

**O'ZBEKISTON RESPUBLIKASI SOG'LIQNI SAQLASH
VAZIRLIGI**

TOSHKENT FARMATSEVTIKA INSTITUTI

Toksikologik, organik va biologik kimyo kafedrası

ORGANIK KIMYO FANIDAN

REFERAT

INDOL

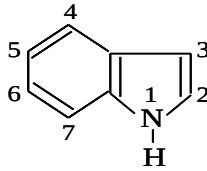
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Tekshirdi: kat.o'q. N.Chinibekova

Toshkent-2014

INDOL

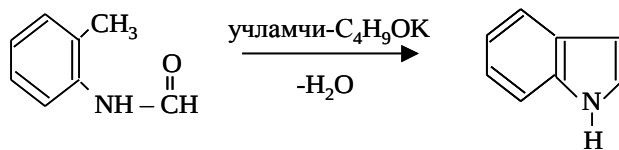
Indol jipslashgan geterosiklik birikmalarga misol bo'ladi.



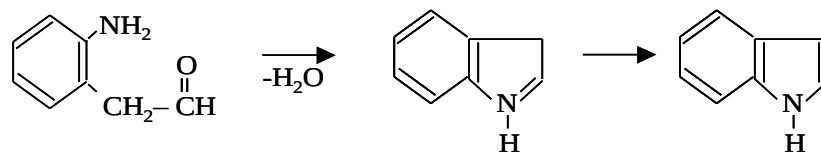
Indol birinchi marotaba 1886 yilda A. Bayer tomonidan oksiindolni rux kukuni bilan haydash orqali olingan. Toshko'mir smolasi tarkibida bo'ladi, u 52°C da suyuqlanadigan rangsiz, qo'lansa hidli, kristall modda.

Indolni asosan quyidagi usullar yordamida sintez qilib olish mumkin:

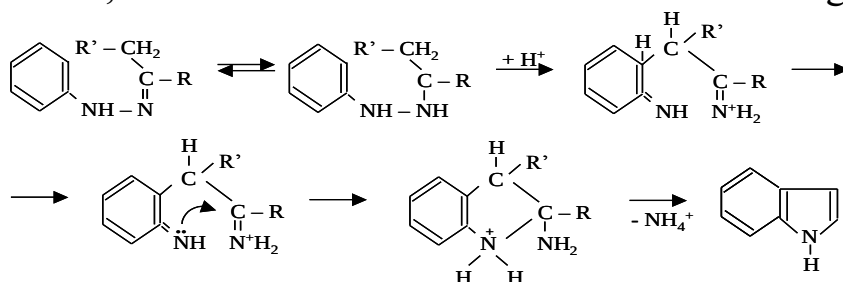
1. Formil-o-toluidinni ichki molekulyar jipslashtirish. Bu indol molekulasining tuzilishini isbotlashda muhim ahamiyat kasb etadi.



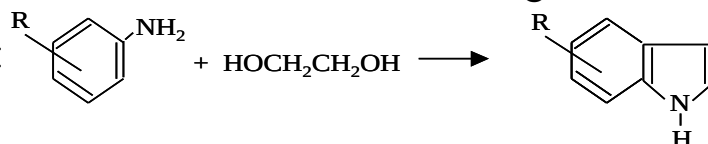
2. o-aminofenilatsetaldegidni ichki molekulyar jipslashtirish orqali ham indol olinadi:



3. Indol hosilalarining olishning keng tarqalgan usullaridan biri aldegid va ketonlarning fenilgidrozonlarini rux kukuni yoki sulfat kislota bilan qo'shib qizdirish hisoblanadi. Bu usul Fisher tomonidan kashf etilgan bo'lib, A.E. Arbuzov tomonidan takomillashtirilgan.

