

**O'ZBEKISTON RESPUBLIKASI OLIY VA O'RTA
MAXSUS TA'LIM VAZIRLIGI**

GULISTON DAVLAT UNIVERSITETI

**UMUMIY KIMYO VA KIMYOVIY
TEXNOLOGIYA KAFEDRASI**

S P I R T L A R MAVZUSIDA

REFERAT

2015 YIL

SPIRTLAR

To'yingan bir atomli spirtlarning gamalogik qatori. Assotsiyatsiyaning spirtlar fizik xossalariga ta'siri. Tabiatda uchrashi. Olinishi: olefinlarni gidratlash, galoid xosilalarni gidrolizlash kabolil gruppali brikmalarni qaytarish va magniy organik brikmalardan sintez orqali olish reaksiyalari. Birlamchi, ikkilamchi va uchlamchi spirtlarning xossalarini solishtirish.

Molekulasida kislorod tutgan organik birikmalar quyidagilardan iborat:

- 1) gidroksil guruhi bo'lgan – oksibirikmalar; a) spirtlar, b) fenollar $Ar-OH$.
- 2) karbonil guruhi bo'lgan birikmalar; a) aldegidlar, b) ketonlar.
- 3) karboksil guruhi bo'lgan birikmalar; karbon kislotalar va ularning hosilalari.

To'yingan bir atomli spirtlar deb – (alkanollar yoki alkagollar) to'yingan uglevodorodlar molekulasida bir yoki bir necha vodorod atomlarini gidroksil guruhiga almashinishidan hosil bo'lgan birikmalarga aytiladi.

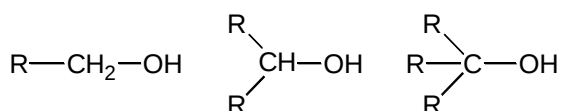
Gidroksil guruhining soniga qarab:

- 1) bir atomli spirtlar, $R-OH$.
- 2) ikki atomli spirtlar, $R-(OH)_2$.
- 3) uch atomli spirtlar, $R-(OH)_3$.
- 4) ko'p atomli spirtlar to'rt va undan ortiq gidroksil guruhiga ega bo'lgan spirtlar.

To'yingan uglevodorod molekulasidagi bitta vodorod atomining gidroksil guruhiga o'rin almashinishidan hosil bo'lgan birikmalarga *to'yingan bir atomli spirtlar* deyiladi.

Umumiy formulasi $C_nH_{2n+1}OH$.

Spirtlarni suvning hosilasi desa ham bo'ladi. Shu sababli ham spirtlarning ba'zi xossalari va kimyoviy reaksiyalari suvnikiga o'xshab ketadi. Gomologik qator a'zolari bir-biridan $(-CH_2-)$ guruhi bilan farq qiladi. Bir atomli spirtlarning molekulasidagi gidroksil guruhining qaysi uglerod atomiga birikkanligiga qarab, spirtlar birlamchi, ikkilamchi va uchlamchi bo'ladi.



Nomlanishi. 1) Tarixiy nomenklaturaga ko'ra nomlaganda avval spirtlarning gidroksil guruhiga birikkan radikalning nomi aytiladi. Masalan:

$CH_3 - OH$ – metil spirti.

$CH_3 - CH_2 - OH$ – etil spirti.

$CH_3 - CH_2 - CH_2 - OH$ – propil spirti.

Spirtlar emperik nom bilan ham ataladi. Masalan: metil spirtni yog'och spirti, etil spirtini vino spirti deb ham aytiladi.

2) Rasional nomenklaturaga ko'ra spirtlarni atashda metil spirtini (CH_3OH) karbinol deb atalib, metil spirti radikalidagi vodorod atomining o'rniga qanday radikallar almashingan bo'lsa, shu radikallar nomi va ularning nechtaligini ko'rsatib oxiriga karbinol so'zi qo'shib o'qiladi.

Jeneva nomenklaturasiga ko'ra to'yingan uglevodorodning nomiga *-ol* qo'shimchasini qo'shish orqali hosil qilinadi va gidroksil bog'langan uglerod atomining nomeri ko'rsatiladi. Nomerlash gidroksil guruhiga yaqin turgan tomondan boshlanadi.

CH_3OH – metil spirti (T)

karbinol (R)

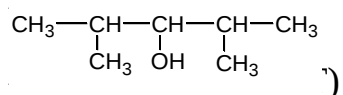
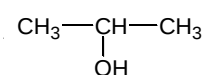
metanol (S)

$CH_3 - CH_2 - OH$ – etil spirti (T)

– metil karbinol (R)

– etanol (S)

$CH_3 - CH_2 - CH_2 - OH$ – n-birlamchi propil spirti (T)



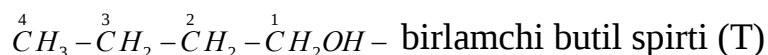
– dimetil karbinol (R)

– propanol – 2 (S)

– diizopropil karbinol (R)

– 2,4-dimetilpentanol-3 (S)

Izomeriyasi. Spirtlarning izomeriyasi ikki xil bo‘ladi: uglerod skeletining izomeriyasi va gidroksil guruhining turish holati izomeriyasi. Masalan, butil spirtining izomeriyasi misolida,

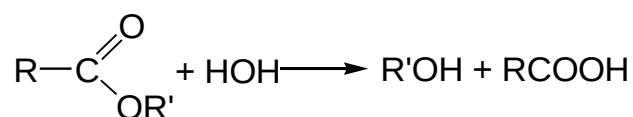


– propil karbinol (R)

– butanol-1 (S)

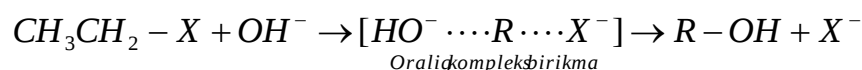
Bir atomli spirtlarning ba’zilar o‘simliklarning efir moylarida va hayvonlar organizmida uchraydi, ular quyidagi usullar bilan sintez qilinadi.

1. Tabiatda uchraydigan murakkab efirlar kislotali yoki ishqoriy sharoitda gidroliz qilib olinadi:

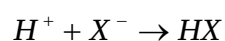
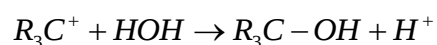
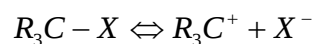


2. Monogalogenli birikmalarga ishqorning suvli eritmasini ta’sir ettirib olinadi:

$\text{CH}_3 - \text{CH}_2 - \text{Br} + \text{AgOH} \rightarrow \text{CH}_3 - \text{CH}_2 - \text{OH} + \text{AgBr}$ Bu gidroliz reaksiyalarida agar galoid alkil birlamchi bo‘lsa reaksiya quyidagi mexanizmida boradi:

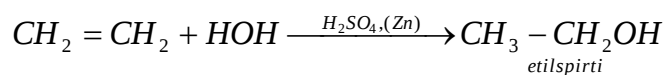


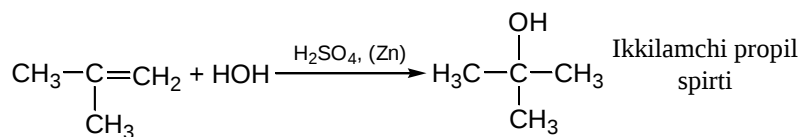
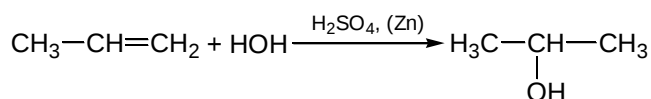
$\text{S}_{\text{N}2}$ – mexanizmida Agar galoid alkil uchlamchi bo‘lsa gidroliz reaksiyasi quyidagicha boradi:



$\text{S}_{\text{N}1}$ – mexanizmida

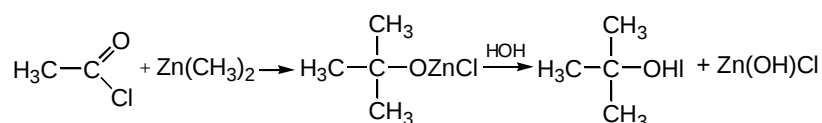
3. To‘yinmagan uglevodorodlarni gidratlash bilan spirtlarni olinishi:





2-metil propanol-2

4.Karbonil guruhini tutgan birikmalarga metallorganik birikmalar ta'sir ettirilganda spirtlarning olinishi:

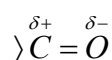


Asosan uchlamchi spirtlar olinadi.

