

Science Uzbekistan

INTERNATIONAL CONGRESS ON MODERN SCIENCES-IV

"Global Prospects for Multidisciplinary Research and Education"

CHIRCHIK STATE PEDAGOGICAL UNIVERSITY

April 08-10, 2025 / Chirchik, Uzbekistan



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PROCEEDINGS BOOK

Volume-3

Editors

Prof. Dr. Jabbor Usarov

Prof. Dr. Dostnazar Khimmataliev

Mutabar Meylieva

Kibrio Burieva

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Based on Order No. 490 of the Minister of Higher Education, Science and Innovation dated
December 27, 2024

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10.04.2025

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Tashkent Local Time: 16:00-18:00

Ankara Local Time: 14:00-16:00

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INTERNATIONAL

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IZONIKOTIN KISLOTANING -TOLUIDIN BILAN REAKTSIYASINI O'RGANISH

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ANNOTATSIYA

Ma'lumki, karbon kislotalarning aromatik aminlar bilan reaksiyalari natijasida xona haroratida to'rtlamchi ammoniy tuzlari hamda yuqori haroratda kislota amidlari sintez qilingan. Dastlab izonikotin kislota va m-toluidin bilan reaksiyasi natijasida m-toluidiniy izonikatinat to'rtlamchi ammoniy tuzi yuqori unum bilan sintez qilindi. Hamda yuqori temperaturada olib borilgan reaksiya natijasida N-(m-tolil)izonikotinamid sintez qilingan moddalarning tuzilishi zamonoviy fizik-kimyoviy tadqiqot usullari bilan tekshirildi.

Kalit so'zlar: m-toluidin, izonikotin kislota, amid, aromatik aminlar, m-toluidiniy izonikatinat, N-(m-tolil)izonikotinamid.

АННОТАЦИЯ

Как известно, в результате реакции карбоновых кислот с ароматическими аминами при комнатной температуре образуются четвертичные аммониевые соли, а при высокой температуре синтезируются амиды кислот. Впервые в результате реакции изоникотиновой кислоты с м-толуидином был синтезирован четвертичный аммониевый соль м-толуидиния изоникотината с высоким выходом. Кроме того, при проведении реакции при высокой температуре был синтезирован N-(м-толил)изоникотинамид, а строение полученных веществ было изучено с помощью современных физико-химических методов анализа.

Ключевые слова: м-толуидин, изоникотиновая кислота, amid, ароматические амины, м-толуидиний изоникотинат, N-(м-толил)изоникотинамид.

ABSTRACT

As is known, the reaction of carboxylic acids with aromatic amines at room temperature results in the formation of quaternary ammonium salts, while at high temperatures, acid amides are synthesized. For the first time, as a result of the reaction of isonicotinic acid with m-toluidine, the quaternary ammonium salt m-toluidinium isonicotinate was synthesized with a high yield. Moreover, when the reaction was

carried out at high temperatures, N-(m-tolyl)isonicotinamide was synthesized, and the structure of the obtained compounds was studied using modern physicochemical analysis methods.

Key words: m-toluidine, isonicotinic acid, amide, aromatic amines, m-toluidinium isonicotinate, N-(m-tolyl)isonicotinamide.

KIRISH

Aminlarni, xususan aromatik aminlarni karbon kislotalarning angidridlari va galogenangidridlari bilan N-atsillash (benzoillash) reaksiyalaridan yuqori unumlar bilan kislota amidlarini olish mumkinligi adabiyot ma'lumotlarini tahlildan ko'rish mumkin. Ammo, bugungi kunda har qanday murakkab tuzilishli organik moddani tayyor reagentlardan foydalangan holda qisqa vaqtda va kam bosqichli reaksiyalar orqali, sintez qilish yo'llarini topish kimyogarlar oldidagi muhim vazifalardan biri bo'lib turibdi. Ta'kidlash kerakki, kislota amidlarining sintezida ham mazkur jihatlarga alohida e'tibor qaratilmoqda. Natijada amidlar sintezida atsillovchi agentlar sifatida karbon kislotalarni to'g'ridan-to'g'ri qo'llash orqali yuqori unum bilan mahsulot sintez qilishning samarali usullari ishlab chiqilmoqda.

