

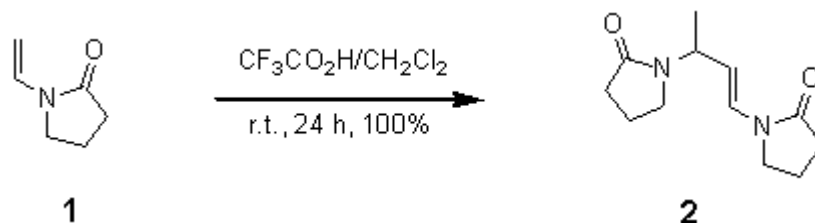
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1,3-Bis(pyrrolidin-2-on-1-yl)but-1-ene

Jin-Cong Zhuo

College of Pharmacy, The Ohio State University, 500 West 12th Avenue, Columbus, OH 43210, USA.
Fax: (614) 292 2435; E-mail: zhuo.1@osu.edu

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To a solution of 1-vinyl-2-pyrrolidinone (**1**, 11.1 g, 100 mmol) in CH_2Cl_2 (100 ml) was added a drop of $\text{CF}_3\text{CO}_2\text{H}$ at room temperature. The resulting solution was stood at room temperature for 24 h. The solvent was evaporated under reduced pressure. The residue is the desired product **2** (11.1 g, 100%). The product can be recrystallise from acetone.

M.p. 73.2-74.8°C (Lit. [1]: 75°C).

IR(cm^{-1} , neat): 3070 m , 1700 vs , 1690 vs , 1675 vs , 1655 vs , 1405 vs , 1285 vs , 1240 s , 955 s , 730 s .

^1H -NMR(CDCl_3): 7.00 (d, $J = 14.2$, 1H, H-1), 4.94 (dd, $J = 14.2$, 6.0, 1H, H-2), 4.89 (m, 1H, H-3), 3.49 (t, $J = 7.2$, 2H, NCH_2), 3.30 (m, 2H, NCH_2), 2.50 (t, $J = 8.1$, 2H, COCH_2), 2.40 (t, $J = 8.1$, 2H, COCH_2), 2.12 (m, 2H, CH_2), 2.00 (m, 2H, CH_2), 1.30 (d, $J = 7.0$, 3H, Me).

^{13}C -NMR(CDCl_3): 174.2 (C, NCO), 173.3 (C, NCO), 125.1 (CH, C-1), 110.7 (CH, C-2), 46.0 (CH, C-3), 45.2 (CH_2 , NCH_2), 42.4 (CH_2 , NCH_2), 31.4 (CH_2 , COCH_2), 31.2 (CH_2 , COCH_2), 18.0 (CH_2), 17.4 (CH_3 , C-4), 17.0 (CH_2).

EI-MS: 223 ($\text{M}+\text{H}^+$, 6), 222 (M^+ , 36), 207 (M^+-Me , 37), 204 (27), 179 (13), 138 (36), 124 (34), 122 (21), 112 (43), 110 (29), 109 (32), 98 (26), 96 (20), 94 (24), 82 (41), 81 (100), 80 (24), 70 (27), 69 (55), 56 (23), 55 (35).

References

1. Breitenbach, J. W.; Galinovsky, F.; Nervadbar, H.; Wolf, E. *Monatsh. Chem.* **1956**, *87*, 580.

Sample availability: available from MDPI. MDPI ID 13352.

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