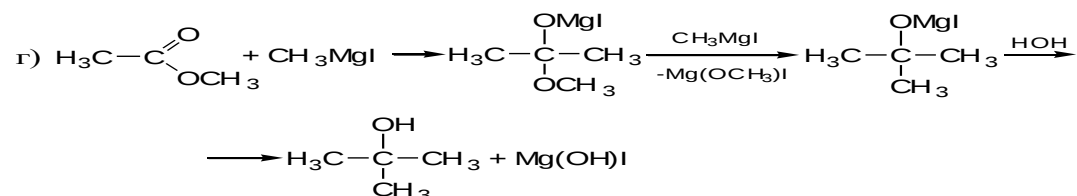
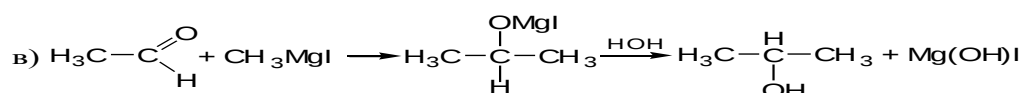
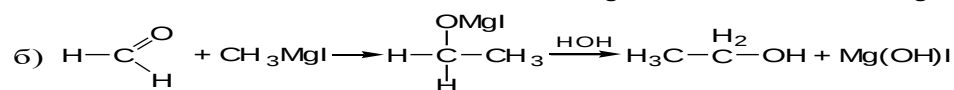
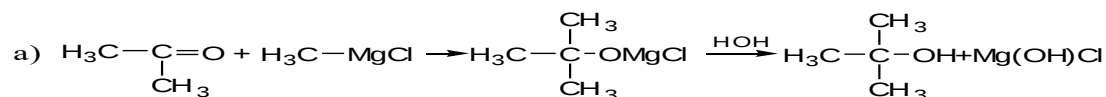
Bu reaksiyani A.M.Butlerov, A.M.Zaysev, E.E.Vagnerlar kashf etgan.

Spirtlarning magniy organik birikmalar yordamida olinish usulini Grinyar topgan.

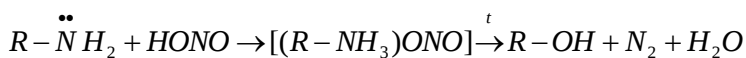
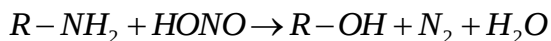
Karbonil guruhga ega bo'lgan birikmalarda, karbonil guruh elektronlar buluti (zichligi) kislorod atomiga tomon siljigan bo'ladi, ya'ni $=\overset{\rightarrow}{\text{C}}=\text{O}$ uglerod atomida musbat zaryadlarning zichligi ortadi, kislorodda esa manfiy zaryadlarning zichligi ko'payadi:



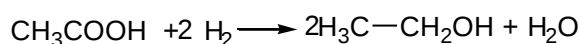
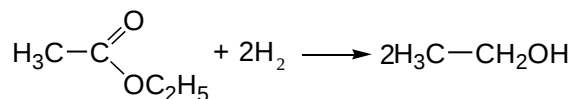
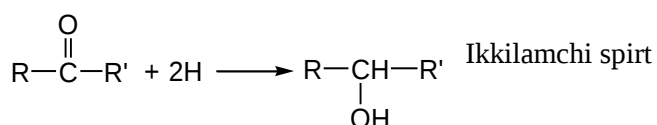
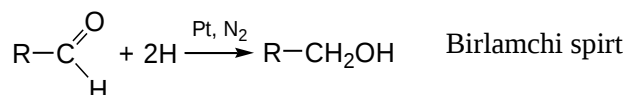
Metall-organik birikmalar ($\text{R}^- + \text{MgCl}$) karbonil guruhli moddalar bilan reaksiyaga kirishganida radikal R^- nukleofil zarracha bo'lib xizmat qiladi va karbonil guruhdagi uglerod atomiga birikadi. $^+\text{MgCl}$ esa kislorodga tomon yo'nalib, u bilan birikadi:



5. Birlamchi aminlarga nitrit kislota ta'sir ettirib olinadi. Bu usulda aminlarning radikaliga qarab birlamchi, ikkilamchi va uchlamchi spirtlar olinadi:

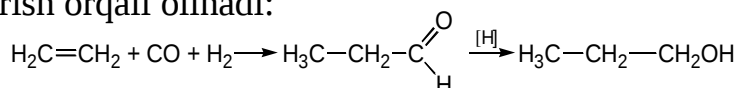


6. Sanoatda spirtlar aldegid, keton va murakkab efirlarni, kislotalarni *Ni, Co, Pt, Cu* katalizatorligida vodorod bilan qaytarib olinadi:

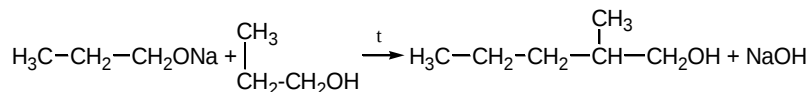


Murakkab efirlarni qaytarib olishda qaynab turgan spirt va N_2 yoki $LiAlH_4$ (litiy alyuminiy gidrid) qaytaruvchi vosita sifatida ishlatiladi.

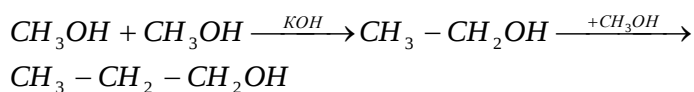
Texnikada birlamchi spirtlar ko'proq oksosintez orqali olingan aldegidlarni qaytarish orqali olinadi:



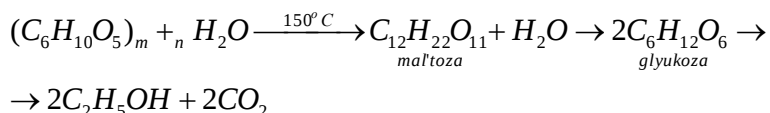
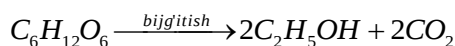
7. Spirtlarning yuqori vakillaridan pastki vakillarini sintez qilib olish:



Bu tipdagi reaksiyalar spirtlarni qattiq KOH (yoki suvsiz) bilan qizdirish orqali boradi:

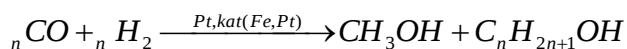


8. Shakar moddalarni fermentlar ta'sirida bijg'itib spirt olish (yoki bu biokimyoviy usul deb ataladi).



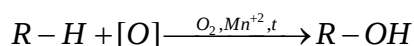
Sellyulozani sulfat kislota ishtirokida gidrolizlab glyukozaga aylantiriladi va etil spirti olinadi. Bu usulda olingan spirt tarkibida oz bo'lsada metil spirt, aldegid va murakkab efirlar bo'ladi. Bu usulda olingan spirtni shuning uchun ham *gidroliz spirti* deyiladi (bu texnik maqsadlarda ishlatiladi).