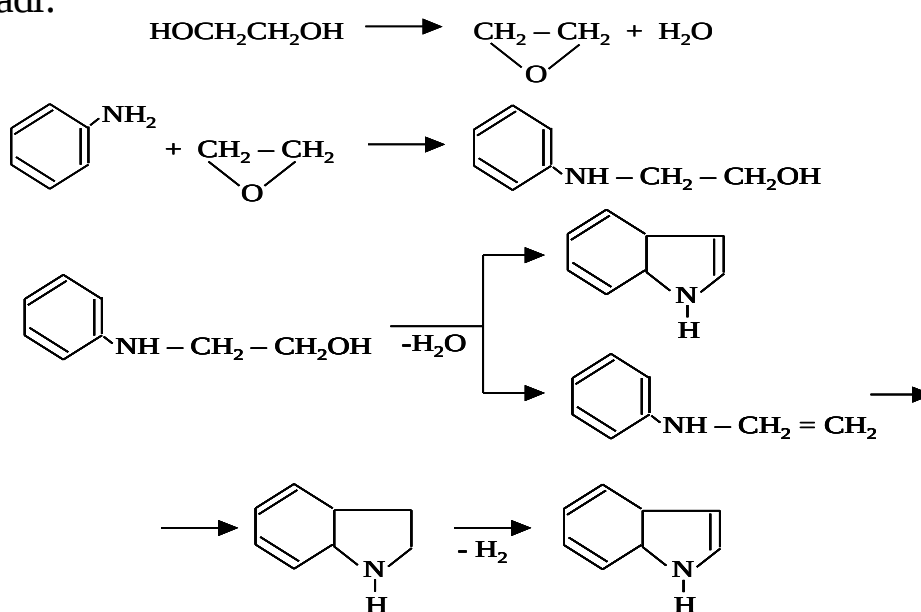


Keyingi yillarda adabiyotlarda indol va uning hosilalarini olishga bag'ishlangan qator yangi usullar paydo bo'ldi. Anilin va uning hosilalari glikollar yoki aminospirtlar bilan birgalikda yuqori haroratda (400-500⁰C) katalizatorlar ustidan o'tkazilgan indol va uning hosilalari hosil bo'ladi:

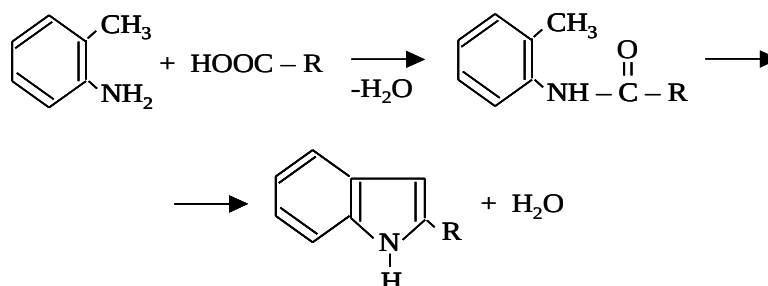


Bu yerda R = galogen, - OH, alkil, aril va boshqalar.

Bu reaksiyaning mexanizmini o'rganish natijasida indol bir necha bosqichda hosil bo'lishligi isbotlandi. Reaksiya quyidagi bosqichlar orqali boradi:



2-alkilindollar o-toluidin va bir asosli karbon kislotalarni yuqori haroratda (400-500⁰C) katalizatorlar ustidan o'tkazilganda yaxshi unum bilan hosil bo'ladi (D.Yusupov va boshqalar).

