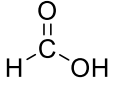
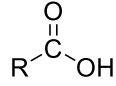


KARBOKSİLİK ASİTLER

Genel formülleri : R-COOH , R-CO₂H



Formik asit

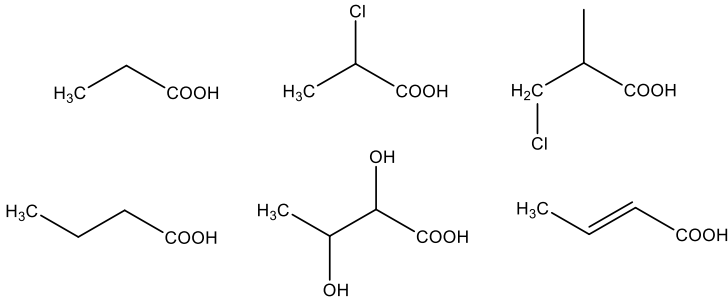
Metanoik asit

düzlemsel... Bağ açıları 120°

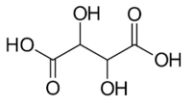
IUPAC adlandırılmalarında;

1. -COOH C atomunun dahil olduğu en uzun C zinciri seçilir. Alifatik bileşiklerde numaralandırmaya – COOH grubu karbonundan başlanır.
2. Zincirdeki süstitüentler yazılarak, zincir adının sonuna –*oik asit* getirilir.
3. -COOH grubu isimlendirmede öncelikli...

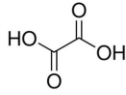
- Propanoik asit
- 2-Kloropropanoik asit (*α-Kloropropanoik asit*)
- 3-Kloro-2-metilpropanoik asit
- Butanoik asit
- 2,3-Dihidroksibutanoik asit
- 2-Butenoik asit



Dikarboksilik asitler

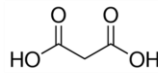


tartarik asit



okzalik asit

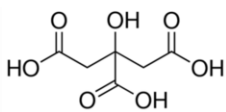
(*etandioik asit*)



malonik asit

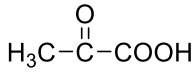
(*propandioik asit*)

Trikarboksilik asitler

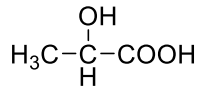


sitrik asit

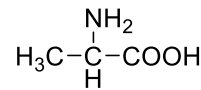
(*2-hidroksipropan-1,2,3-trikarboksilik asit*)



Pirüvik asit
 α -Ketopropanoik asit



Laktik asit
2-Hidroksi propanoik asit
 α -Hidroksi propanoik asit

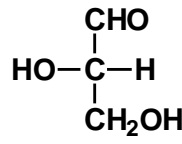
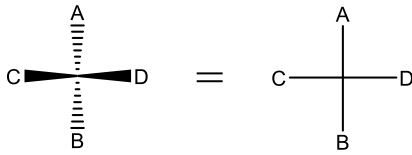
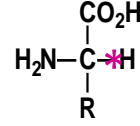


Alanin
2-Amino propanoik asit
 α -amino propanoik asit

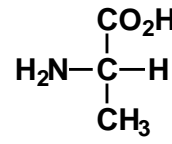
Aminoasitler

α -Amino karboksilik asitler

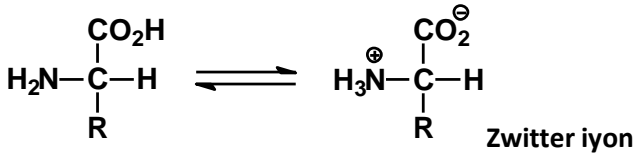
Gliseraldehid konfigürasyonuna bağlı olarak, D ya da L aminoasit olarak adlandırılır.
Doğal aa: L \rightarrow α -C 'S' konfigürasyonunda
(Doğal KH: D)



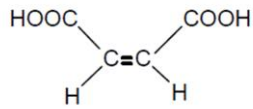
L-gliseraldehid



L-alanin

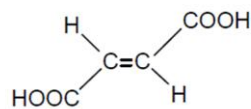


- Aminoasitler hem asit (proton veren), hem de baz (proton alan) özellik gösterirler. Amfoter bileşiklerdir.
- Nötr moleküller olan, ancak hem – hem de + yük içeren bu türlere 'zwitter iyon' denir.



