

## N-{(2Z)-4-[4-(3-chlorophenyl)piperazin-1-yl]but-2-enyl}-1,8-naphthalimide

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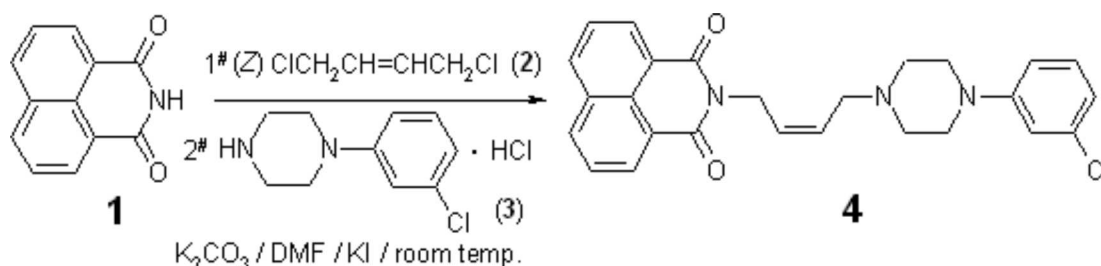
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In continuation of our interest on synthesis and properties of arylpiperazine derivatives investigated as a serotonin receptors ligands [1-3], herein we presented one-pot synthesis of N-{(2Z)-4-[4-(3-chlorophenyl)piperazin-1-yl]but-2-enyl}-1,8-naphthalimide (**4**). Starting materials e.g. 1,8-naphthalimide (**1**), (Z)-1,4-dichloro-2-butene (**2**), and 1-(3-chlorophenyl)piperazine hydrochloride (**3**) were commercially available reagents.



A mixture of the 1,8-naphthalimide (**1**) (3.94 g, 0.02 mole), powdered  $K_2CO_3$  (4.14 g, 0.03 mole), catalytic amount of KI, and 40 mL of DMF was stirred at ambient temperature for 2 h. Then the (Z)-1,4-dichloro-2-butene (**2**) (2.50 g, 0.02 mole) was added and the stirring continued for another 10 h. Next, a new portion of anhydrous  $K_2CO_3$  (5.25 g, 0.04 mole) and 1-(3-chlorophenyl)piperazine hydrochloride (**3**) (4.66 g, 0.02 mole) was added and the reaction mixture was stirred again for 10 h. The mixture was filtrated and the filtrate evaporated. The residue was suspended in 50 mL of acetone, which was decanted from semisolids, and the procedure repeated to give solid crystals. This material purified by crystallization with 1-butanol afforded of the desired N-{(2Z)-4-[4-(3-chlorophenyl)piperazin-1-yl]but-2-enyl}-1,8-naphthalimide (**4**) (3.1 g, 35%) as the light yellow crystals. For biological experiments the base **4** was converted into hydrochloride salt with ethanol saturated with HCl.

Melting point: 138–140 °C. (for HCl salt mp 279–281 °C)

$^1H$ -NMR (80 MHz,  $CDCl_3$ ):  $\delta$ = 2.64–2.76 (m, 4H,  $2CH_2$ -pip); 3.17–3.30 (m, 4H,  $2CH_2$ -pip); 3.39 (d, 2H,  $CH_2$ -N-pip); 4.87 (d, 2H,  $CH_2$ -N-imide); 5.68–5.79 (m, 2H,  $CH=CH$ ); 6.74–7.26 (m, 4H, ArH); 7.74 (t, 2H,  $H_{3,6}$ -imide); 8.22 (d, 2H,  $H_{4,5}$ -imide); 8.61 (d, 2H,  $H_{2,7}$ -imide).

IR (KBr,  $cm^{-1}$ ): 2954-2780 (CH); 1699, 1663 (C=O); 1590-1435 (C=C).

MS (EI, 70 eV; m/z, rel.%): 445 [ $M^+$ ] (21); 250 (61); 235 (100); 196 (15); 180 (32).

Elemental Analysis: Calculated for  $C_{26}H_{24}ClN_3O_2 \cdot HCl$  (482.41): C, 64.73%; H, 5.22%; N, 8.71%. Found: C, 64.79%; H, 5.33%; N, 8.48%.

## References

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*Sample Availability:* Available from MDPI.

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