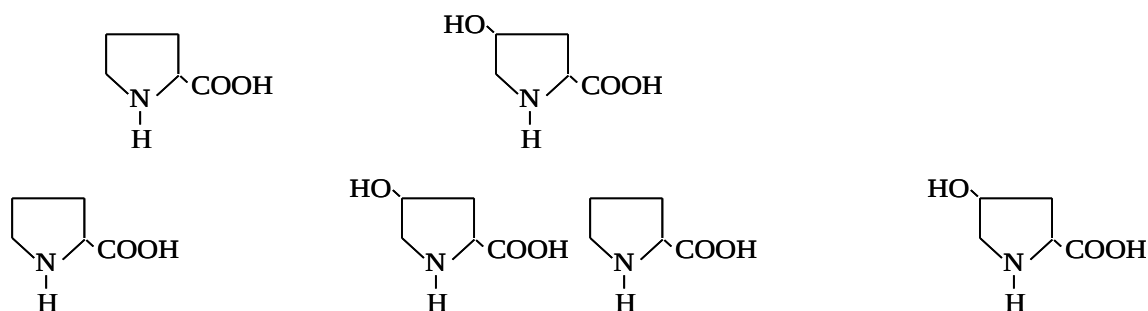


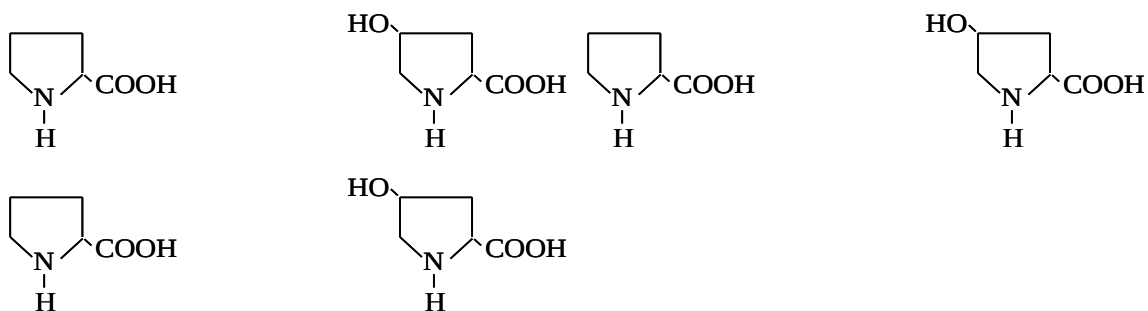
Bu yerda $\text{R} = \text{CH}_3$; $-\text{C}_2\text{H}_5$; $-\text{C}_3\text{H}_7$, va boshqalar.

Indol va skatol (3-metilindol, suyuqlanish harorati 95⁰C) oqsil moddalarning chirishi natijasida hosil bo'ladilar. Har ikkisi ham o'ta qo'lansa hidga ega. Indol juda oz miqdorda erituvchilarga qo'shilganda gul hidini beradi. U jasmin va apelsin gullari tarkibida uchraydi.

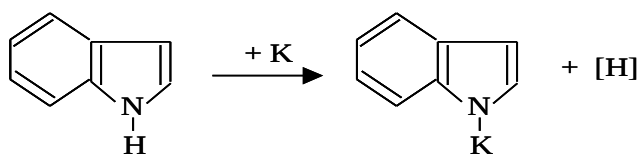
Indolning kimyoviy xossalari pirrolnikiga o'xshash. Indol pirrolga o'xshash kuchsiz asos xossasiga ega. Shuning bilan birga, u fenolning xossalarini takrorlaydi (kuchsiz kislota).

Kislotalar ta'sirida polimerlanib ketadi. Pirrolga o'xshash xlorid kislota bilan namlangan qarag'ay tayoqchani qizil rangga bo'yaydi (Erlix reaksiyasi).



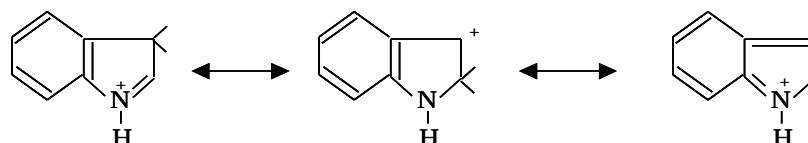


Kimyoviy xossalari. 1. Indol kaliy yoki natriy bilan indol kaliy yoki indol natriyni hosil qiladi:



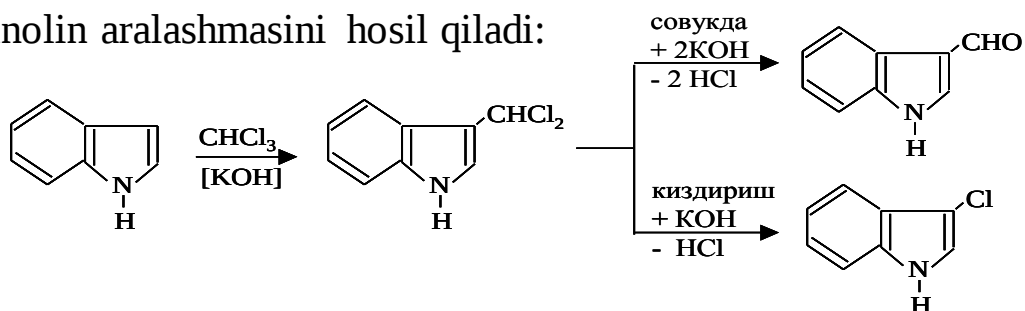
2. Elektrofil almashinish reaksiyalari vaqtida o'rinbosarlar asosan 3– holatdagi vodorod bilan almashinadilar. Agar 3–holat band bo'lsa u holda almashinish 2 – holatdagi vodorodlar hisobiga boradi.

3– holatda almashish oson borishiga sabab, uning barqarorlik rezonansi benzol halqasidagi tutashishning yuqolishiga olib kelmaydi.