cis -Butendioik asit

Maleik asit

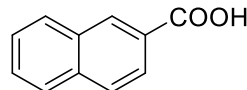
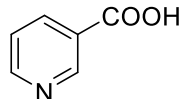
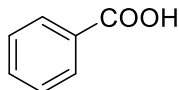
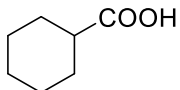


trans -Butendioik asit

Fumarik asit

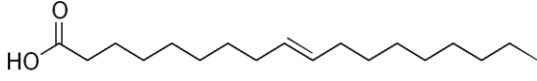
4. Halkalı, aromatik ve heterohalkalı karboksilik asit bileşiklerinde, ana yapının adının sonuna *karboksilik asit* eklenir ve -COOH grubunun bağlandığı konum belirtilir.

- Sikloheksankarboksilik asit
- Benzenkarboksilik asit (*Benzoik asit*)
- Piridin-3-karboksilik asit (*Nikotinic asit; Niasin; Vit-B3*)
- Naftalen-2-karboksilik asit

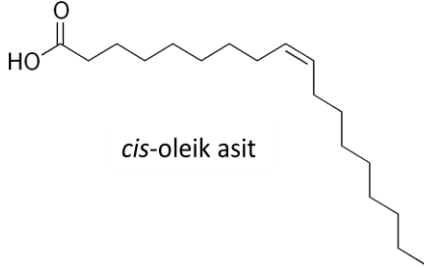


YAĞ ASİTLERİ

C₁₈

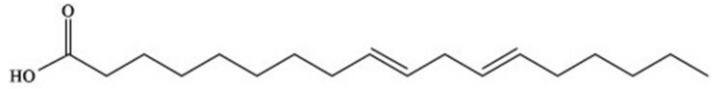
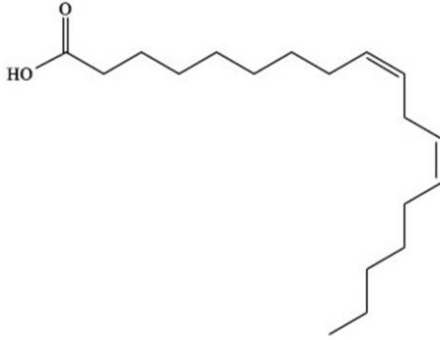


trans-Oleik asit (Elaidik asit)



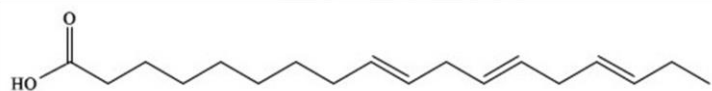
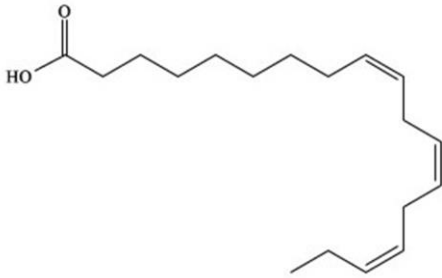
cis-oleik asit

Oleik asit (*cis*-9-oktadekenoik asit)



trans- izomer

Linoleik asit (*cis,cis*-9,12-oktadekadienoik asit)



trans- izomer

Linolenik asit (*cis,cis,cis*-9,12,15-oktadekatrienoik asit)

18:1 (9) ya da 18:1 Δ^9

C sayısı

= bağ sayısı

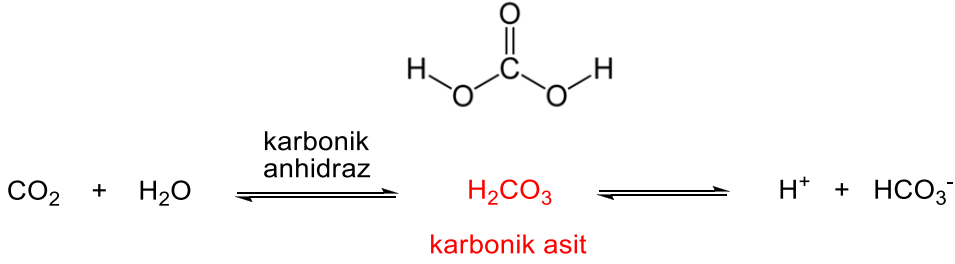
= bağın yeri

= bağın konfigürasyonu *cis* ise belirtilmez. *trans* ise, Δ 'nın yanına *trans* yazılır.