9. CO ni gidrogenlash (oksosintez).



$CO + H_2 \xrightarrow{Fe, Pt}$ Birlamchi spirtlarning pastki vakillari aralashmasi (sintol).

10. To'yingan uglevodorodlarni oksidlash orqali:



Fizikaviy xossalari. a) to'g'ri zanjirli birlamchi spirtlarning C_{10} gacha bo'lganlari oddiy sharoitda suyuqlik, C_{11} dan yuqorisi qattiq moddalardir. b) normal tuzilishli va birlamchi spirtlarning qaynash haroratlari izo tuzilishli, ikkilamchi va uchlamchi spirtlar qaynash haroratlarida yuqoriroq bo'lib, bu farq $20^\circ S$ ga yaqin.

Qaynash haroratlari:

Birlamchi > ikkilamchi > uchlamchi

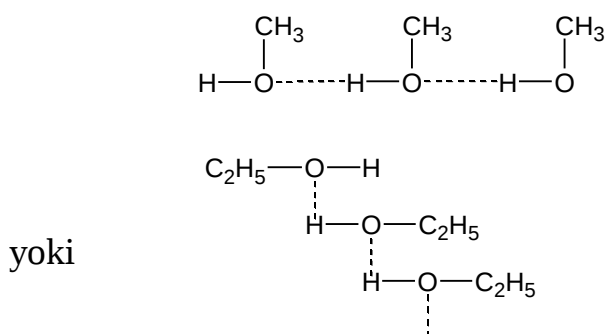
Suyuqlanish harorati esa aksincha:

Birlamchi < ikkilamchi < uchlamchi

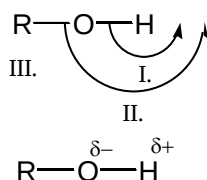
Molekulyar massaning oshishi bilan qaynash haroratlari ham oshib boradi. v) propil spirtiga bo'lgan vakillari suvda eriydi (CH_3OH va C_2H_5OH suv bilan istalgan nisbatda aralashadi) qolganlarida eruvchanlik kamayib boradi va yuqori vakillari suvda umuman erimaydi. Uchlamchi spirtlar odatda yaxshiroq eriydi. g) spirtlarning pastki vakillari o'ziga xos hidga ega, o'rta vakillari noxush yoqimsiz hidga ega, yuqori vakillari esa hidsiz moddalar. Spirtlarning barcha vakillarining solishtirma og'irligi birdan kichik bo'lib, ular suvdan engil.

Spirtlar molekulalari orasida vodorod bog'lanish bo'lib, shuning hisobiga ular efirlarga nisbatan yuqori qaynash haroratiga ega. Radikaldagi vodorod atomlari vodorod bog'lanish hosil qilish qobiliyatiga ega emas. Spirtlar molekulasida

vodorod bog‘lanish borligi tufayli ularning barchasi suyuqliklar yoki qattiq moddalardir. Vodorod bog‘lanish energiyasi oddiy bog‘lanish energiyasidan kam bo‘lib, spirtlar qaynaganda vodorod bog‘lanish uziladi.



Kimyoviy xossalari. Spirtlar uglevodorod radikali va gidroksil guruhidan tashkil topgan.



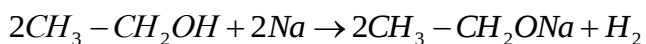
I.Spirtlar gidroksil guruhidagi vodorod atomi hisobiga *Na, K, Al, Zn, Mg* kabi metallari bilan reaksiyaga kirishadi.

II.Spirtlar gidroksil guruhi hisobiga reaksiyaga kirishadi.

III.Radikaldagi vodorod atomi hisobiga reaksiya boradi.

IV.Spirtlarning oksidlanish reaksiyalari.

I. 1.Alkagolyatlarni hosil bo‘lishi:



Spirtlar neytral moddalar bo‘lib, spirt gidroksilidagi vodorod atomining harakatchan bo‘lishiga va metallar bilan almashinish reaksiyasiga kirishiga sabab elektronomanfiyligi katta bo‘lgan element kislorod bilan bog‘langanligidir. Ya’ni kislorod o‘rtadagi elektron zichlikni kuchli darajada o‘ziga tortadi, natijada vodorod proton ko‘rinishida uziladi. Alkagolyatlarni hosil bo‘lishida spirtlar kuchsiz kislota rolini bajaradi. Alkagolyatlar qattiq moddalar bo‘lib oson gidrolizlanadi.



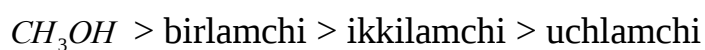
Ishqoriy metallardan hosil bo'lgan alkagolyatlar $NaOH$ va KOH larga nisbatan kuchli asoslik xususiyatiga ega bo'lgan moddalardir.

Spirtlar suv bilan solishtirilganda suvdan ham kuchsiz kislotalik xususiyatiga ega ekan.

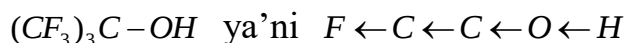
$$K_a(H_2O) = 10^{-16} \quad \text{spirlarniki} \quad K_a = 10^{-18}$$

Spirtlarning ichida kislotaliligi kuchliroq ifodalangani metanol bo'lib $K_a(CH_3OH) = 10^{-17}$.

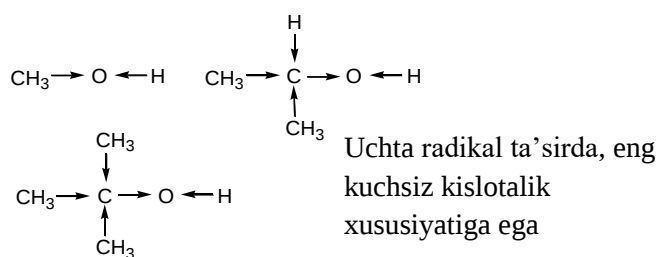
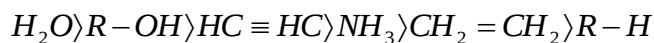
Vodorodni proton holida ajralib chiqishi va kislotalik xususiyatini quyidagi qatorda ifodalanadi:



Agar spirt radikalida elektronomanfiyligi kattaroq element joylashgan bo'lsa, uning kislotalik xossasi kuchliroq bo'lib u karbonat kislotani uning tuzlaridan siqib chiqarishi mumkin.



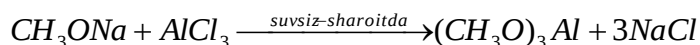
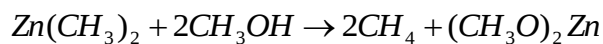
O'rganilgan organik birikmalarning kislotalik xossalari solishtirilganda ularni quyidagicha joylashtirish mumkin:



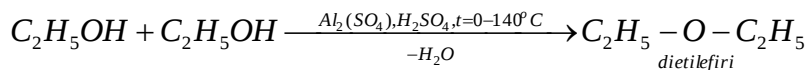
Alkagolyatlar.

CH_3ONa natriy metilati yoki natriy metoksidi.

CH_3-CH_2-ONa natriy etilati yoki natriy etoksid.

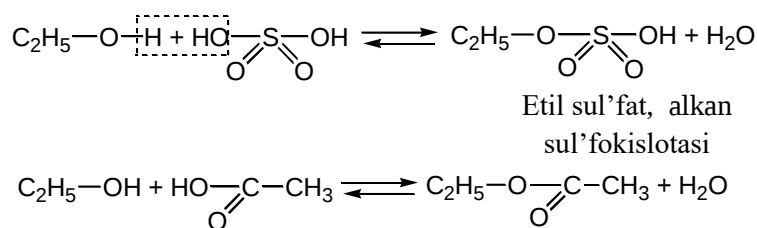


2.Oddiy efirlarning hosil bo'lishi:



Molekulalararo degidratlanish reaksiyasi.