ADABIYOTLAR TAHLILI METODOLOGIYASI

Karbon kislotalarning aminlar bilan reaksiyalarini o'rganish bilan bog'liq izlanishlarning natijalari reaksiyalarning oraliq protonlangan to'rtlamchi ammoniy tuzlari hosil bo'lishi bilan borishi, ma'lum sharoitda qizdirilganda esa kondensatlanishi natijasida kislota amidlari hosil bo'lishini ko'rsatadi [1;4-8, 2; 371-379 b., 3; 194-197 b.,].

Triftoimetil guruhi saqlagan anion xolatidagi aromatik birikmalardan yangi uchlamchi amidlar sintez qilingan. Anion holatidagi aktiv triftoimetil guruh saqlagan birikmalar uchlamchi amidlarni sintez qilish uchun suvli sharoitda ikkilamchi aminlar bilan reaksiyaga kirishgan va 99% unum bilan uchlamchi amidni sintez qilingan [4; 2024-2027 b.]:

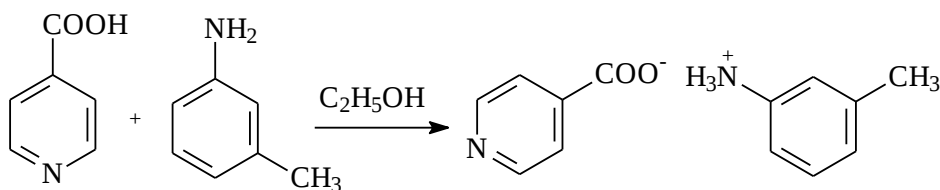
Xitoylik bir guruh olimlar ham kislota asosli kondensatlanish reaksiyalari orqali bor kislotalaridan kislota amidlarini olishda muvaffaqiyatli natijalarni ko'rsatishgan. Ularning dastlabki urinishlari asosida, 4-fenilbutan kislotasini benzilamin bilan 91% unumda, n-benzil-4-fenilbutiramid sintez qilishgan [5; 262-272 b.]:

Amid bog'li birikmalar orasida izoniazid mikrobiologik skriningi past kontsentratsiyalarda patogen bakteriyalarning ayrim shtammlariga nisbatan juda yuqori faolligi aniqlangan. So'ngra tuberkulyoz va sil kasali bo'lmagan mikobakteriyalarga qarshi istiqbolli antimikrobakterial xususiyatlari kuzatilgan [6; 20450-20462 b.]:

MUHOKAMA

Mazkur ish ham yuqorida ta'kidlab o'tilgan izlanishlarning davomi bo'lib, izonikotin kislotalaning m-toluidin bilan tuzlarini olishga bag'ishlangan. Tuz olish reaksiyalari reagentlarning 1:1 mol nisbatida xona xaroratida qutbli organik erituvchi etanolida olib borildi. Amin va izonikotin kislota alohida idishlarda qutbli organik erituvchida eritilib, aralashtirildi va reaksiya aralashmasi 5-6 kun davomida ochiq havoda qoldirildi. Erituvchi uchib ketishi bilan idish tubida tuz kristallari hosil bo'ldi.

Izonikotin kislota tuzining xosil bo'lishini quyidagi sxema orqali ko'rsatish mumkin:

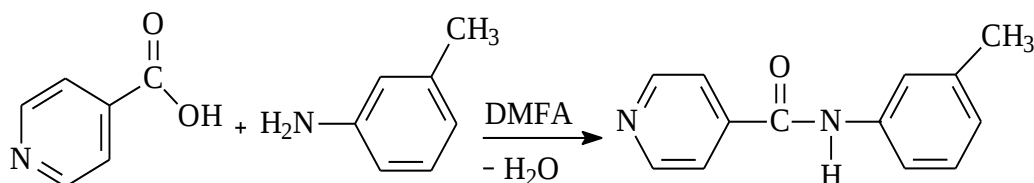


Olingan m-toluidiniy izonikatinat tuzi atsetonda yuvib tozalandi, suyuqlanish haroratlari aniqlandi va tuzilishi IQ-spektroskopiya usuli orqali o'rganildi.

