United States
Environmental Protection Agency

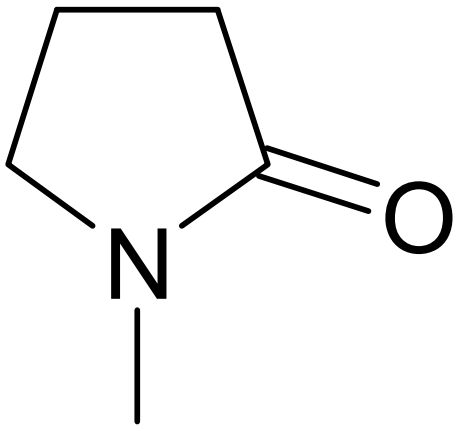
Office of Chemical Safety and
Pollution Prevention

Final Risk Evaluation for n-Methylpyrrolidone

Systematic Review Supplemental File:

Data Extraction of Epidemiological Studies

CASRN: 872-50-4



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The table below presents data summaries of epidemiological studies considered in hazard characterization of NMP, as described in Section 3.2 of the Risk Evaluation. Studies that were excluded due to an Unacceptable or Low data quality score are not included. The presented exposure levels are values reported by the study authors and do not represent the PODs used for risk estimation.

Target Organ/ System	Outcome/ Endpoint	Study Population	Exposure	Results	Reference	Data Quality Evaluation
Hepatic	Gamma glutamyl transferase (GGT) expression (in IU/l) was measured in serum as an indication of liver function	Cross-sectional, 8 male workers, Switzerland 2006-2011, ages 22-60	Measured in air and via biomonitoring, daily NMP inhalation exposure median 0.18 mg/m3, urine metabolite biomarkers show NMP/creatinine medians before and after shift: 0.39 mg/g and 0.27 mg/g (5-HNMP), 0.56 mg/g and 1.06 mg/g (2-HMSI)	Positive association between NMP and GGT expression, not statistically significant	Haufroid et al. 2014	Medium
Musculoskeletal/ Motor Function	Motor nerve conductivity velocity	Cross-sectional, 14 factory workers, Japan 2009, 5 day study	Measured in air and via biomonitoring, daily NMP inhalation exposure means of 0.14-0.26 ppm, with maximum exposure of 0.80ppm, urine biomarkers show NMP/creatinine geometric mean of 0.081 mg/g creatinine	Positive association with mean conductivity velocity, not statistically significant	Nishimura et al. 2009	Medium
Neurological/ Behavior	Self-rated depression scale	Cross-sectional, 14 factory workers, Japan 2009, 5 day study	Measured in air and via biomonitoring, daily NMP inhalation exposure means of 0.14-0.26 ppm, with maximum exposure of 0.80ppm, urine biomarkers show NMP/creatinine geometric mean of 0.081 mg/g creatinine	Negative association with depression score, statistically significant but stated to not be associated with NMP levels in logistic regression models (data not provided)	Nishimura et al. 2009	Medium

Target Organ/ System	Outcome/ Endpoint	Study Population	Exposure	Results	Reference	Data Quality Evaluation
Renal	Serum creatinine (mg/dl) was measured as an indicator of kidney function	Cross-sectional, 8 male workers, Switzerland 2006-2011, ages 22-60	Measured in air and via biomonitoring, daily NMP inhalation exposure median 0.18 mg/m3, urine metabolite biomarkers show NMP/creatinine medians before and after shift: 0.39 mg/g and 0.27 mg/g (5-HNMP), 0.56 mg/g and 1.06 mg/g (2-HMSI)	Positive association between NMP and serum creatinine levels, not statistically significant	Haufroid et al. 2014	Medium
Respiratory	Forced expiratory volume in 1st second of spirometry (FEV1)	Cross-sectional, 8 male workers, Switzerland 2006-2011, ages 22-60	Measured in air and via biomonitoring, daily NMP inhalation exposure median 0.18 mg/m3, urine metabolite biomarkers show NMP/creatinine medians before and after shift: 0.39 mg/g and 0.27 mg/g (5-HNMP), 0.56 mg/g and 1.06 mg/g (2-HMSI)	Negative association between NMP and FEV1, not statistically significant	Haufroid et al. 2014	Medium

Haufroid, V; Jaeger, VK; Jeggli, S; Eisenegger, R; Bernard, A; Friedli, D; Lison, D; Hotz, P. (2014). Biological monitoring and health effects of low-level exposure to N-methyl-2-pyrrolidone: A cross-sectional study. Int Arch Occup Environ Health 87(6):663-74. http://dx.doi.org/10.1007/s00420-013-0906-5

Nishimura, S; Yasui, H; Miyauchi, H; Kikuchi, Y; Kondo, N; Takebayashi, T; Tanaka, S; Mikoshiba, Y; Omae, K; Nomiyama, T. (2009). A cross-sectional observation of effect of exposure to N-methyl-2-pyrrolidone (NMP) on workers' health. Ind Health 47(4):355-62. http://dx.doi.org/10.2486/indhealth.47.355