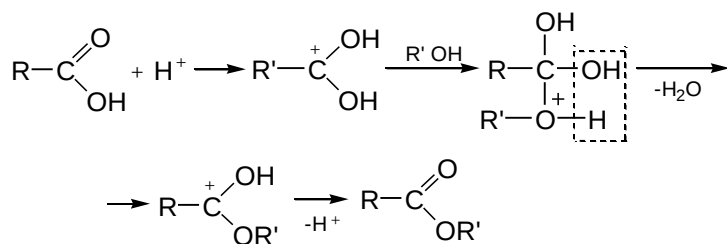
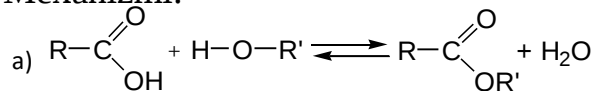
3.Murakkab efirlarning hosil bo'lishi. Spirt gidroksilidagi vodorod atomini organik yoki mineral kislota qoldig'iga almashinishi:



Sirka kislotasini etil firi yoki etil asetat

Spirt va kislota o'rtasida murakkab efir hosil bo'lishi bilan boradigan reaksiyaga eterefikasiya yoki efirlanish reaksiyasi deb ataladi.

Mexanizmi:



b)

Karboniy ioni

Oksoniy ioni

Karboniy ioni \

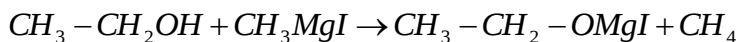
Eterefikasiya reaksiyasini mahsulot hosil bo'lish tomoniga ya'ni o'ng tomonga borishini tezlatish uchun quyidagi talablar amalga oshiriladi:

a) suv haydaladi (agar hosil bo'lgan efirning t_{qay} dan suvning t_{qay} past bo'lsa).

b) efir haydaladi (agar hosil bo'lgan efirning t_{qay} suvning t_{qay} dan past bo'lsa).

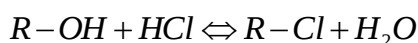
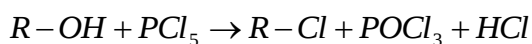
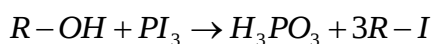
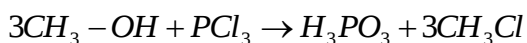
v) reaksiyaga kirishayotgan kislota yoki spirtning birortasini konsentrasiyasi ko‘proq olinadi.

4. Magniyorganik birikmalarni hosil qilish. Spirtlarga magniy galogenalkillar ta’sir ettirilsa to‘yingan uglevodorodlar ajralib chiqadi.



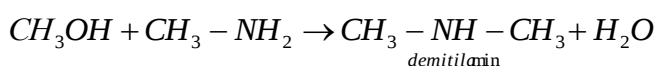
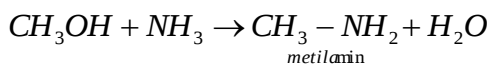
II. Spirt gidrosilining reaksiyalari. Spirtlardagi gidroksil guruhi dissosiasiyalanmaydi, lakmus qog‘ozi rangini o‘zgartirmaydi ya’ni neytral. Lekin ayrim kimyoviy reaksiyalarda gidroksil guruhi to‘lig‘icha almashinadi yoki ajralib chiqadi.

1. Spirtlarga fosfor galogenidlarining ta’siri:

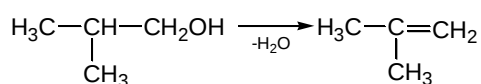
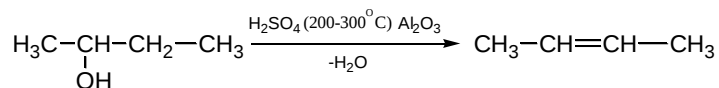


Oxirgi reaksiya (H_2SO_4) suvni tortib oluvchi agent ishtirokida boradi.

2. Spirtlarga ammiakning ta’siri :



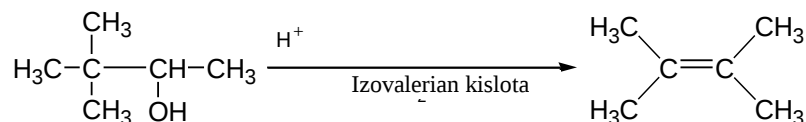
3. Gidroksil guruhini va qo‘shni vodorod atomini ajralishi yoki ichki molekulyar degidratlanish reaksiyasi, etilen qatori uglevodorodlarini hosil bo‘lishi bilan boradi. degidratlanish reaksiyalari suvni tortib oluvchi agentlar ishtirokida boradi. Bu reaksiyalar Zaysev qoidasiga binoan amalga oshadi. Bunda vodorod atomi kamroq gidrogenlangan uglerod atomidan ajraladi. Misol,



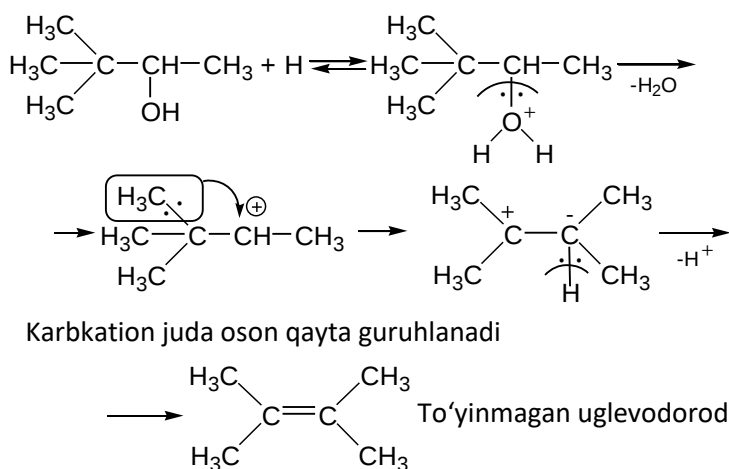
Degidratlanish reaksiyalari uchlamchi spirtlarda osonroq boradi yoki buni quyidagicha deb qaraymiz:

Uchlamchi > ikkilamchi > birlamchi

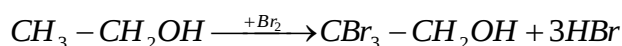
Retropinakolin qaytaguruhlanishi.



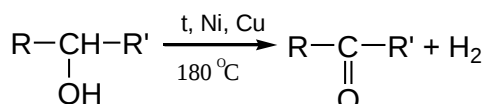
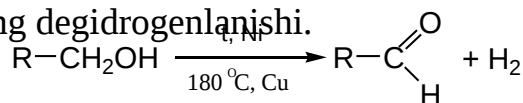
Mexanizmi:



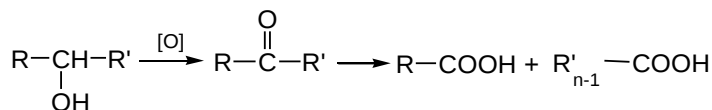
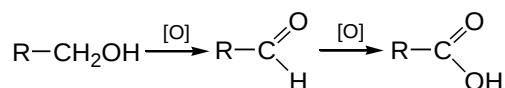
III. Spirtlar radikalidagi vodorodning reaksiyasi:



Spirtlarning degidrogenlanishi.



IV. Spirtlarning oksidlanishi. Oksidlovchi vosita sifatida xromli aralashma ($\text{H}_2\text{SO}_{4(\kappa)} + \text{K}_2\text{Cr}_2\text{O}_7$) yoki ($\text{KMnO}_4 + \text{H}_2\text{SO}_4$) aralashmalaridan foydalaniladi.