Doğal olanlarda tüm = bağlar *cis* konfigürasyonundadır.

Bikarbonat-karbonik asit tampon sistemi

Karbonik asit, zayıf asit ve vücut pHsından sorumludur.

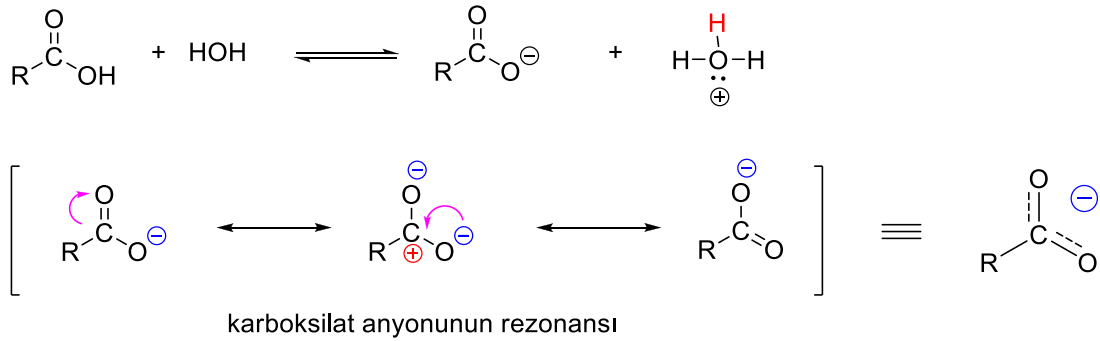


- **Açıl grubu:** R-C=O
- Türedikleri asidin ismindeki *-ik asit* yerine *-il* getirilerek adlandırılır.

formik asit HCOOH → formil (metanoil) HC=O
asetik asit CH₃COOH → asetil (etanoil) CH₃C=O
benzoik asit Ph-COOH → benzoil Ph-C=O

Karboksilik asitlerin özellikleri

Organik karboksilik asitler zayıf asitlerdir (pKa~5). Suda iyonlaşarak karboksilat anyonu ve hidronyum iyonu verirler. En kuvvetlisi: HCOOH



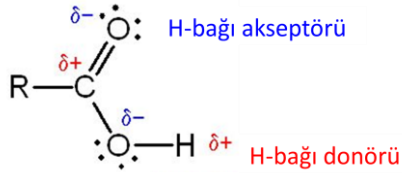
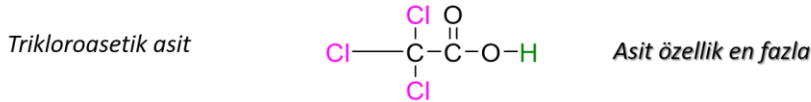
(-) yük rezonansla delokalize olmaktadır. (-) yükün iki O atomu üzerinde eşit dağılması karboksilat iyonunu kararlı kılar ve dengeyi ürünler lehine kaydırır.

Karboksilik asitlerin asitliği nelere bağlıdır?

İndüktif etki...

- ✓ Karboksil grubuna bağlı -özellikle αC üzerindeki e- çekici gruplar (-I) asitliği artırır; e- verici gruplar (+I) asitliği azaltır.
- ✓ İndüktif etki, e- çekici grubun uzaklığına bağlı olarak azalır.

Soru: Aşağıdaki bileşikleri asitlikleri yönünden kıyaslayarak açıklayınız.



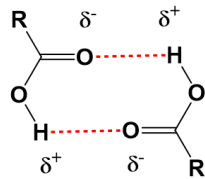
C=O ve O-H grubu nedeniyle karboksilik asitlerin polariteleri oldukça yüksektir.

1-4 C'lu olanlar (Formik asit, asetik asit, propiyonik asit, butirik asit) HQH ile H-bağları yaparak iyi çözünürler. C sayısı arttıkça (hidrokarbon kısmı büyüdükçe) çözünürlük azalır. Aromatik olanları suda çözünmezler.

2 Karboksilik asit molekülü arasında H-bağı ile *dimer* oluşur. H-bağı ile molekül büyüdüğü için, aynı molekül ağırlığındaki alkollerden daha yüksek erime ve kaynama noktalarına sahiptirler.

