SYNTHESIS AND PURIFICATION OF FURYLACROLEIN.

Shergoziyev Kilichbek
Teacher of Fergana State University

Annotation: *This research paper provides an in-depth examination of the synthesis and purification of furylacrolein, an acrolein derivative. The study encompasses the reaction process involving sodium hydroxide, furfural, and acetaldehyde, as well as purification methods, including recrystallization, superheated steam distillation, and vacuum distillation. This comprehensive work contributes to the understanding of organic synthesis and the potential applications of furylacrolein.*

Keywords: *Furylacrolein, acrolein, organic synthesis, purification, recrystallization, superheated steam distillation, vacuum distillation.*

Abstract: *This research paper elucidates the synthesis and purification of furylacrolein, an intriguing derivative of acrolein. The synthesis process involves the reaction of sodium hydroxide with furfural and acetaldehyde under controlled conditions, resulting in the formation of needle-shaped crystals of furylacrolein. Furthermore, the purification of furylacrolein is explored through multiple techniques, including recrystallization, superheated steam distillation, and vacuum distillation. The study not only contributes to the knowledge of organic synthesis but also opens avenues for the potential application of furylacrolein in various fields.*

INTRODUCTION

Acrolein, a vital chemical compound used in various industrial applications, has sparked considerable interest due to its reactivity and versatile nature. Among its derivatives, furylacrolein stands out as an intriguing compound with potential uses in the fields of chemistry and beyond. This paper aims to present a comprehensive investigation into the synthesis and purification of furylacrolein, shedding light on its formation and potential applications.

Experimental Section

Synthesis of Furylacrolein. To initiate the synthesis process, 7 grams of sodium hydroxide were dissolved in 1400 ml of water. Subsequently, 100 grams of freshly distilled furfural were added to the solution, which was cooled to 0°C while stirring continuously for 15 minutes. With meticulous temperature control, 60 grams of acetaldehyde, dissolved in 300 ml of water, were added evenly through a dropping funnel over a span of 5 hours. Notably, needle-shaped crystals of furylacrolein precipitated approximately 45-50 minutes after the commencement of acetaldehyde addition.

Upon the completion of acetaldehyde addition, the reaction mixture was allowed to stand for 1.5-2 hours, facilitating the formation of furylacrolein crystals. These crystals were subsequently isolated by suction filtration, washed 2-3 times with cold water, squeezed, and dried in a controlled environment, either in the absence of light or within a desiccator containing calcium chloride.

Purification of Furylacrolein. The furylacrolein obtained from the synthesis was subjected to purification through multiple techniques, including recrystallization, superheated steam distillation, and vacuum distillation. Each of these methods served to refine the furylacrolein, ensuring its purity and suitability for various applications.

Results and discussion.The synthesis of furylacrolein through the reaction of sodium hydroxide, furfural, and acetaldehyde resulted in the formation of needle-shaped crystals, indicating the successful production of the compound. The subsequent purification steps, such as recrystallization and distillation, further enhanced the quality of the furylacrolein, rendering it suitable for various applications, including chemical synthesis and research.

Conclusion. The synthesis and purification of furylacrolein, a derivative of acrolein, have been successfully demonstrated in this study. The controlled reaction of sodium hydroxide, furfural, and acetaldehyde, followed by purification through recrystallization and distillation, has yielded high-quality furylacrolein. This work not only contributes to the knowledge of organic synthesis but also opens doors to potential applications of furylacrolein in various scientific and industrial domains. Furylacrolein's distinct properties and reactivity make it a compound of significant interest for future research and development.

REFERENCES:

1. Пономарев А.А. «Синтезы и реакции фурановых веществ» издательство Саратовского университета, 1960.

2. Псарев, Д. Н., & Зайцев, В. В. (2019). Способы получения полимерных композиционных материалов. Наука и Образование, 2(4).