Uglerod-uglerod bog'lari uziladi. Uchlamchi spirtlar juda qiyin oksidlanadi. Sababi oksidlanishga uchraydigan vodorod atomi

Ishlatilishi. Metil spirtidan formaldegid, metilxlorid, metilamin, dimetilamin, bo‘yoqlar, dorivor preparatlar, xushbo‘y moddalar olishda, undan tashqari erituvchi sifatida ham lak-bo‘yoq, neftni qayta ishlash sanoatida, benzinni merkaptanlardan tozalashda ishlatiladi. Metil spirti zaharli. Etil spirti asosan erituvchi sifatida ishlatiladi. Etil spirti metil spirt va qo‘lansa hidli moddalar qo‘shib dinaturatlanadi. So‘ngra undan sirka aldegid, sirka kislota, xloroform, dietil efirlarini olishda xom ashyo sifatida foydalaniladi.

Bir atomli to‘yinmagan spirtlar

To‘yinmagan uglevodorodlardagi vodorod atomining o‘rniga gidroksil guruhining almashinishidan hosil bo‘lgan birikmalarga *tuyinmagan spirtlar* deyiladi.

Umumiy formulasi $C_nH_{2n-1}OH$. Etilen qatori to‘yinmagan spirtlari uchta guruhga bo‘linadi:

1. $CH_2=CH-OH$ vinil spirti. Gidroksil guruh qo‘sh bog‘ yonidagi uglerod atomiga birikkan.

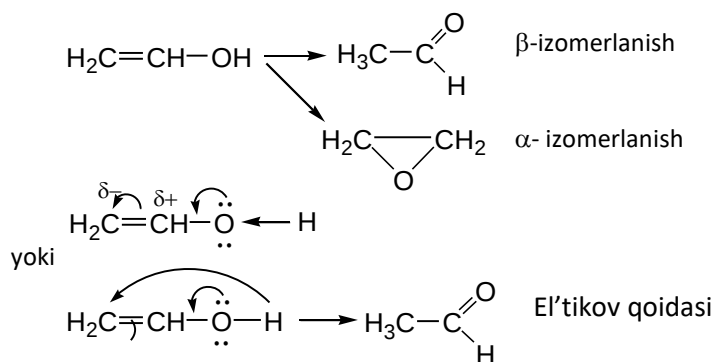
2. Gidroksil guruh qo‘sh bog‘ yonidagi atomga yondoshgan uglerodga birikkan, masalan;

$CH_2=CH-CH_2OH$ allil spirti.

3. Gidroksil guruh qo‘sh bog‘dan uzoqda joylashgan uglerod atomiga birikkan, masalan;

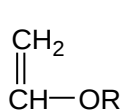
$CH_2=CH-CH_2-CH_2-OH$

1. Birinchi guruh spirtlari beqaror birikmalar, ular erkin holda uchramaydi, ularni *enollar* deyiladi. Bu xil spirtlar darhol izomerlanib qoladi:

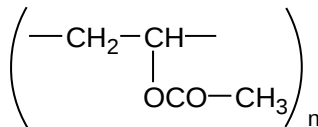


Vinil spirti erkin holda mavjud

bo'la olmaydi. Lekin uning efirlari mavjud.

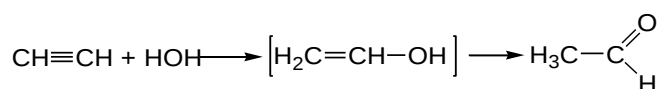


Vinil efiri

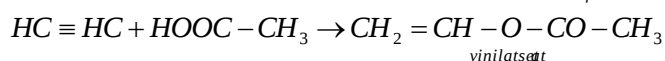
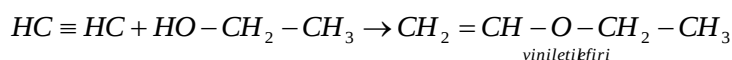


polivinil asetat

Vinil spirti hosilalari Kucherov reaksiyasi bo'yicha olinadi:



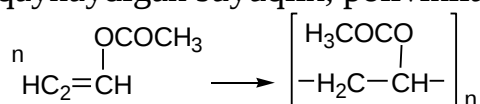
Agar suv o'rniga spirt olinsa vinil efiri hosil bo'ladi (Favorskiy reaksiyasi):



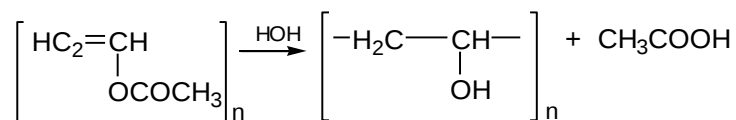
Sanoatda vinilasetatni xuddi shu usulda 100-120°S da ZnSO_4 , CaSO_4 , $(\text{CH}_3\text{COO})_2\text{Zn}$ katalizatorligida olinadi.

Vinil spirtining oddiy va murakkab efirlari oziq-ovqat sanoatida, tibbiyotda, plastmassalar va sintetik tolalar olishda muhim xom ashyo hisoblanadi.

Vinilasetat 73°S da qaynaydigan suyuqlik, polivinilasetat esa qattiq polimerdir:



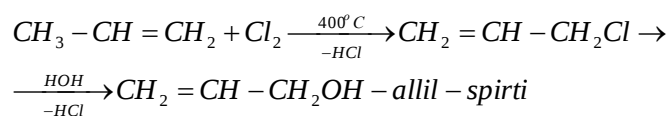
Bu ishqor yoki kislotada gidrolizlanganda polivinilspirt hosil bo'ladi:



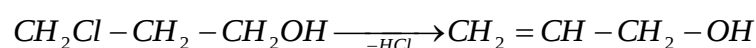
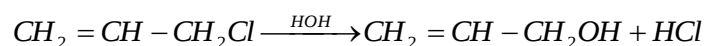
Polivinil spirt oddiy sharoitda qattiq shishasimon polimer 90°S da yumshaydi, suvda eriydi.

2.Allil spirti. Allil spirti ancha barqaror modda bo‘lib, tabiatda sof holda efirlar tarkibida uchraydi va ana shulardan ajratib olinadi.

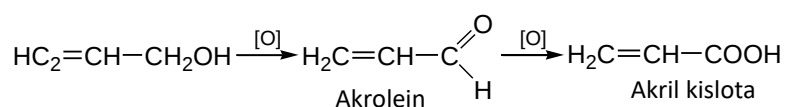
Sanoatda propilendan olinadi:



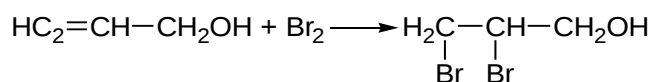
Laboratoriya sharoitida esa tarkibida qo‘sh bog‘ va galogenli uglevodorodlardan yoki galogen va gidroksil guruhli birikmalardan olinadi:



Allil spirti kimyoviy jihatdan to‘yinmagan uglevodorodlarga va spirtlarga o‘xshab reaksiyalarga kirishadi. Masalan, spirtlarga xos reaksiyasi:

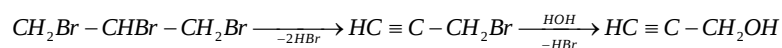


To‘yinmagan uglevodorodlarga xos reaksiyalari:

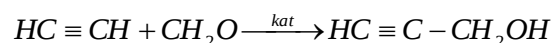


Allil spirtidan texnikada gliserin olinadi.

