United States
Environmental Protection Agency

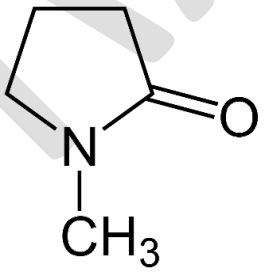
Office of Chemical Safety and
Pollution Prevention

Draft Risk Evaluation for N-Methylpyrrolidone

Systematic Review Supplemental File:

Data Quality Evaluation of Environmental Fate and Transport Studies

CASRN: 872-50-4



October 2019

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Study Reference:	**ECHA (European Chemicals Agency). (2017). Biodegradation in soil: 1-methyl-2-pyrrolidone. Helsinki, Finland. Retrieved from https://echa.europa.eu/registration- dossier/-/registered-dossier/15493/5/3/4#** **HERO ID: 3970767**					
Domain	**Metric**	**Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]**	**Comments**	**Metric Score**	**Metric Weighting Factor**	**Weighted Score**
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2
	2. Test Substance Purity	Medium	The test substance source and purity were not reported in this secondary source; the Primary source may have more detail.	2	1	2
Test Design	3. Study Controls	Low	Controls were not reported in this secondary source; however, the Primary source may contain more detail.	3	2	6
	4. Test Substance Stability	High	Limited details were reported in this secondary source; however, the Primary source may contain more detail.	1	1	1
Test Conditions	5. Test Method Suitability	High	The test method was suitable for the test substance.	1	1	1
	6. Testing Conditions	Medium	Limited details were reported in this secondary source; however, Primary source may contain more detail. Omissions were not likely to have had a substantial impact on the study results.	2	2	4
	7. Testing Consistency	High	No inconsistencies were reported or identified.	1	1	1

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	8. System Type and Design	Medium	Limited system design details were reported.	2	1	2
Test Organisms	9. Test Organism Degradation	Low	Not reported. This was a secondary source; the Primary source may contain more detail.	3	2	6
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Outcome Assessment	11. Outcome Assessment Methodology	High	The outcome assessment was appropriate for this study.	1	1	1
	12. Sampling Methods	High	The sampling was reported and suitable for the study.	1	1	1
Confounding/ Variable Control	13. Confounding Variables	Medium	Limited details were reported in the secondary source; the Primary source may contain more detail. Transformation products were not measured, and evaporation was not specified; however, these omissions were not likely to have had an impact on the results.	2	1	2
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	Medium	There were omissions in the results details; however, these were not likely to have had a substantial impact on the study results. This is a secondary source; the Primary source may contain more detail.	2	2	4

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	16. Statistical Methods and Kinetic Calculations	Not rated	Not reported. This was a secondary source; the Primary source may have more detail.	NR	NR	NR
Other	17. Verification or Plausibility of Results	Not rated	Not applicable for this secondary source; the Primary source may have more detail.	NR	NR	NR
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	22	18	33
High	Medium	Low	**Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:**	1.83	**Overall Score (Rounded):**	1.8
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			**Overall Quality Level:**	Medium

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Study Reference:	**Matsui, S; Murakami, T; Sasaki, T; Hirose, Y; Iguma, Y. (1975). Activated sludge degradability of organic substances in the wastewater of the Kashima petroleum and petrochemical industrial complex in Japan. Prog Water Technol 7: 645-659.** **HERO ID: 18852**					
Domain	**Metric**	**Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]**	**Comments**	**Metric Score**	**Metric Weighting Factor**	**Weighted Score**
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2
	2. Test Substance Purity	Medium	The source and purity of the test substance were not reported; however, the test substance was identified by analytical means.	2	1	2
Test Design	3. Study Controls	Medium	The use of controls was not reported but likely did not impact the study results.	2	2	4
	4. Test Substance Stability	Medium	Test substance stability was not included but does not limit the interpretation of the results.	2	1	2
Test Conditions	5. Test Method Suitability	High	The method is suitable for test material.	1	1	1
	6. Testing Conditions	High	Conditions were adequately monitored and reported.	1	2	2
	7. Testing Consistency	High	Every substrate was tested under the same conditions.	1	1	1
	8. System Type and Design	High	Testing conditions were monitored, reported, and appropriate for the method.	1	1	1
Test Organisms	9. Test Organism Degradation	High	The inoculum source was reported.	1	2	2

