

STUDYING THE PROCESS OF OBTAINING BENZOLKETOCARBOXYLIC ACID THROUGH THE OXIDATION OF ETHYLBENZENE

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Introduction

The oxidation of aromatic compounds is one of the important methods for synthesizing new organic substances. Benzolketocarboxylic acid (phenylglyoxylic acid, $C_6H_5COCOOH$) is an important intermediate compound in organic synthesis, and its derivatives are characterized by the presence of various functional groups. The aim of this study is to investigate the oxidation process in the presence of potassium permanganate and evaluate the possibility of isolating benzolketocarboxylic acid.

Keywords

benzolketocarboxylic acid, phenylglyoxylic acid, ethylbenzene, potassium permanganate, oxidation, benzoic acid, selective oxidation.

**ETILBENZOLNI OKSIDLASH ORQALI BENZOLKETOKARBON KISLOTASINI
OLISH JARAYONINI O'RGANISH**

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Kirish. Aromatik birikmalarni oksidlash yangi organik moddalarni sintez qilishda muhim usullardan biri hisoblanadi. Benzolketokarbon kislota (fenilglioksil kislota, $C_6H_5COCOOH$) organik sintez uchun muhim oraliq birikma bo'lib, uning hosilalari turli

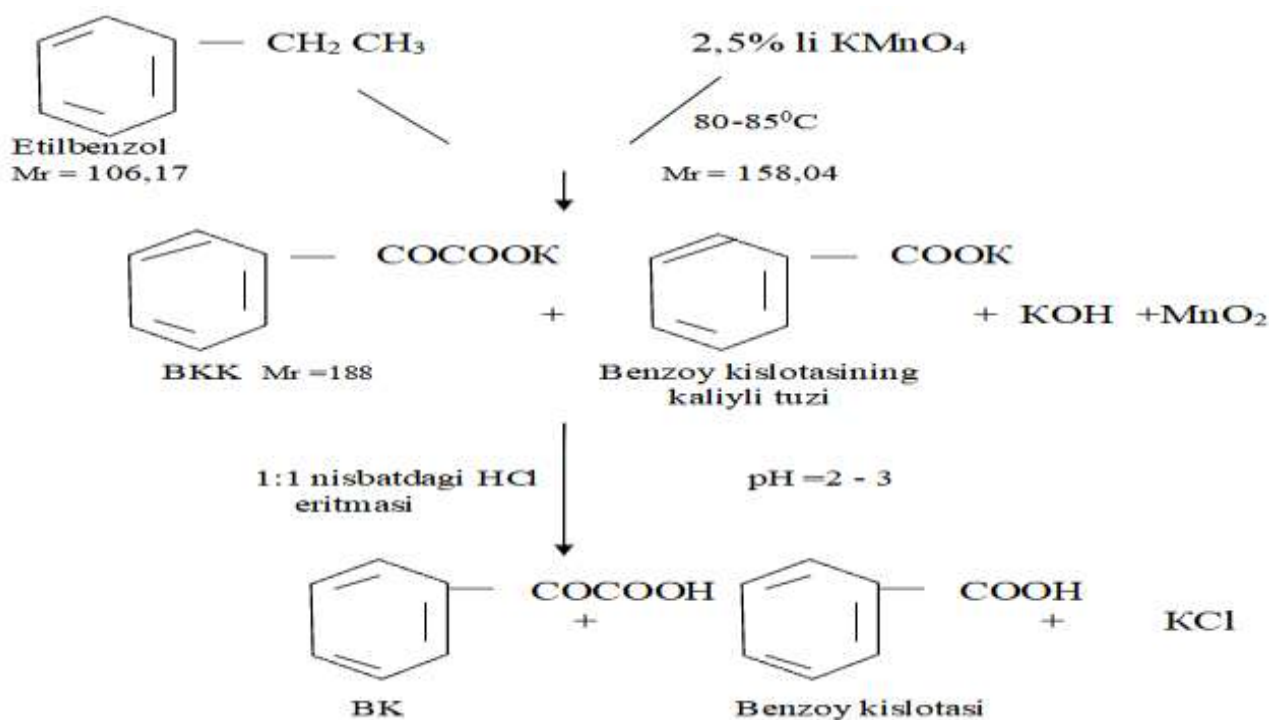
funksional guruhlar saqlashi bilan tavsiflanadi. Mazkur tadqiqotning maqsadi kaliy permanganat ishtirokida oksidlash jarayonini o'rganish va benzoilketokarbon kislotasini ajratib olish imkoniyatini baholashdan iborat.