Propargil spirt. Molekulasida uchbog‘ tutgan to‘yinmagan spirt propargil spirti laboratoriyada gliserin tribromiddan olinadi:

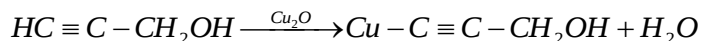
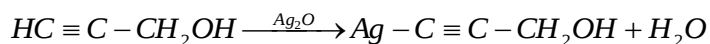


Sanoatda esa asetilenga formaldegid ta’sir ettirib olinadi:



Propargil spirti 114°S da qaynaydi, qo‘lansa hidli, rangsiz suyuqlik bo‘lib, kimyoviy xossalari jihatidan asetilen qatori uglevodorodlariga va birlamchi spirtlarga xos hamma reaksiyalarga kirishadi.

Masalan;



Propargil spirti, allil spirti, gliserin va divinilni olishda ishlatiladi.

KO'P ATOMLI SPIRTLAR

Molekulasida ikki va undan ortiq gidroksil guruhlari bo'lgan birikmalar *ko'p atomli spirtlar* deyiladi. Ko'p atomli spirtlarning molekulasidagi gidroksil guruhlar turli uglerod atomiga bog'langan bo'ladi.

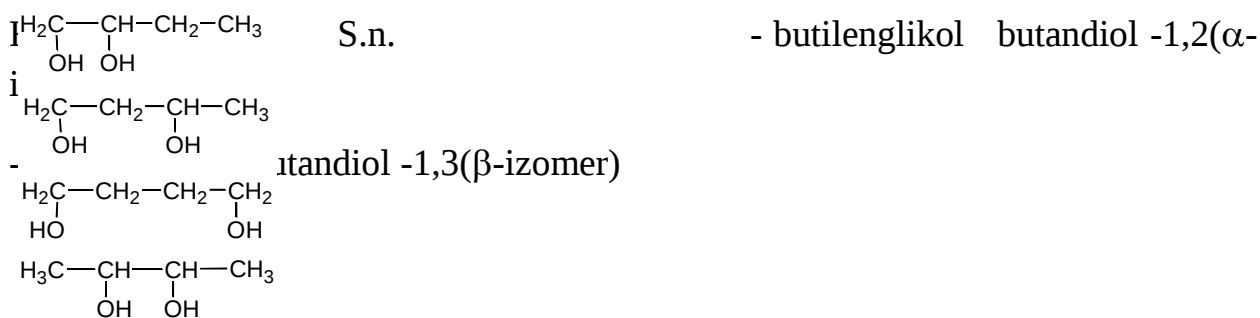
Agar bir uglerod atomiga bir necha gidroksil guruh birikkan bo'lsa, ular barqaror emas, u holda undan suv molekulasi ajralib chiqishi natijasida aldegid, keton va kislotalar hosil bo'ladi.

Ikki atomli spirtlar (glikollar yoki diollar). Bular har bir uglerod atomiga bittadan gidroksil guruh saqlagan birikmalardir.

Izomerlari va nomenklaturasi.

Sistematik nomenklaturaga ko'ra ularga "*diol*" so'zi qo'shib va shu gidroksil guruh qaysi uglerod atomiga turganligini ko'rsatib aytiladi.

Butandiolning oltita izomeri bor:



- butilenglikol butandiol -1,4(γ-izomer)

- butilenglikol butandiol-2,3 (α-izomer)

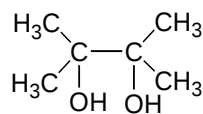


$$\begin{array}{c} \text{H}_2\text{C}-\text{CH}-\text{CH}_2\text{OH} \\ | \quad | \\ \text{HO} \quad \text{CH}_3 \end{array}$$
 - butilenglikol 2-etilpropandiol-1,3

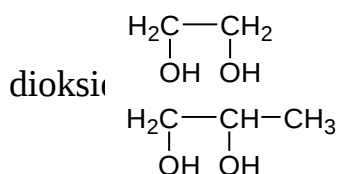
(β-izomer)

Glikollar gidroksil guruhlarining joylashishiga qarab α , β , γ holatlarda bo'ladi.

Glikollarning ikkilamchi va uchlamchi birikmalari ham bo'lishi mumkin. Bunda ikkita gidroksil guruh qo'shni uglerod atomida joylashgan bo'ladi.

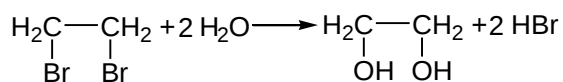


Ular pinakollar deb ataladi. Ayrim hollarda ikki atomli spirtlarni dioksi birikmalar deb ham atashadi. Masalan;

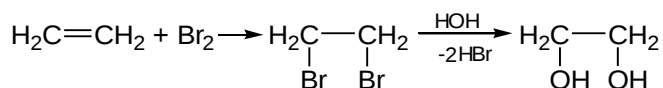


- 1,2-dioksiopropanb Olinishi. Bir atomli spirtlarni olinish usullaridan ikki atomli spirtlarni olishda ham foydalaniladi.

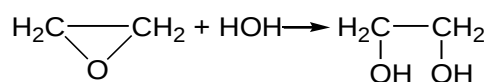
1.Uglevodorodlarning digalogenli hosilalarini gidrolizlab olinadi:



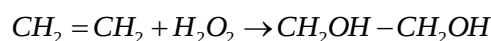
Sanoatda etilendan etilenglikol olinadi, buning uchun oldin etilenning digalogenli hosilasi olinadi, keyin u gidrolizlanadi, ya'ni

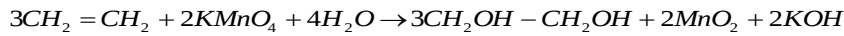


2.Epoksidlarga suv biriktirib (gidratlab) olinadi: (misol, etilen oksiddan).

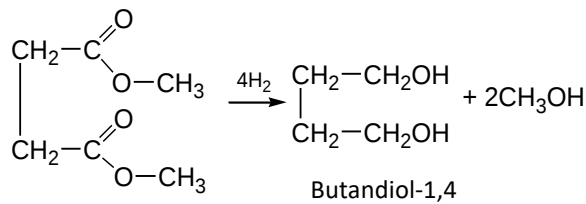


3.To'yinmagan uglevodorodlarga CrO_3 katalizatorligida oksidlovchilar vodorod peroksid, kaliy permanganat ta'sir ettirib olinadi (Vagner reaksiyasi):

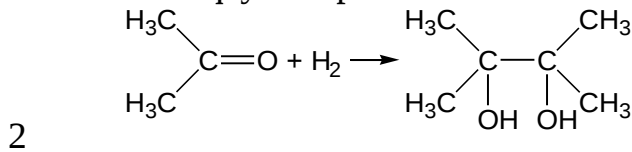




4. Dikarbon kislotalarning murakkab efirlarini katalizatorlar ishtirokida qaytarib olinadi:



5. Ketonlarni qaytarib pinakonlar olinadi:



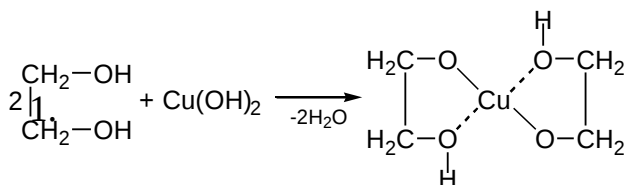
2

Fizikaviy xossalari. Glikollar rangsiz, hidsiz moddalar bo'lib, pastki vakillari suyuqliklar, yuqori vakillari esa qattiq kristall moddalardir. Ikki atomli spirtlar (etilenglikol) zaharli bo'lib, suvda yaxshi eriydi. Bular suvdan og'ir bo'lib, bir atomli spirtlarga nisbatan yuqoriroq haroratda qaynaydi. Masalan, etilenglikol $t_{\text{qay.}}=197,2^\circ\text{S}$ da, etil spirti esa $78,3^\circ\text{S}$ da qaynaydi.