3. Саминов, Х. Н. У., Ибрагимов, А. А., & Назаров, О. М. (2021). ИССЛЕДОВАНИЕ ФИТОХИМИЧЕСКИХ КОМПОНЕНТОВ PÚNICA GRANÁTUMCOPTA" ҚАЮМ" ПРОИЗРАСТАЮЩЕЙ В УЗБЕКИСТАНЕ. Universum: химия и биология, (1-1 (79)), 57-60.

4. Marufjono‘g, S. O. Q. li.(2023). INDUKTIV BOG ‘LANGAN PLAZMA MASS SPEKTROMETRIYASI USULI YORDAMIDA ANJIR (FICUS CARICA L.) BARGINING MAKRO VA MIKROELEMENT TARKIBINI ANIQLASH. Scientific Impulse, 1 (9), 1726–1728.

5. Саминов, Ҳ. Н. Ў., & Назаров, О. М. (2022). АНОР ЎСИМЛИГИНИНГ ҲАЛҚ ТАБОБАТИДА ТУРЛИ КАСАЛЛИКЛАРНИ ДАВОЛАШДА ҚЎЛЛАНИЛИШИ. Oriental renaissance: Innovative, educational, natural and social sciences, 2(Special Issue 4-2), 180-182.

6. Marufjono‘g, S. O. Q. li.(2023). ANJIR (FICUS CARICA L.) BARGIDAN KUMARINLAR OLISH. Scientific Impulse, 1 (9), 1723–1725.

7. Саминов, Х. Н. Ў. (2022). АНОР МОЙИ ВА УНДАН ТАЙЁРЛАНГАН КОМПОЗИЦИЯЛАРИНИ ТИФ ТН АСОСИДА СИНФЛАШ. Science and innovation, (Special Issue), 417-418.

8. Kilichbek, S. (2023). CHROMATOGRAPHIC SEPARATION OF ORGANIC COMPOUNDS USING ADSORPTION CHROMATOGRAPHY. INNOVATIVE DEVELOPMENTS AND RESEARCH IN EDUCATION, 2(20), 172-173.

9. Саминов, Х. Н. Ў. (2022). АНОР ЎСИМЛИГИНИНГ ЭФИР МОЙИ ТАРКИБИНИ ЎРГАНИШ. Science and innovation, (Special Issue), 419-421.

10. Marufjono‘g, S. O. Q., &Numonjono‘g‘li, S. X. (2023). OLXO ‘RI MEVASINING INSON SALOMATLIGIGA TA’SIRI. O'ZBEKISTONDA FANLARARO INNOVATSIYALAR VA ILMIY TADQIQOTLAR JURNALI, 2(22), 4-6.

11. Saminov , K., Ibragimov , A., & Nazarov Otabek Mamadaliyevich, N. O. M. (2023). STUDY OF VOLATILE COMPONENTS OF LEAVES AND FLOWERS OF Punica granatum L., VARIETY “KAYUM” GROWING IN UZBEKISTAN. Scientific Journal of the Fergana State University, (3), 147. Retrieved from https://journal.fdu.uz/index.php/sjfsu/article/view/2613.

12. Kilichbek, S. (2023). DETERMINATION OF MACRO AND MICROELEMENT CONTENT OF FIG (FICUS CARICA L.) LEAF USING INDUCTIVELY COUPLED PLASMA MASS SPECTROMETRY METHOD. Scientific Impulse, 1(12), 287-288.

13. Саминов , Х., Ибрагимов , А., & Назаров , О. (2023). DETERMINATION OF THE CONTENT OF CHEMICAL ELEMENTS OF Púnica granátum VARIETY "QAYUM". Scientific Journal of the Fergana State University, 28(1), 11. https://doi.org/10.56292/SJFSU/vol28_iss1/a11.

14. Kilichbek, S. (2023). COUMARINS: NATURE'S VERSATILE COMPOUNDS WITH DIVERSE PHARMACOLOGICAL ATTRIBUTES. НаучныйФокус, 1(5), 1-3.