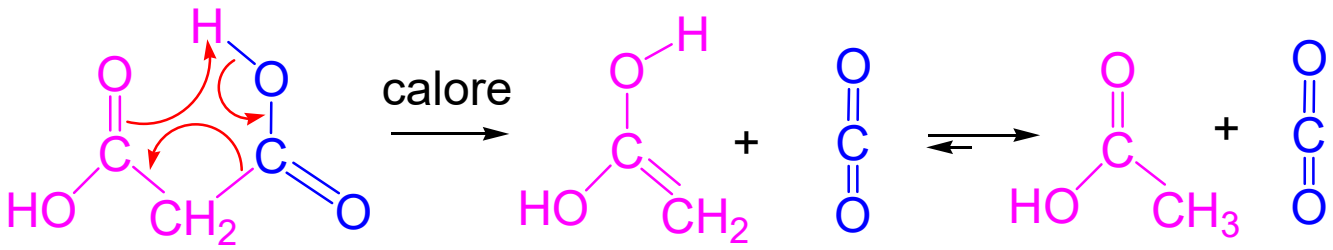
acido β-ossobutanoico
acido acetoacetico

enolo
dell'acetone

acetone

La decarbossilazione dei β-chetoacidi (conversione dell'acido ossalsuccinico in acido α-chetoglutarico) si ritrova in un processo metabolico di grande importanza:
il **ciclo di Krebs**

Decarbossilazione degli acidi β-dicarbossilici



acido propandioico
acido malonico

forma enolica
dell'acido acetico

acido acetico