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	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Outcome Assessment	11. Outcome Assessment Methodology	High	The method reported is suitable for biodegradation assessment.	1	1	1
	12. Sampling Methods	High	The timing and frequency of the sampling methods were clearly reported and adequate for the outcomes of interest.	1	1	1
Confounding/ Variable Control	13. Confounding Variables	High	Absorption and volatilization were discussed.	1	1	1
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	16. Statistical Methods and Kinetic Calculations	Medium	No information regarding statistics and kinetics were provided; however, results from multiple times points was reported.	2	1	2
Other	17. Verification or Plausibility of Results	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	19	20	25
High	Medium	Low	**Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:**	1.25	**Overall Score (Rounded):**	1.3
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			**Overall Quality Level:**	High

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Study Reference:	Cai, S, hu; Cai, T; Liu, S; Yang, Q; He, J; Chen, L; Hu, J. (2014). Biodegradation of N-methylpyrrolidone by Paracoccus sp. NMD-4 and its degradation pathway. Int Biodeterior Biodegradation 93: 70-77. http://dx.doi.org/10.1016/j.ibiod.2014.04.022 HERO ID: 3576998					
Domain	**Metric**	**Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]**	**Comments**	**Metric Score**	**Metric Weighting Factor**	**Weighted Score**
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2
	2. Test Substance Purity	High	The test substance source was reported.	1	1	1
Test Design	3. Study Controls	Medium	Appropriate controls were included but results were not reported; additional information may be in the Supporting Information.	2	2	4
	4. Test Substance Stability	Medium	Limited details regarding this metric; however, this was not likely to have influenced the results.	2	1	2
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	6. Testing Conditions	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	7. Testing Consistency	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1

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Test Organisms	9. Test Organism Degradation	Medium	Well characterized enrichment pure culture from pesticide factory activated sludge. Relevant for study of potential degradation pathways; however, not representative of natural environmental conditions and rates were not relevant.	2	2	4
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Outcome Assessment	11. Outcome Assessment Methodology	High	Appropriate for identification of potential degradation pathways; however, there may be others. Degradation rates were not relevant to environmental rates.	1	1	1
	12. Sampling Methods	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Confounding/ Variable Control	13. Confounding Variables	High	No confounding variables were noted.	1	1	1
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	16. Statistical Methods and Kinetic Calculations	High	The analysis of data was clearly described.	1	1	1

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Other	17. Verification or Plausibility of Results	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	18	20	25
High	Medium	Low	**Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:**	1.25	**Overall Score (Rounded):**	1.3
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			**Overall Quality Level:**	High

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Study Reference:	Chow, ST; Ng, TL. (1983). The biodegradation of N-methyl-2-pyrrolidone in water by sewage bacteria. Water Res 17: 117-118. http://dx.doi.org/10.1016/0043- 1354(83)90292-0 HERO ID: 3577230					
Domain	**Metric**	**Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]**	**Comments**	**Metric Score**	**Metric Weighting Factor**	**Weighted Score**
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2
	2. Test Substance Purity	Medium	The test substance source was reported; however, company and purity details were omitted.	2	1	2
Test Design	3. Study Controls	Medium	Some details regarding the results of the controls were omitted such as the result of readily and poorly biodegradable reference substances; however, this was not likely to have influenced the interpretation of the study results.	2	2	4
	4. Test Substance Stability	Medium	Details regarding this metric were not included; however, this was not likely to have influenced the interpretation of the study results.	2	1	2
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1

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	6. Testing Conditions	High	Details regarding this metric were limited but both tests were standard biodegradability tests. This omission was not likely to have influenced the interpretation of the study results.	1	2	2
	7. Testing Consistency	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Test Organisms	9. Test Organism Degradation	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Outcome Assessment	11. Outcome Assessment Methodology	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	12. Sampling Methods	Medium	Details regarding this metric were limited; however, this was not likely to have influenced the interpretation of the study results.	2	1	2
Confounding/ Variable Control	13. Confounding Variables	High	Disappearance of the test material was examined, and further assessment of loss was employed.	1	1	1
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR

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Data Presentation and Analysis	15. Data Reporting	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	16. Statistical Methods and Kinetic Calculations	High	The analysis of data was clearly described.	1	1	1
Other	17. Verification or Plausibility of Results	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	19	20	25
High	Medium	Low	**Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:**	1.25	**Overall Score (Rounded):**	1.3
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			**Overall Quality Level:**	High