Kimyoviy xossalari. Glikollar bir atomli spirtlarga xos barcha reaksiyalarga kirishadi. Glikollar bitta gidroksil guruhi hisobiga yoki ikkala gidroksil guruhi hisobiga reaksiyalarga kirishadi.

Glikollarda kislotalik xossasi bir atomli spirtlarga nisbatan kuchliroq ifodalangan. Ular shuning uchun ham og'ir metallarning gidroksidlari bilan reaksiyaga kirishib rangli kompleks birikmalar hosil qiladi.

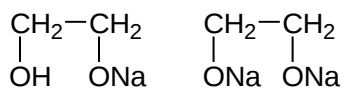
Bu ular uchun sifat reaksiyasidir.



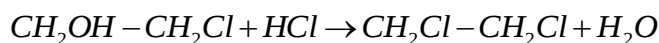
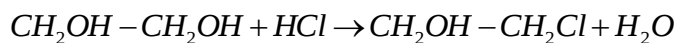
Mis glikolyati (havorangli kompleks birikma).

Bu birikmada mis atomi ortiqcha valentliklari bilan bog'langan bo'lib bunday ichki molekulyar (metallar bilan) bog'lanishli rangli birikmalar *xelatlar* deyiladi.

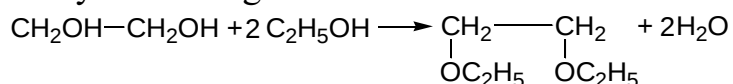
Glikollar ishqoriy metallar bilan to'liq va yarim glikolyatlarni hosil qiladi:



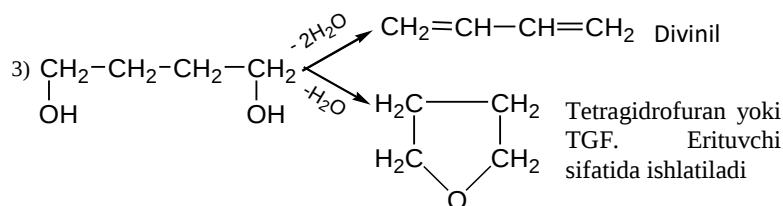
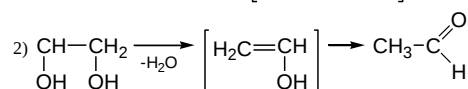
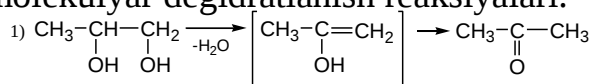
3. Galogenli birikmalarni hosil bo'lishi:



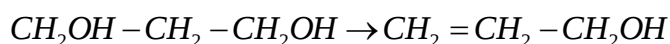
4. Oddiy efirlarning hosil bo'lishi:



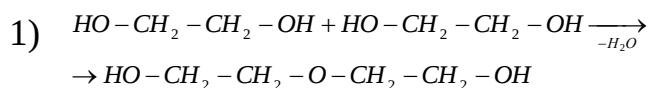
5. Ichki molekulyar degidratlanish reaksiyalari.



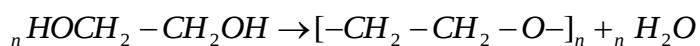
4) Agar β -glikol bo'lsa to'yinmagan spirt hosil bo'ladi:



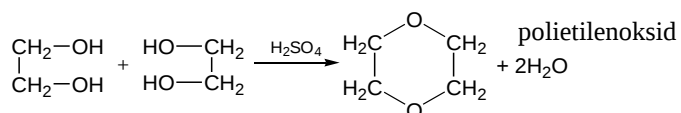
Molekulalararo degidratlanish reaksiyalari.



bu reaksiya yana davom etishi mumkin va polimer modda hosil bo'ladi:

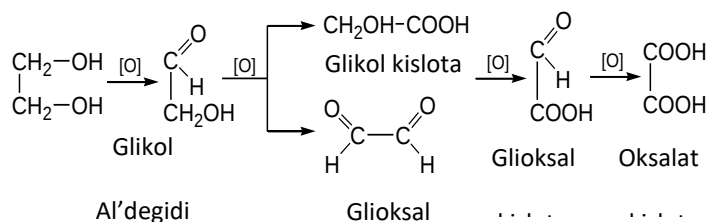


2) Favorskiy reaksiyasi:

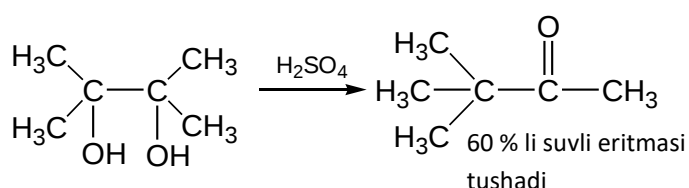


Dioksan-siklik efir erituvchi sifatida ishlatiladi.

6.Oksidlash reaksiyasi:



7.Pinakolin qaytaguruhlanishi. Ikki atomli uchlamchi spirt – pinakon (2,3-dimetilbutandiol-2,3) sulfat kislota ishtirokida qayta guruhlanadi va keton - pinakolin hosil bo‘ladi:



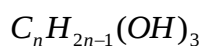
Ishlatilishi. Etilenglikoldan “antifrizlar” ya’ni past haroratda ham muzlamaydigan suyuqlik sifatida foydalaniladi. Antifrizlardan motorlarni sovitishda, etilenglikolning dinitratidan esa portlovchi modda sifatida, TGF, dioksanlardan erituvchi sifatida foydalaniladi.

Etilenglikol bundan tashqari polimer moddalar olishda, lak-bo‘yoq tayyorlashda va sintetik tola “lavsan” olishda ishlatiladi.

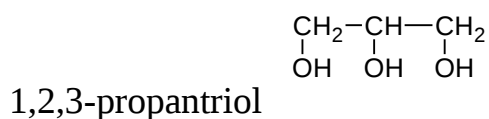
Uch atomli spirtlar

(gliserinlar yoki triollar)

Uch atomli spirtlarda uchta uglerod atomiga uchta gidroksil guruhi birikkan bo‘ladi, ularning umumiy formulasi:



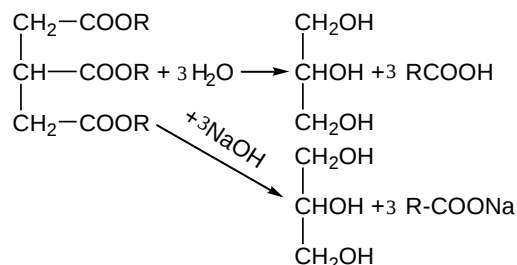
Ular Jeneva nomenklaturasiga ko‘ra triollar deb ataladi, ularning birinchi vakili *gliserin* yoki *propantriol* deyiladi.



Buni birinchi marta Sheele (1879) yog‘ni qo‘rg‘oshin oksidi bilan qizdirib olgan.

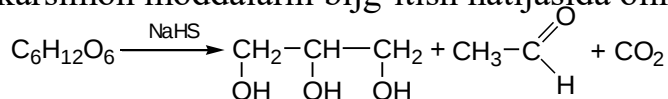
Izomeriyasi. Uch atomli spirtlarda ham izomeriya xuddi ikki atomli spirtlardagi singari, ya'ni uglevodorod zanjirining tuzilishiga va gidroksil guruhlarining joylashishiga bog'liq.

Olinishi. 1. Gliserin o'simlik yoki hayvon yog'larini kislotali yoki ishqoriy sharoitda gidrolizlash orqali olinadi:

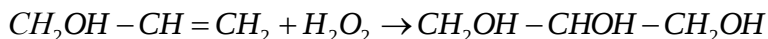


Agar $R = C_{17}H_{35}$ bo'lsa, ya'ni $C_{17}H_{35}COONa$ xo'jalik sovuni olinadi. Shuning uchun ishqoriy sharoitdagi gidrolizlanishni *sovunlanish* deb ham ataladi.