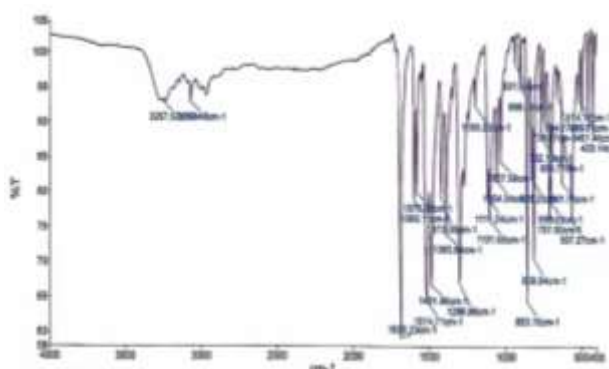
Olingan tuzlar qishloq xo'jaligida pestitsidlar sifatida qo'llash mumkin bo'lgan biologik faollikni namoyon qilishi kutiladi.

Tadqiqotlarni davom ettirgan holda izonikotin kislotasining m-toluidin bilan reaksiyasini yuqori haroratda qaynaydigan erituvchi dimetilformamid (DMFA) ning qaynash temperaturasida teskari sovutgich bilan jihozlangan kolbada magnitli aralashtirgichda 7 soat olib borildi va tegishli kislota amidi sintez qilindi.

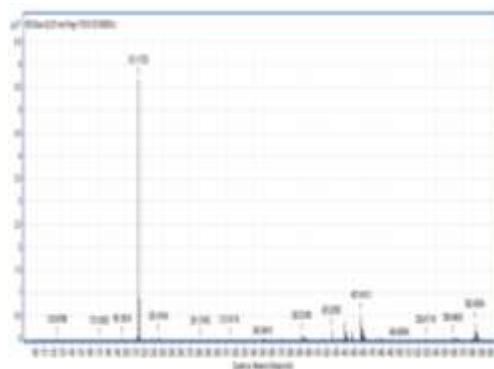
Reaksiya tenglamasi quyidagicha:



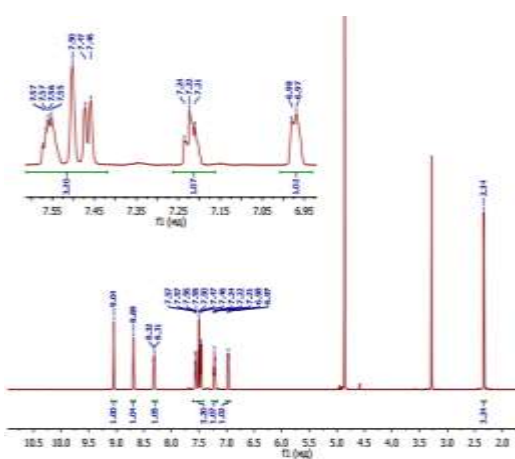
Olingan mahsulotni 40% li etanol-suv aralashmasidan qayta kristallandi, kaltsiy xloridli eksikatorida quritildi. Suyuqlanish harorati aniqlandi, IQ va YaMR spektrlari yordamida tuzilishini tasdiqlagan hamda tozaligi yupqakatlaml xromatografiya (YuQX) usuli yordamida tekshirildi.



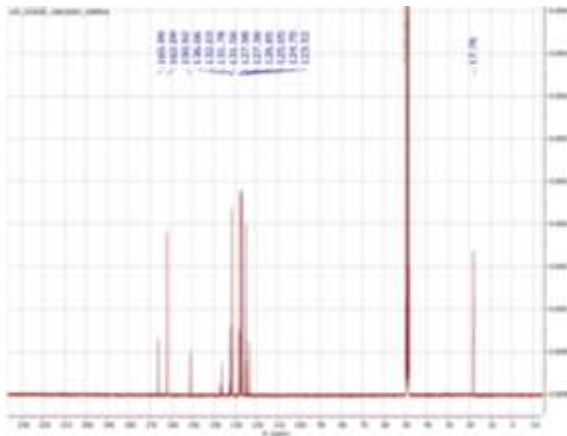
N-(m-tolil)izonikotinamidning IQ spektri