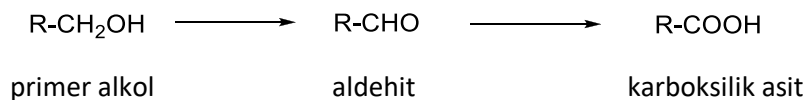
Propanol (*ma*: 60; *kn*: 97°C)

Asetik asit (*ma*: 60; *kn*: 118°C)

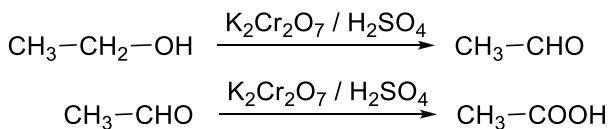


Karboksilik asit bileşiklerinin elde edilişleri

1. Primer alkol ve aldehitlerin oksidasyonu ile;

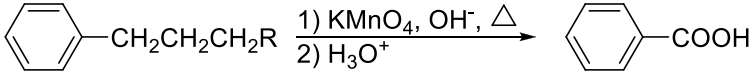
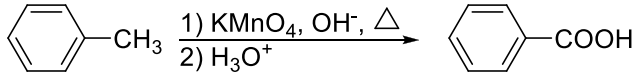


Oksidasyon işlemi $\text{CrO}_3 - \text{H}_2\text{SO}_4$, KMnO_4 , $\text{K}_2\text{Cr}_2\text{O}_7$, HNO_3 gibi ajanlarla yapılabilir. Aldehitlerin oksidasyonlarında Ag_2O kullanılır.

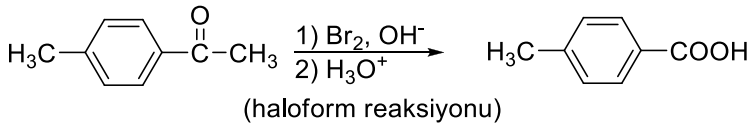
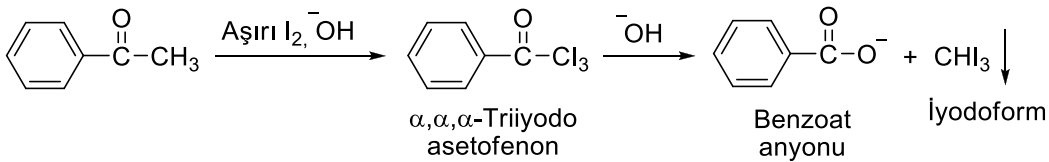
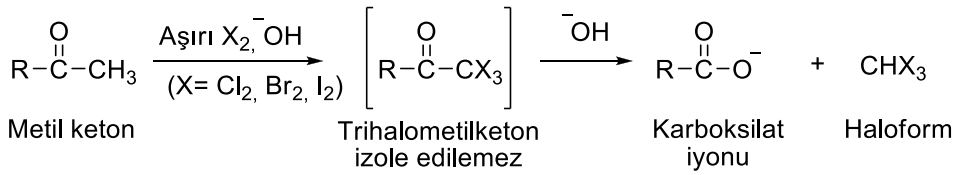


2. Aromatik yan zincirlerin oksidasyonu ile;

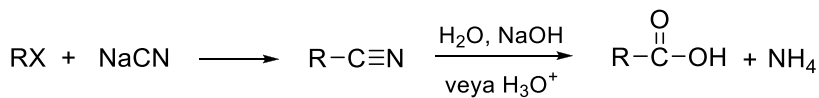
Oksidasyon benzilik C-H bağında olur.



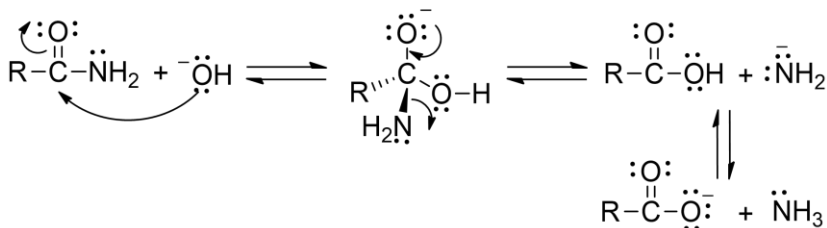
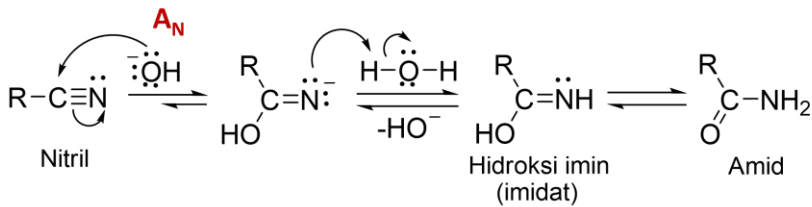
3. Haloform reaksiyonu ile;



