

## Spectroscopic data for the products

### Products in Table 2

**N,N<sup>2</sup>-dipropylurea:** GC-MS, m/z: 27 (9%), 30 (100), 43 (20), 58 (14), 73 (5), 87 (6), 115 (8), 129 (4), 144 (36).

**N,N<sup>2</sup>-diisopropylurea:** GC-MS, m/z: 27 (5%), 30 (3), 41 (11), 44 (100), 58 (20), 129 (8), 144 (13).

**N,N<sup>2</sup>-dibutylurea:** GC-MS, m/z: 30 (100%), 41 (15), 58 (15), 72 (5), 101 (2), 129 (4), 157 (4), 172 (7).

**N,N<sup>2</sup>-diisobutylurea:** GC-MS, m/z: 30 (100%), 41 (17), 58 (18), 72 (5), 101 (2), 129 (6), 157 (6), 172 (22).

**N,N<sup>2</sup>-di-sec-butylurea:** GC-MS, m/z: 29 (8%), 41 (8), 44 (100), 58 (17), 72 (4), 143 (14), 172 (2).

**N,N<sup>2</sup>-dihexylurea:** GC-MS, m/z: 30 (100%), 44 (26), 55 (8), 102 (12), 158 (10), 185 (28), 228 (34).

**N,N<sup>2</sup>-dioctylurea:** GC-MS, m/z: 30 (100%), 44 (32), 57 (16), 101 (9), 130 (20), 156 (20), 186 (14), 227 (42), 241 (25), 284 (60).

**N,N<sup>2</sup>-diallylurea:** GC-MS, m/z: 30 (29%), 41 (50), 56 (100), 85 (10), 111 (1), 140 (2).

**N,N<sup>2</sup>-bis(2-methoxyethyl)urea:** GC-MS, m/z: 30 (100%), 43 (25), 59 (10), 70 (11), 102 (3), 131 (18), 161 (15), 176 (2).

**N,N<sup>2</sup>- dicyclohexylurea:** GC-MS, m/z: 28 (7%), 56 (100), 70 (16), 99 (38), 143 (36), 224 (50).

**N,N<sup>2</sup>- dibenzylurea:** GC-MS, m/z: 28 (5%), 39 (5), 51 (5), 65 (14), 79 (18), 91 (50), 106 (100), 149 (16), 240 (56).

**N,N<sup>2</sup>- diphenethylurea:** GC-MS, m/z: 30 (100%), 39 (5), 51 (5), 65 (11), 77 (13), 91 (38), 104 (22), 177 (22), 268 (30).

**Imidazolidin-2-one:** GC-MS, m/z: 15 (5%), 30 (75), 42 (16), 58 (5), 86 (100)

**4-methylimidazolidin-2-one:** GC-MS, m/z: 28 (25%), 30 (25), 42 (22), 44 (22), 56 (10), 58 (9), 85 (100), 100 (41).

**Tetrahydropyrimidin-2(1H)-one:** GC-MS, m/z: 28 (47%), 30 (75), 43 (10), 56 (20), 71 (5), 100 (100).

**Hexahydro-1H-benzo[d]imidazol-2(3H)-one:** GC-MS, m/z: 28 (11%), 41 (11), 56 (14), 68 (6), 84 (14), 97 (100), 111 (14), 140 (50).

**Oxazolidin-2-one:** GC-MS, m/z: 28 (88%), 42 (38), 59 (58), 87 (100).

**1-(2-hydroxyethyl)imidazolidin-2-one:** GC-MS, m/z: 28 (16%), 42 (18), 56 (43), 70 (16), 99 (100), 130 (5).

**5-methyloxazolidin-2-one:** GC-MS, m/z: 28 (58%), 42 (92), 58 (11), 86 (100), 101(27).

**1-(2-hydroxypropyl)-5-methylimidazolidin-2-one:** GC-MS, m/z: 28 (14%), 42 (52), 56 (10), 70 (43), 99 (46), 113 (100), 158 (2).

**4-methyloxazolidin-2-one:** GC-MS, m/z: 28 (47%), 42 (80), 58 (12), 86 (100),

101(27).

**1-(1-hydroxypropan-2-yl)-4-methylimidazolidin-2-one:** GC-MS, m/z: 28 (10%), 41 (24), 56 (18), 84 (40), 127 (100), 158 (2).

