

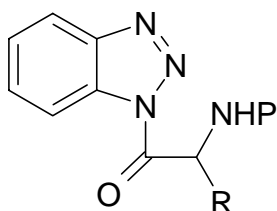
**Professor Alan R. KATRITZKY**

**Novel N-, O-, S-, and C-Acylation and Related Reactions.  
Peptides and More**

*Center for Heterocyclic Compounds, Department of Chemistry, University of Florida,  
P.O. Box 117200, Gainesville, FL 32611-7200, USA  
Email: katritzky@chem.ufl.edu*

Acylbenzotriazoles are advantageously prepared directly from the corresponding carboxylic acids by two routes which enable the easy preparation of RCOBt of which the corresponding acyl chlorides are difficult to prepare, unstable, hygroscopic, and/or require special handling. Thus  $\alpha,\beta$ -olefinic and  $\alpha,\beta$ -acetylenic carboxylic acids, heterocyclic derivatives including pyridines, furans, indoles, and hydroxy acids all give RCOBt in high yields: nearly all are RCOBt are crystalline.

N-  $\alpha$ -(Protected amino)acylbenzotriazoles **1** have been prepared for 17 of the 20 natural amino acids. Only the amino functionality needs to be protected in serine, tyrosine, tryptophan, methionine, and cysteine. Compounds **1** are stable, crystalline (mp 100-200 °C) and soluble in organic solvents. They are nonhygroscopic and can be handled and weighed without special precautions.



P = Cbz, Boc or Fmoc

R can include OH, indole NH or SH

Acylbenzotriazoles, including **1**, are excellent N-acylating agents. Importantly they can be used in partially aqueous solutions, which enable the acylation of amino acids without the need to prepare esters soluble in organic solvents. Di-, tri-, and tetra-peptides have thus been prepared.

Acylbenzotriazoles are also efficient agents for O- and S- acylation reactions which occur in high yield.  $\alpha$ -Aminoacyl derivatives of terpenes, lipids, and steroids will be reported. C-Acylation by RCOBt allows the efficient preparation of a wide variety of bifunctional compounds.

Compounds XN=CBt<sub>2</sub> and analogs enable a wide range of efficient imidoylations, providing high-yielding routes to amidines and guanidines.