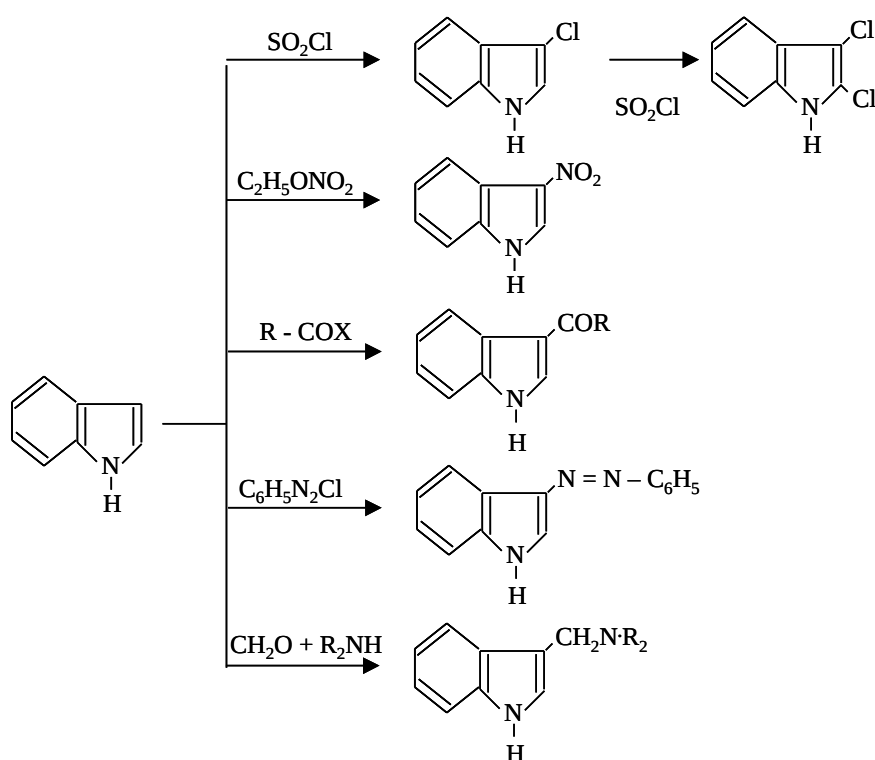


Indol platina katalizatori ishtirokida vodorod bilan qaytarilganda 2,3-digidroindol hosil bo'ladi.

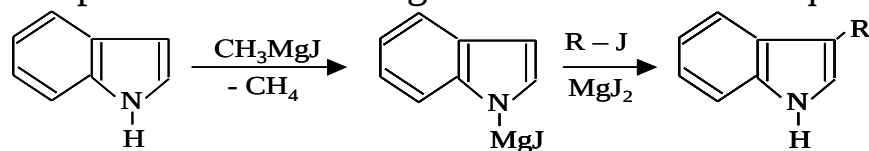
Indol xloroform bilan ishqor ishtirokida 3-indolkarbaldegid va 3-xlorxinolin aralashmasini hosil qiladi:



Indolni faqat sulfuril xlorid bilan galogenlash mumkin. U etilnitrit bilan nitrolanganda 3-nitroindol hosil bo'ladi. Indol sulfat angidridning piridin bilan hosil qilgan kompleksi bilan sulfolanganda indol 3-sulfokislota hosil bo'ladi. Asiklik azoqushish va boshqa reaksiyalar ham 3 - holatdagi vodorod hisobiga boradi. Quyida indol halqasidagi elektrofil almashinish reaksiyalariga ayrim misollar keltirilgan.

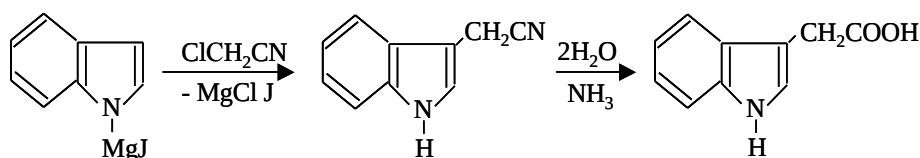


Indol ham pirrol kabi metallorganik birikmalar hosil qiladi:

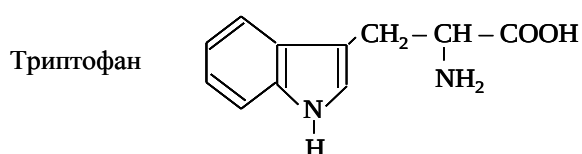


Indolilkarbon kislotalar. Indolilkarbon kislotalar muhim biologik aktiv birikmalar bo'lib, ular Fisher usuli bo'yicha ketono yoki aldegidokislotalar fenilgidrozonlarini rux xloridi bilan qizdirish orqali hosil qilinadi. Indolilkarbon kislotalar qattik moddalar bo'lib va indol hosilalariga oson parchalanadilar.