Kalit so'zlar: benzoilketokarbon kislota, fenilglioksil kislota, etilbenzol, kaliy permanganat, oksidlash, benzoat kislota, selektiv oksidlash.

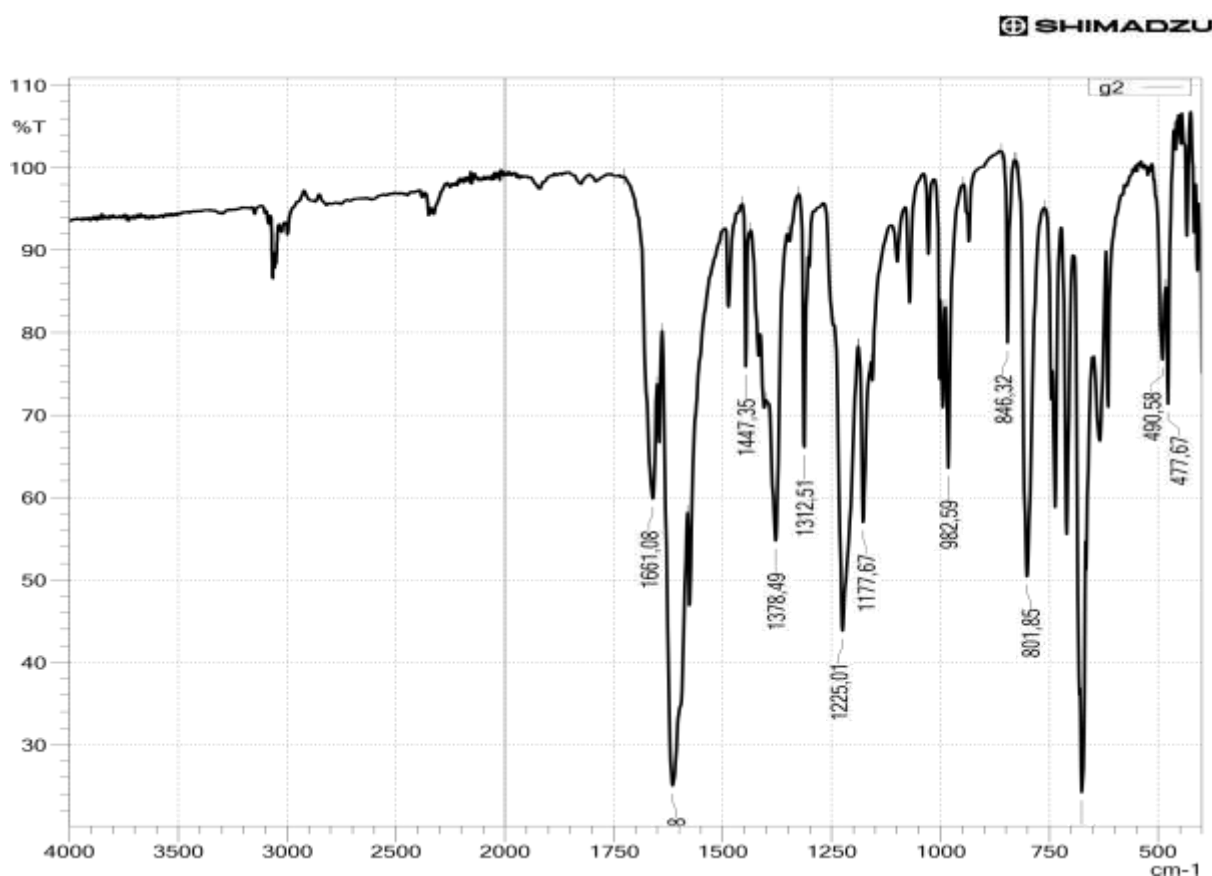
Adabiyotlar tahlili. Fenilglioksil kislota olish usullari orasida mandel kislotasini oksidlash muhim o'rin tutadi. Organic Syntheses manbasida mandel kislotasini ishqoriy muhitda kaliy permanganat bilan oksidlash, marganes dioksid cho'kmasini filtrlash va mahsulotni keyingi bosqichlarda ajratish usuli bayon qilingan [1]. Ushbu usul fenilglioksil kislota olishda oksidlovchi miqdori, harorat va mahsulotni ajratish sharoitlari muhimligini ko'rsatadi. Cullis va Ladbury etilbenzolning kaliy permanganat bilan oksidlanish kinetikasini o'rgangan. Tadqiqotda dastlab atsetofenon hosil bo'lishi, uning keyinchalik benzoat kislotagacha oksidlanishi qayd etilgan [2]. Bu natija etilbenzolni kuchli oksidlovchi bilan qayta ishlashda kerakli mahsulotga yuqori selektivlikni ta'minlash murakkabligini ko'rsatadi. Shu sababli etilbenzoldan fenilglioksil kislota olish imkoniyatini faqat reaksiya rangining o'zgarishi yoki moysimon mahsulot hosil bo'lishi bilan baholab bo'lmaydi. Fenilglioksil kislota olishning muqobil yo'nalishlari ham o'rganilgan. Kalvoda va Tvrzická mandel kislotasini elektrokimyoviy usulda hosil qilingan oksidlovchi yordamida fenilglioksil kislotagacha oksidlashni tadqiq etgan [3]. Tang va hammualliflar esa rasemik mandel kislotasidan fermentlar ishtirokidagi bosqichma-bosqich biokatalitik jarayon orqali fenilglioksil kislota olish usulini taklif qilgan va yuqori konversiyaga erishgan [4]. Bu tadqiqotlar maqsadli mahsulotni olishda boshlang'ich modda va oksidlash usulini to'g'ri tanlash muhimligini tasdiqlaydi.