Study Reference:	Chow, ST; Ng, TL. (1983). The biodegradation of N-methyl-2-pyrrolidone in water by sewage bacteria. Water Res 17: 117-118. http://dx.doi.org/10.1016/0043- 1354(83)90292-0 HERO ID: 3577230					
Domain	**Metric**	**Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]**	**Comments**	**Metric Score**	**Metric Weighting Factor**	**Weighted Score**
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2
	2. Test Substance Purity	Medium	The test substance source was reported; however, company and purity details were omitted.	2	1	2
Test Design	3. Study Controls	Medium	Some details regarding the results of the controls were omitted such as the result of readily and poorly biodegradable reference substances; however, this was not likely to have influenced the interpretation of the study results.	2	2	4
	4. Test Substance Stability	Medium	Details regarding this metric were not included; however, this was not likely to have influenced the interpretation of the study results.	2	1	2
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1

	6. Testing Conditions	High	Details regarding this metric were limited but both tests were standard biodegradability tests. This omission was not likely to have influenced the interpretation of the study results.	1	2	2
	7. Testing Consistency	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Test Organisms	9. Test Organism Degradation	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Outcome Assessment	11. Outcome Assessment Methodology	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	12. Sampling Methods	Medium	Details regarding this metric were limited; however, this was not likely to have influenced the interpretation of the study results.	2	1	2
Confounding/ Variable Control	13. Confounding Variables	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR

Data Presentation and Analysis	15. Data Reporting	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	16. Statistical Methods and Kinetic Calculations	High	The analysis of data was clearly described.	1	1	1
Other	17. Verification or Plausibility of Results	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	19	20	25
High	Medium	Low	**Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:**	1.25	**Overall Score (Rounded):**	1.3
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			**Overall Quality Level:**	High

Study Reference:	**Gomolka, B; Gomolka, E. (1981). The effect of n-methylpyrrolidone (nmp) on the action of activated-sludge. Acta Hydrochim Hydrobiol 9: 555-572. http://dx.doi.org/10.1002/aheh.19810090509 HERO ID: 3577684**					
Domain	**Metric**	**Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]**	**Comments**	**Metric Score**	**Metric Weighting Factor**	**Weighted Score**
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2
	2. Test Substance Purity	Low	The test substance source and purity were not reported nor verified by analytical means.	3	1	3
Test Design	3. Study Controls	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	4. Test Substance Stability	Medium	Details regarding this metric were omitted; however, this was not likely to have influenced the interpretation of the results.	2	1	2
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	6. Testing Conditions	Medium	Some details regarding this metric were omitted; however, this was not likely to have influenced the interpretation of the results.	2	2	4
	7. Testing Consistency	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1

	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Test Organisms	9. Test Organism Degradation	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Outcome Assessment	11. Outcome Assessment Methodology	Low	Some details regarding this metric were omitted, analytical details were not included; this limited precise interpretation of the results presented. Major focus was on concentration that would have affected disturbance of activated sludge treatment. High concentrations were required by the analytical method. These results may not be applicable to lower concentrations likely to be found in activated sludge treatment plants.	3	1	3
	12. Sampling Methods	Medium	Some details regarding this metric were omitted; however, this was not likely to have influenced the interpretation of the results.	2	1	2
Confounding/ Variable Control	13. Confounding Variables	Not rated	No confounding variables were noted.	NR	NR	NR
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR

Data Presentation and Analysis	15. Data Reporting	Medium	Some data were not reported but were unlikely to substantially impact the results.	2	2	4
	16. Statistical Methods and Kinetic Calculations	Medium	Some details were omitted; however, these omissions were not likely to have had a substantial impact on the study results.	2	1	2
Other	17. Verification or Plausibility of Results	Medium	The study results were reasonable data; however, due to limited information evaluation of the reasonableness of the study results was not possible.	2	1	2
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	24	19	31
High	Medium	Low	**Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:**	1.63	**Overall Score (Rounded):**	1.7
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			**Overall Quality Level:**	Medium[1]
[1]This study's overall quality rating was downgraded: Analytical methods were unclear which limits interpretation of the study results.						