Indolilkarbon kislotalar orasida 3-indolilsirka kislota (gereroauksin) va triptofan 3-(3' - indol) – 2 –amiopropion kislota ahamiyati katta. Indolil sirka kislota indolilatsetonitrilni gidrolizlab olinishi mumkin:

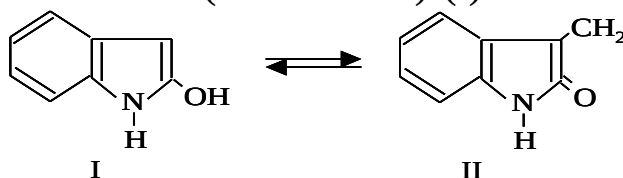


Indolilsirka kislota o'simliklarni o'sishiga yordam beruvchi garmon hisoblanadi.

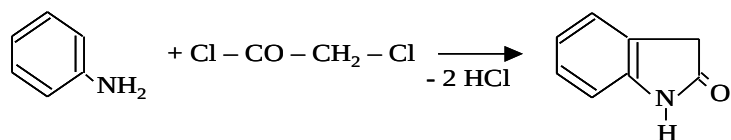


Triptofan almashtirib bo'lmaydigan aminokislotalar jumlasiga kiradi va ko'pchilik oqsillar tarkibida uchraydi. Oqsilning chirishi natijasida undan indolning barcha hosilalari hosil bo'ladi:

Oksiindollar. 2-oksiindol (α -oksiindol) (I)

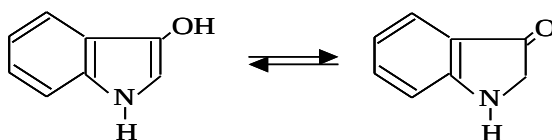


o-aminofenilsirka kislotaning laktani (II) bilan tautomer shaklda mavjud bo'ladi. 2-oksindol o-aminofenilsirka kislotani mineral kislotalar bilan qo'shib qizdirish, izatinni qaytarish yoki anilinni xloratsetilxlorid bilan reaksiyasi yordamida olinishi mumkin:

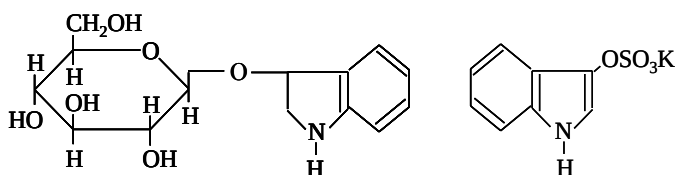


2-oksiindol rux bilan qo'shib qizdirilganda indolni hosil qiladi.

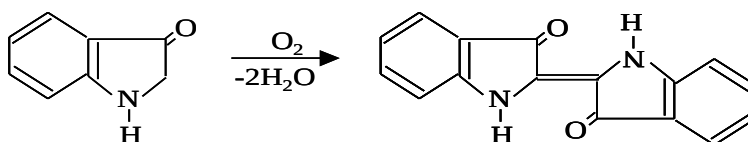
3-oksiindol (β - indoksil).



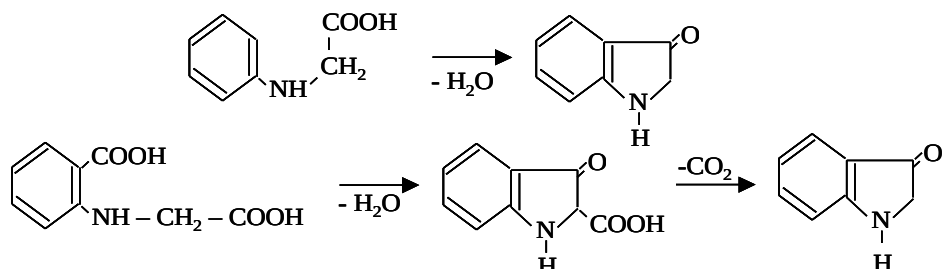
Indigotera turkumi o'simliklar tarkibida indikan ko'rinishida va odam peshobi tarkibida sulfat ko'rinishida uchraydi.