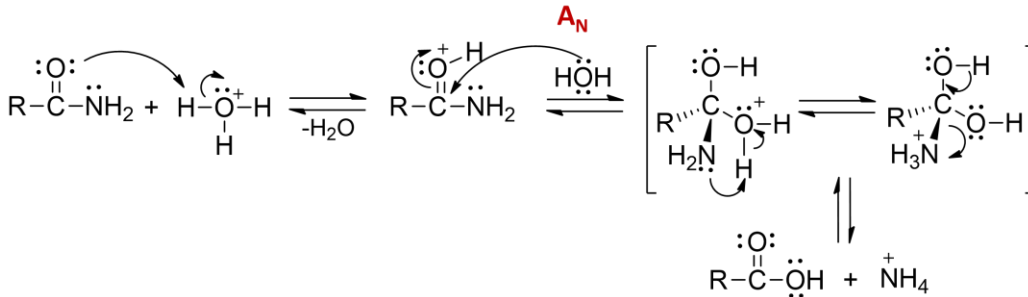
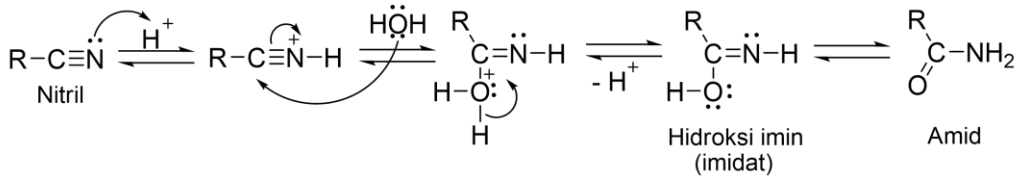
4. Nitrillerin hidrolizi ile;



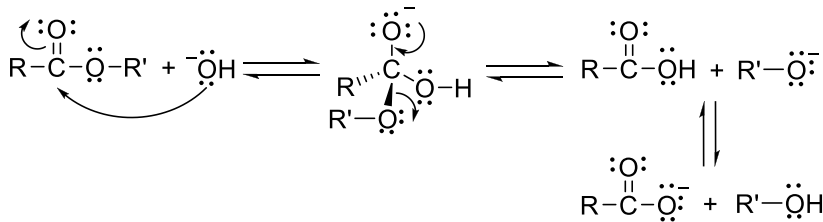
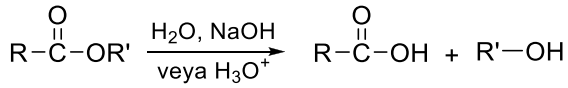
Bazik hidroliz



Asit hidroliz



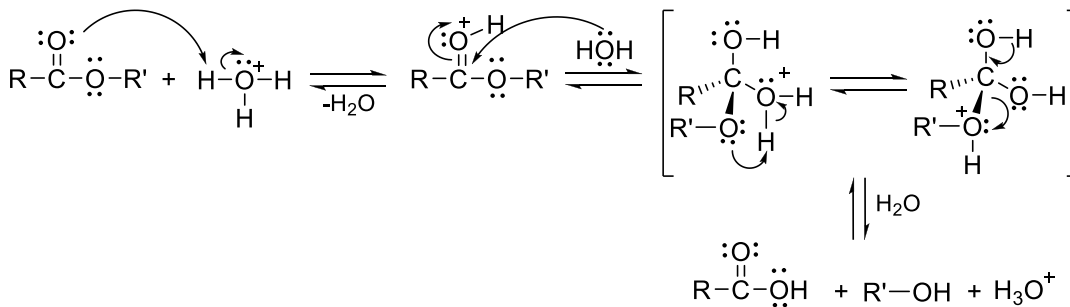
5. Esterlerin hidrolizi ile;



Bazik hidroliz (Esterlerin baz katalizli hidrolizi = Saponifikasyon = sabunlaştırma)

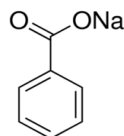
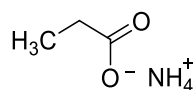
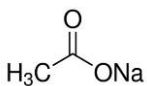
Yağ asitlerinin gliserin esterlerinin alkali hidrolizi ile SABUN elde edilir.