Study Reference:	Toxicology and Regulatory Affairs. (2003). 2-Pyrrolidone. (201-14664B). Freeburg, IL. https://java.epa.gov/oppt_chemical_search/ HERO ID: 3970220					
Domain	**Metric**	**Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]**	**Comments**	**Metric Score**	**Metric Weighting Factor**	**Weighted Score**
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name and CASRN.	1	2	2
	2. Test Substance Purity	Medium	The test substance purity was not reported.	2	1	2
Test Design	3. Study Controls	Medium	Control group details were omitted.	2	2	4
	4. Test Substance Stability	Medium	The test substance stability was not reported.	2	1	2
Test Conditions	5. Test Method Suitability	High	The MITI test was suitable for ready biodegradation determination. Zahn-Wellens test simulated activated sludge treatment. BIOWIN QSAR results were suitable for amides.	1	1	1
	6. Testing Conditions	Medium	There were omissions in testing conditions; however, the omissions were not likely to have had a substantial impact on the study results.	2	2	4
	7. Testing Consistency	Not rated	Multiple study groups were not reported.	NR	NR	NR
	8. System Type and Design	Medium	Details regarding the system type and design were not reported; however, the omission was not likely to have had a substantial impact on the study results.	2	1	2

Test Organisms	9. Test Organism Degradation	Medium	Adaption was not specified.	2	2	4
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Outcome Assessment	11. Outcome Assessment Methodology	High	The methods were suitable for various estimates of biodegradability.	1	1	1
	12. Sampling Methods	Not rated	Sampling methods were not reported.	NR	NR	NR
Confounding/ Variable Control	13. Confounding Variables	Not rated	No confounding variables were noted.	NR	NR	NR
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	Medium	The target chemical and transformation product(s) concentrations, extraction efficiency, percent recovery, and mass balance were not reported.	2	2	4
	16. Statistical Methods and Kinetic Calculations	Low	Statistical methods or kinetic calculations were not reported.	3	1	3
Other	17. Verification or Plausibility of Results	Not rated	This metric met the criteria for high confidence as expected for this type of study.	NR	NR	NR
	18. QSAR Models	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
			Sum of scores:	21	17	30
High	Medium	Low	**Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:**	1.76	**Overall Score (Rounded):**	1.8
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			**Overall Quality Level:**	Medium

Study Reference:	**ECHA (European Chemicals Agency). (2017). Biodegradation in water: screening tests: 1-methyl-2-pyrrolidone. Helsinki, Finland. Retrieved from https://echa.europa.eu/registration-dossier/-/registered-dossier/15493/5/3/2#** **HERO ID: 3970766**					
Domain	**Metric**	**Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]**	**Comments**	**Metric Score**	**Metric Weighting Factor**	**Weighted Score**
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2
	2. Test Substance Purity	Medium	The test substance source and purity were not reported.	2	1	2
Test Design	3. Study Controls	Medium	Study control data were omitted.	2	2	4
	4. Test Substance Stability	Medium	The test substance stability was not included but did not limit the interpretation of the results.	2	1	2
Test Conditions	5. Test Method Suitability	High	The test method was suitable for the test material.	1	1	1
	6. Testing Conditions	Medium	Test conditions were omitted such as pH and temperature.	2	2	4
	7. Testing Consistency	Medium	Test conditions were omitted across samples.	2	1	2
	8. System Type and Design	Medium	Details regarding the system type and design were limited; however, the omissions were not likely to have had a substantial impact on the study results.	2	1	2
Test Organisms	9. Test Organism Degradation	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR

Outcome Assessment	11. Outcome Assessment Methodology	High	The outcome of interest and its basis were reported and addressed the outcome of interest.	1	1	1
	12. Sampling Methods	Medium	Sampling methods were omitted. Sampling timing was suitable.	2	1	2
Confounding/ Variable Control	13. Confounding Variables	Not rated	No confounding variables were noted.	NR	NR	NR
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	Medium	The target chemical and transformation product(s) concentrations, extraction efficiency, percent recovery, and mass balance were not reported.	2	2	4
	16. Statistical Methods and Kinetic Calculations	Medium	Statistical Methods and Kinetic Calculations were not reported.	2	1	2
Other	17. Verification or Plausibility of Results	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	23	19	31
High	Medium	Low	**Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:**	1.63	**Overall Score (Rounded):**	1.6
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			**Overall Quality Level:**	High

Study Reference:	BASF. N-methyl pyrrolidone biodegradability. HERO ID: 4140473					
Domain	**Metric**	**Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]**	**Comments**	**Metric Score**	**Metric Weighting Factor**	**Weighted Score**
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2
	2. Test Substance Purity	Medium	The test substance source and purity were not reported.	2	1	2
Test Design	3. Study Controls	Medium	Details regarding this metric were omitted; however, this source is a summary and a routine guideline was cited.	2	2	4
	4. Test Substance Stability	Medium	Details regarding this metric were omitted; however, this source is a summary and a routine guideline was cited.	2	1	2
Test Conditions	5. Test Method Suitability	High	The method is suitable for test material.	1	1	1
	6. Testing Conditions	Medium	Details regarding this metric were omitted; however, this source is a summary and a routine guideline was cited.	2	2	4
	7. Testing Consistency	Medium	Details regarding this metric were omitted; however, this source is a summary and a routine guideline was cited.	2	1	2
	8. System Type and Design	Medium	Details regarding this metric were omitted; however, this source is a summary and a routine guideline was cited.	2	1	2
Test Organisms	9. Test Organism Degradation	Medium	Details regarding this metric were omitted; however, this source is a summary and a routine guideline was cited.	2	2	4