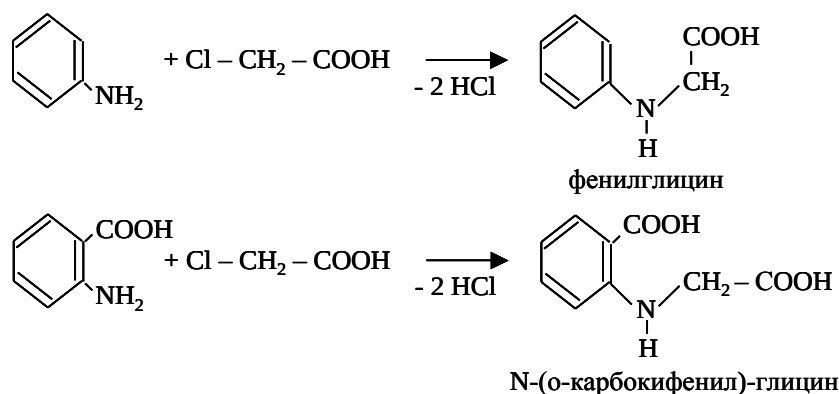
Indoksilning ishqoriy eritmaları havoda indigogacha oson oksidlanadi. Indoksil sanoatda indigo olish uchun yarim mahsulot hisoblanadi.



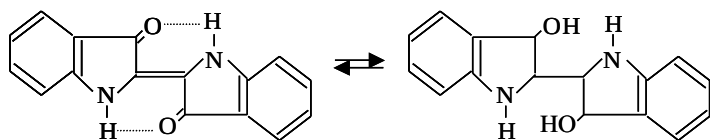
Indoksil va indigo olishning eng muhim usullaridan biri Geyman tomonidan taklif etilgan N – fenilglitsin (I) yoki N –(o-karboksifenil) glitsinni (II) ishqor bilan qo'shib qizdirish yo'li hisoblanadi:



N – fenilglitsinni anilin va xlor sirk kislotadan, N – (o-karboksifenil)-glitsinni esa antranil va xlor sirk kislotalardan olish mumkin:

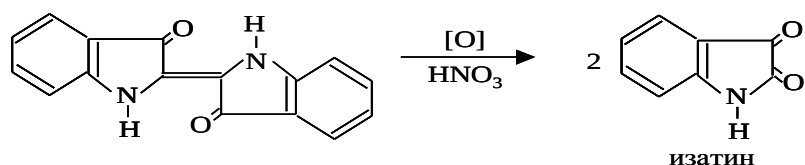


Indigo molekulasi bir tekislikda joylashgan va trans tuzilishga ega. Ko'k indigo 390⁰C da suyuqlanadi. U asosan erituvchilarda, kislota va ishqorlarda erimaydi. Indigoni bo'yagich sifatida ishlatish uchun u dastlab qaytariladi va oq indigoga aylantiriladi. Oq indigo bilan gazmol bo'yaladi. Bo'yalgan gazmol quritilish davomida undagi oq indigo oksidlanib ko'k indigoga aylanadi, bo'yashning bu turiga kub bo'yash deyiladi.

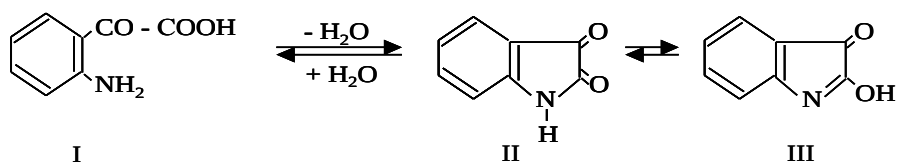


Sanoatda indigodan tashqari indigo karimin, tioindigo kabi bo'yagichlar keng ishlatiladi.

Indigo oksidlanganda izatinga aylanadi. Oksidlash azot yoki xrom kislotalari yordamida olib borilishi mumkin.



Izatin (II) to'q qizil rangli kristall modda. U o-aminofenilglioksil kislota (I) ning laktoni hisoblanadi. Ishqor qo'shib qizdirilganda o-aminofenilglioksil kislotani hosil qiladi.



Izatin asosan imid (III) shaklida mavjud bo'ladi.

Adabiyotlar ro'yxati

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