N-(m-tolil)izonikotinamidning mass spektri



N-(m-tolil)izonikotinamidning ^1H YAMR-spektri



^{13}C N-(m-tolil)izonikotinamidning ^{13}C YAMR-spektri

NATIJARAR

m-Toluidiniy izonikatinat (1)

Stakanga 0,69 g (0,005 mol) izonikotin kislota va 0,535 g (0,005 mol) *m*-toluidinning oʻzaro taʼsiridan 1,1393 g (93%) *m*-toluidiniy izonikatinat olindi. Suyuqlanish harorati 79-81°C. IQ-spektri (KBr, ν , cm^{-1}): 2859, 2599 ($^+\text{NH}_3$), 2084 ($^+\text{NH}_3$), δ 1657 ($^+\text{NH}_3$), 1611 (COO^-), 1385 (COO^-), 3423 (ON). ^1N YaMR spektri (400 MGts, CD_3COOD , δ , m.u., J/Gts): 7.87 (1H, dd, $J = 7.9, 1.7$, H-6), 7.43 (1H, s., N-2'), 7.39 (1H, d., $J = 8.0$, N-6'), 7.25 (1N, dd, $J = 8.4, 7.3, 1.7$, N-4), 7.18 (1N, t, $J = 7.8$, N-5'), 7.12 (1N, k.d., $J = 7.5$, N-4'), 6.88 (1N, t.d, $J = 8.2, 1.2$, N-5), 6.83 (1N, d, $J = 7.2$, N-3), 2.27 (3N, s, N-7').

N-(m-tolil)izonikotinamid (2)

Teskari sovutgich bilan jihozlangan kolbada 1,277 g (0,010 mol) izonikotin kislota, 1,110 g (0,010 mol) *m*-toluidin, 10 ml dimetilformamid solindi va magnitli aralashtirgichda 7 soat davomida qizdirildi. Reaksiya tugaganidan soʻng dimetilformamid haydab olindi, quruq qoldiq 40% li etanol-suv aralashmasida qayta kristallandi. 0,770 g (64%) 2-modda olindi. Suyuqlanish harorati 122-124°S. $R_f = 0,58$ (benzol:atseton 1:3) Iq-spektri (KBr, ν , cm^{-1}): 3250 (NH), 1630 (S=O), 1265 (C-N), 1585 (C=C aromatik halqa). ^1H NMR (600 MHz, METHANOL-D4L-D4) δ 9.05 (dd, $J = 2.7, 1.5$ Hz, 1H), 8.71 – 8.66 (m, 1H), 8.34 – 8.28 (m, 1H), 7.59 – 7.53 (m, 1H), 7.50 (s, 1H), 7.49 – 7.44 (m, 1H), 7.22 (td, $J = 8.5, 3.5$ Hz, 1H), 7.00 – 6.95 (m, 1H), 2.33 (dd, $J = 5.5, 2.7$ Hz, 3H). ^{13}C NMR (151 MHz, METHANOL-D4L-D4) δ 165.01, 151.39, 148.05, 138.55, 135.98, 131.49, 128.55, 125.33, 123.81, 121.49, 118.06, 48.09, 47.95, 47.38,

XULOSA

1. Izonikotin kislotasining *m*-toluidin bilan etanolda xona haroratidagi reaksiyalari natijasida ammoniy toʻrtlamchi tuzi hosil boʻlishi aniqlandi.
2. Izonikotin kislotasining *m*-toluidin bilan kondensatlanish reaksiyalari yuqori haroratda qaynaydigan erituvchi DMFA ning qaynash temperaturasida teskari sovutgich bilan jihozlangan kolbada magnitli aralashtirgichda tegishli kislota amidi sintez qilindi.
3. Olingan *m*-toluidiniy izonikatinat tuzi va amidning individualligi YuQX bilan tekshirildi, barcha mahsulotlarning tuzilishi IQ- va ^1H YAMR va ^{13}C YAMR spektri yordamida oʻrganildi va tasdiqlandi.

FOYDALANILGAN ADABIYOTLAR ROʻYXATI

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