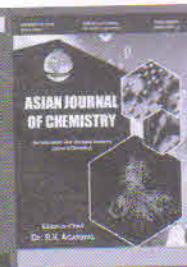


Asian Journal of Chemistry:

Vol. 38, No. 2 (2026), 517-521

ASIAN JOURNAL OF CHEMISTRY

<https://doi.org/10.14233/ajchem.2026.35101>



Synthesis and Characterisation of Critical Impurities in Ampicillin Trihydrate: N-Formyl Ampicilloic Acid and D-Phenylglycylampicillin

L. HANMANTH RAO^{1,2,*}, MOGILI PADMA², ABHISHEK SHANKAR SAXENA² and SRINU KARNATI²

¹Process Research and Development, Aragen Life Sciences, Number 12, Plot No 28 A, IDA, Nacharam, Hyderabad-500076, India
²Department of Engineering Chemistry, A.U. College of Engineering (A), Andhra University, Visakhapatnam-530003, India

*Corresponding author: E-mail: hanmanth85@gmail.com

Received: 20 October 2025

Accepted: 16 January 2026

Published online: 31 January 2026

AJC-22270

The current research work elucidates the identification, synthesis and characterisation of two critical impurities of ampicillin trihydrate, designated as *N*-formyl ampicilloic acid and *D*-phenylglycylampicillin (European Pharmacopoeia impurity I). The formation of *N*-formyl ampicilloic acid results from the cross-contamination of ampicillin trihydrate with residual formic acid, whereas *D*-phenylglycylampicillin arises through the amidation of amino group in the side chain of ampicillin trihydrate with *D*-phenylglycine methylester. These impurities substantially affect the overall quality of the ampicillin trihydrate API; therefore, their identification and control are critical. This work holds significant value for the generic pharmaceutical industry, as an efficient synthetic route for these impurities has been established using readily accessible starting materials.

Keywords: Ampicillin trihydrate, *N*-Formyl ampicilloic acid, *D*-Phenylglycylampicillin.