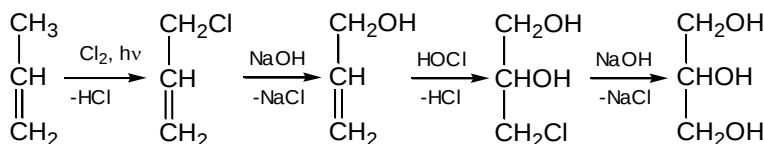
2. Shakarsimon moddalarni bijg'itish natijasida olinadi:



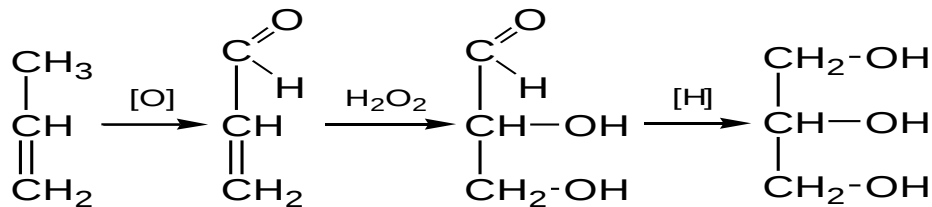
3. Allil spirtiga katalizator ishtirokida vodorod peroksid ta'sir ettirib gliserin olinadi:



4. Sintez usuli. Propilendan olinishi (Vilyams, 1947):



yoki bu jarayonni oksidlanish orqali ham amalga oshirish mumkin:

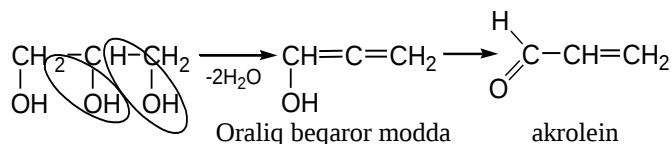


propilen akrolein gliserin aldegid

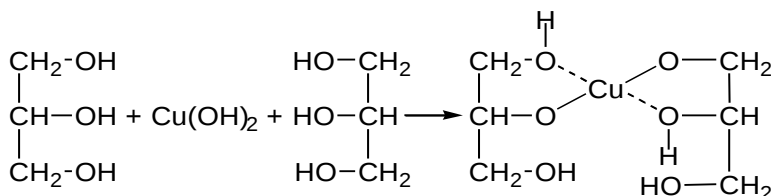
Fizikaviy xossalari. Gliserin rangsiz, quyuq suyuqlik bo'lib shirin ma'zaga ega. U oddiy sharoitda 290°S da qaynaydi, solishtirma og'irligi $d_{4}^{20}=1,260$. Suv va spirta yaxshi eriydi, efir va xloroformda erimaydi.

Kimyoviy xossalari. Uchta gidroksil guruhi hisobiga reaksiyalarga kirishadi uch qator tuzlar, efirlar hosil qiladi. Ko'p reaksiyalari bir atomli va ikki atomli spirtlarnikiga o'xshash.

1.Xarakterli reaksiyalaridan biri uni ochishda ishlatiladigan reaksiya akroleinning hosil bo'lishi. Bu reaksiya suvni tortib oluvchi agentlar ishtirokida boradi ($KHSO_4$, H_3BO_3 , $MgSO_4$):

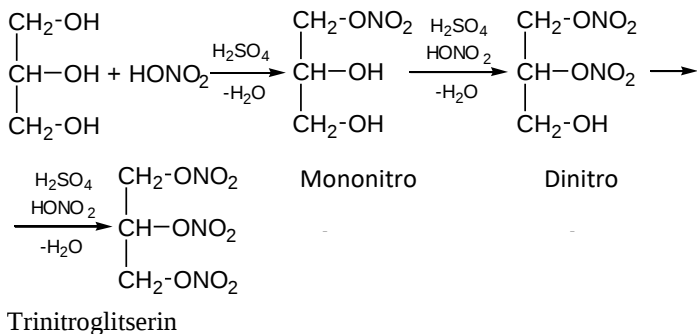


2.Gliserin ham kuchsiz kislotalik xususiyatiga ega bo'lib, ko'p atomli spirtlarga xos reaksiyaga, ya'ni og'ir metallarning gidroksidlari bilan reaksiyaga kirishadi:



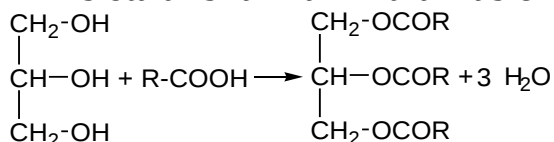
mis gliserati havo rangli cho'kma

3.Kislotalar ta'sirida protlovchi moddalar hosil qiladi:



Trinitrogliserin suvda erimaydi, organik erituvchilarda eriydi. U protlovchi modda bo'lib, undan dinamitlar tayyorlashda ishlatiladi. Nitrogliserinning 1 % li spirtidagi eritmasi tibbiyotda stenokardiya kasalligida qon tomirlarini kengaytiruvchi vosita sifatida ishlatiladi. Aslida trinitrogliserin bu gliserinning trinitrati bo'lib, murakkab efirdir, uni sanoatda ishlatilish jarayonida osonroq-qisqaroq nitrogliserin deb atashgan (noto'g'ri nomlanish).

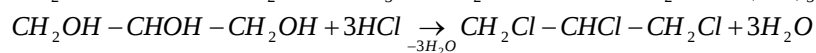
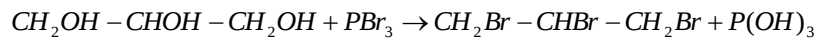
4.Organik kislotalar bilan ham murakkab efirlar hosil qiladi:



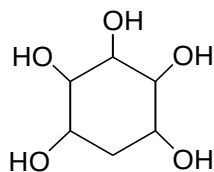
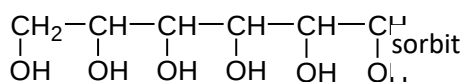
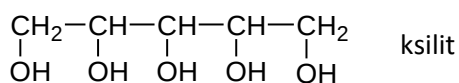
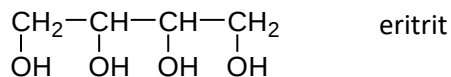
R – to‘yingan kislota qoldig‘i bo‘lsa C_{17} dan yuqorisi qattiq yog‘lar.

R – to‘yinmagan kislota qoldig‘i bo‘lsa suyuq moylar.

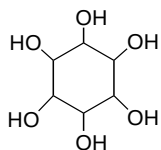
5.Fosfor galogenidlarining ta’siri:



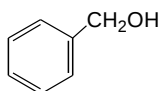
Ko‘p atomli spirtlarning boshqa vakillari:



Siklik efir kvertsit o‘simliklarning urug‘larida uchraydi.



Inozit. Qon mahsulotlari tarkibida, jigar, tuxumda bo‘ladi.



Aromatik benzil spirti. Efir moulari tarkibida uchraydi.

NAZORAT SAVOLLARI:

- 1.Bir atomli to‘yingan qator spirtlariga misollar keltiring va butanolning hamma izomerlarini yozib sistematik nomenklaturaga ko‘ra nomlang.
- 2.Birlamchi, ikkilamchi, uchlamchi spirtlarni olinishiga misollar keltiring va ularning fizikaviy, kimyoviy xossalarini solishtiring.
- 3.Spirt gidroksili hisobiga boradigan reaksiyalarga misollar keltiring.
- 4.Vinil spirti qanday xossalarga ega ?
- 5.To‘yinmagan bir atomli spirtlar to‘yingan qator spirtlaridan nima bilan farq qiladi ?