**1,3-oxazinan-2-one:** GC-MS, m/z: 28 (100%), 44 (8), 56 (37), 101(56).

**1-(3-hydroxypropyl)tetrahydropyrimidin-2(1H)-one:** GC-MS, m/z: 28 (30%), 44 (100), 56 (35), 70 (12), 113 (88), 158 (18).

### Products in Table 3

**N-butyl-N'-isopropylurea:** GC-MS, m/z: 27 (9%), 30 (64), 41 (16), 44 (100), 58 (17), 87 (4), 101 (2), 116 (3), 143 (4), 158 (17).

**N-sec-butyl-N'-butylurea:** GC-MS, m/z: 30 (25%), 41 (10), 44 (100), 58 (18), 72 (6), 143 (21), 172 (4).

**N-butyl-N'-hexylurea:** GC-MS, m/z: 30 (100%), 44 (20), 57 (6), 74 (6), 101 (6), 130 (5), 157 (6), 185 (2), 200 (12).

**N-butyl-N'-cyclohexylurea:** GC-MS, m/z: 30 (44%), 41 (21), 56 (100), 61 (5), 70 (12), 74 (8), 99 (15), 117 (27), 156 (3), 198 (27).

**N-benzyl-N'-butylurea:** GC-MS, m/z: 30 (85%), 44 (30), 51 (8), 65 (17), 77 (77), 91 (90), 106 (100), 206 (95).

**N-butyl-N',N'-diethylurea:** GC-MS, m/z: 29 (23%), 44 (27), 58 (100), 72 (35), 100 (37), 172 (17).

**N-butyl-N',N'-dipropylurea:** GC-MS, m/z: 27 (5%), 30 (10), 43 (17), 58 (4), 72 (100), 86 (7), 100 (2), 128 (4), 171 (8), 200 (9).

**N,N,N'-tributylurea:** GC-MS, m/z: 29 (13%), 44 (21), 57 (16), 86 (100), 100 (6), 129 (3), 156 (4), 185 (8), 228 (9).

**N-butylpyrrolidine-1-carboxamide:** GC-MS, m/z: 28 (12%), 39 (7), 43 (40), 55 (37), 70 (85), 86 (16), 98 (100), 114 (12), 127 (7), 141 (5), 170 (20).

**N-butylpiperidine-1-carboxamide:** GC-MS, m/z: 28 (15%), 41 (36), 56 (32), 69 (30), 84 (100), 112 (75), 128 (10), 184 (23).

**N-butylpiperidine-1-carboxamide:** GC-MS, m/z: 29 (19%), 42 (19), 57 (100), 70 (25), 87 (40), 114 (38), 129 (6), 143 (5), 155 (6), 186 (7).

### Products in Scheme 3

**N-butyl-N'-cyclohexylurea:** GC-MS, m/z: 30 (32 %), 42 (23), 56 (100), 70 (15), 83 (6), 99 (18), 117 (35), 156 (6), 198 (40).

**N-cyclohexyl-N'-hexylurea:** GC-MS, m/z: 30 (33 %), 43 (30), 56 (100), 70 (16), 83 (8), 99 (25), 145 (38), 156 (7), 170 (3), 183 (12), 197 (9), 226 (40).

**N-cyclohexyl-N'-octylurea:** GC-MS, m/z: 30 (32 %), 43 (27), 56 (100), 70 (16), 83 (7), 99 (30), 156 (13), 173 (38), 183 (10), 197 (10), 211 (9), 225 (8), 254 (43).

**N-benzyl-N'-cyclohexylurea:** GC-MS, m/z: 28 (12 %), 41 (15), 56 (75), 65 (15), 77 (11), 91 (77), 106 (60), 151 (17), 232 (100).

**N-cyclohexyl-N',N'-diethylurea:** GC-MS, m/z: 29 (20 %), 39 (5), 44 (27), 58 (100), 72 (58), 87 (9), 100 (68), 116 (13), 155 (5), 169 (5), 183 (3), 198 (55).

**N-cyclohexyl-N',N'-dipropylurea:** GC-MS, m/z: 30 (5 %), 43 (20), 55 (6), 72 (100), 86 (6), 98 (6), 115 (6), 128 (6), 155 (4), 197 (10), 226 (17).

**N,N-dibutyl-N'-cyclohexylurea:** GC-MS, m/z: 29 (7 %), 44 (15), 57 (15), 86 (100), 100 (7), 129 (7), 156 (4), 211 (7), 254 (15).

**N-cyclohexyl-N'-phenylurea:** GC-MS, m/z: 28 (8 %), 56 (5), 77 (3), 93 (100), 119 (3), 218 (5).