Asit hidroliz



Karboksilik asit bileşiklerinin reaksiyonları

1. Karboksilik asitler kuvvetli bazlarla tepkimeye girerler ve **karboksilat tuzlarını** oluştururlar.

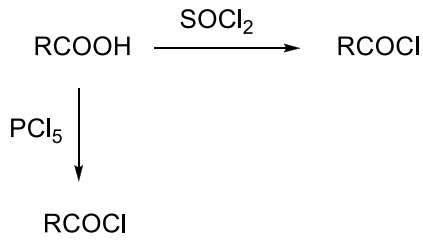


sodyum asetat

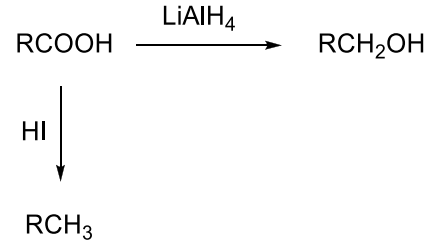
amonyum propiyonat

sodyum benzoat (koruyucu gıda katkı maddesi, E211)

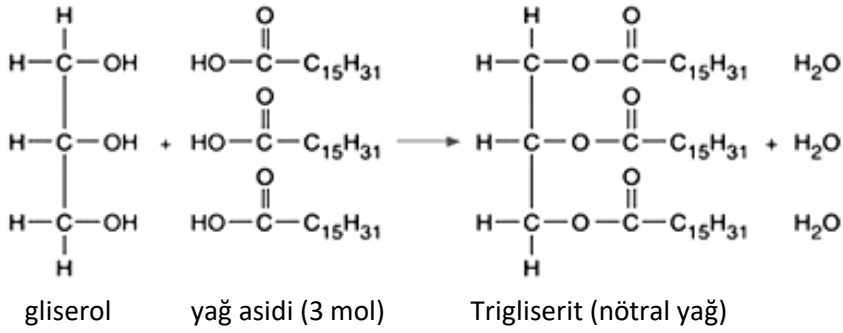
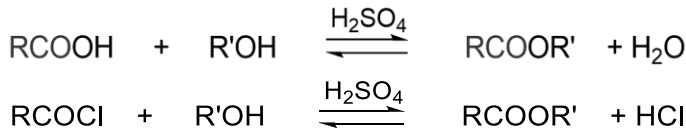
2. Halojenasyon



3. Redüksiyon

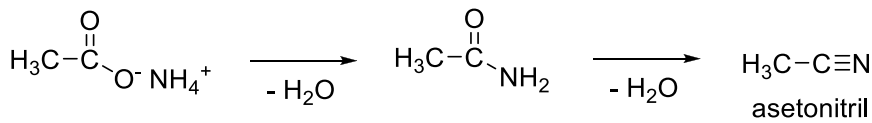
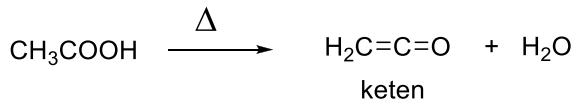


4. Esterleştirme (Fischer esterifikasyonu)

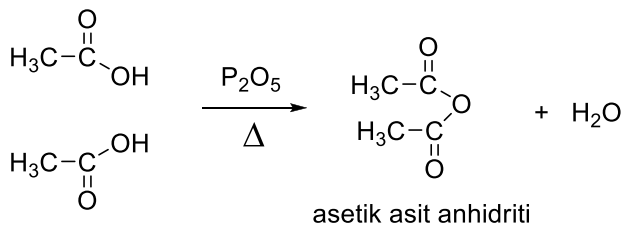


5. Deshidratasyon

a. Molekül içi (intramoleküler)



b. Moleküller arası (intermoleküler)



KAYNAKLAR

- Organik Kimya, G. Solomons- C. Fryhle, Literatür Yayıncılık, 7. Basımdan çeviri, 2010.
- Organic Chemistry, L.G. Wade, Jr., 6th Edition, 2005.
- Organik Kimya, Hart-Crain-Hart, Palme Yayıncılık, 12. Baskıdan çeviri, 2018.
- Ankara Üniversitesi Eczacılık Fakültesi, Farmasötik Kimya Pratikleri 1-2, 2. Baskı, Ankara Üniversitesi Basımevi.