

## Improved Synthesis of 1H,4H-3,6-dinitropyrazolo[4,3-C]pyrazole

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**Abstract:** 1H,4H-3,6-dinitropyrazolo[4,3-C]pyrazole (DNPP) was synthesized from acetylacetone via monocyclization, diazotization, bicyclization, nitration, oxidation, and decarboxylative nitration. The overall yield of DNPP was 11.3% and 4% higher than that reported before. The synthesis of 4-amino-3,5-dimethylpyrazole was carried out by one-pot method which shows a number of advantages in comparison with the procedure adapted in the literature, including eliminating the use of mixture acid and iron power, shorting the reaction time (from 72 h to 24 h), improving the yield (from 79.1% to 92.0%), and simplifying the post-treatment. In addition, both nitration and decarboxylative nitration were studied.

**Key words:** organic chemistry; 1H,4H-3,6-dinitropyrazolo[4,3-C]pyrazole (DNPP); 1,4-diamino-3,6-dinitropyrazolo[4,3-C]pyrazole(LLM-119); synthesis

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## EUROPYRO 2011

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- (2) New explosive devices and systems including:
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  - Miniaturisation and nanotechnologies,
  - Ordnance, industry and space applications,
  - Disposal technologies.
- (3) Applications to solid propulsion for small rocket motors and gas generators.
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  - Transition to detonation and advanced studies on reaction zone,
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- (7) Regulations, environment and recycling:
  - European directives (CE 93/15, CE 2007/23, REACH, GHS and CLP, etc.) implementation to commercial explosives, pyrotechnics and fireworks;
  - Standardisation;
  - Explosive safety in industry and for environment;
  - Disposal and recycling technologies.

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