Materiallar va metodlar. Tajribada 16 l suv 40 °C gacha isitilib, 400 g KMnO_4 eritildi. Aralashma 80–85 °C gacha qizdirilib, kuchli aralashtirish ostida 184 ml

etilbenzol qo'shildi. Oksidlash 30–35 daqiqa davom ettirildi. Reaksiyon aralashma filtrlanib, MnO_2 cho'kmasi ajratildi va issiq suv bilan yuvildi. Filtrat hajmi 1 l gacha kamaytirildi. So'ng 7 M HCl yordamida $\text{pH} = 3$ gacha kislotalanib, benzoat kislota ajratildi. Keyinchalik filtrat $\text{pH} 1$ gacha kislotalandi va moysimon holdagi BKK olindi. Mahsulotning unumi [64%], erish harorati [63°C] (adabiyotda 62-66 °C).va bu ko'satkich bo'yicha ham BKK ga mos keladi. Quyida ushbu jarayon reaksiyon sxemada (1-rasm) va olingan mahsulotning IQ tahlili ko'rsatilgan. (2-rasm)



1-rasm.



2-rasm.

BKK ning IQ spektrida (Shimadzu) 1661 cm^{-1} da aril-keon guruhining $\text{C}=\text{O}$ valent tebranishi, ~ 1600 va 1378 cm^{-1} da karboksilat anionining (COO^-) mos ravishda asimmetrik va simmetrik valent tebranishlari, 1447 va $\sim 1580\text{ cm}^{-1}$ da aromatik halqaning $\text{C}=\text{C}$ tebranishlari, $\sim 3060\text{ cm}^{-1}$ da aromatik $\text{C}-\text{H}$ tebranishi, ~ 690 va $720-760\text{ cm}^{-1}$ da monoalmashgan benzol halqasining deformatsion tebranishlari kuzatildi.(2-rasm)

Natijalar va muhokama. Reaksiya davomida KMnO_4 ning binafsha rangining yo'qolishi va MnO_2 cho'kmasining hosil bo'lishi kuzatildi. Kislotalash bosqichlarida benzoat kislota ajratish hamda moysimon fraksiya hosil bo'lishi qayd etildi.

Xulosa: etilbenzolni KMnO_4 bilan oksidlash orqali benzoilformat kislota olish mumkin; olingan kislota keyingi bosqichda biologik faol hosilalar sintezi uchun asos bo'ladi.

Foydalanilgan adabiyotlar

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