	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Outcome Assessment	11. Outcome Assessment Methodology	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	12. Sampling Methods	Medium	Details regarding this metric were omitted; however, this source is a summary and a routine guideline was cited.	2	1	2
Confounding/ Variable Control	13. Confounding Variables	Medium	Details regarding this metric were omitted; however, this source is a summary and a routine guideline was cited.	2	1	2
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	Medium	Details regarding this metric were omitted; however, this source is a summary and a routine guideline was cited.	2	2	4
	16. Statistical Methods and Kinetic Calculations	Medium	Statistical and kinetic details were omitted; however, these omissions were not likely to have had a substantial impact on the study results.	2	1	2
Other	17. Verification or Plausibility of Results	Not rated	Due to limited information, evaluation of the reasonableness of the study results was not possible.	NR	NR	NR
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	25	19	34
High	Medium	Low	**Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:**	1.79	**Overall Score (Rounded):**	1.8

≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			**Overall Quality Level:**	Medium[1]
[1]The source is a summary document that references "A Correlation Study of Biodegradability Determinations with Various Chemicals in Various Tests" P. Gerike and W.K. Fischer Ecotoxicity and Environmental Safety 3, 159 (1979).						

Study Reference:	BASF. N-methyl pyrrolidone biodegradability. HERO ID: 4140473					
Domain	**Metric**	**Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]**	**Comments**	**Metric Score**	**Metric Weighting Factor**	**Weighted Score**
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2
	2. Test Substance Purity	Medium	The test substance source and purity were not reported.	2	1	2
Test Design	3. Study Controls	Medium	Details regarding this metric were omitted; however, this source is a summary and a routine guideline was cited.	2	2	4
	4. Test Substance Stability	Medium	Details regarding this metric were omitted; however, this source is a summary and a routine guideline was cited.	2	1	2
Test Conditions	5. Test Method Suitability	High	The method is suitable for test material.	1	1	1
	6. Testing Conditions	Medium	Details regarding this metric were omitted; however, this source is a summary and a routine guideline was cited.	2	2	4
	7. Testing Consistency	Medium	Details regarding this metric were omitted; however, this source is a summary and a routine guideline was cited.	2	1	2

	8. System Type and Design	Medium	Details regarding this metric were omitted; however, this source is a summary and a routine guideline was cited.	2	1	2
Test Organisms	9. Test Organism Degradation	Medium	Details regarding this metric were omitted; however, this source is a summary and a routine guideline was cited.	2	2	4
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Outcome Assessment	11. Outcome Assessment Methodology	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	12. Sampling Methods	Medium	Details regarding this metric were omitted; however, this source is a summary and a routine guideline was cited.	2	1	2
Confounding/ Variable Control	13. Confounding Variables	Medium	Details regarding this metric were omitted; however, this source is a summary and a routine guideline was cited.	2	1	2
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	Medium	Details regarding this metric were omitted; however, this source is a summary and a routine guideline was cited.	2	2	4

	16. Statistical Methods and Kinetic Calculations	Medium	Statistical and kinetic details were omitted; however, these omissions were not likely to have had a substantial impact on the study results.	2	1	2
Other	17. Verification or Plausibility of Results	Not rated	Due to limited information, evaluation of the reasonableness of the study results was not possible.	NR	NR	NR
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	25	19	34
High	Medium	Low	**Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:**	1.79	**Overall Score (Rounded):**	1.8
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			**Overall Quality Level:**	Medium[1]
[1]Primary source cited: A Correlation Study of Biodegradability Determinations with Various Chemicals in Various Tests" P. Gerike and W.K. Fischer Ecotoxicity and Environmental Safety 3, 159 (1979).						

Study Reference:	BASF. N-methyl pyrrolidone biodegradability. HERO ID: 4140473					
Domain	**Metric**	**Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]**	**Comments**	**Metric Score**	**Metric Weighting Factor**	**Weighted Score**
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2
	2. Test Substance Purity	Medium	The test substance source and purity were not reported.	2	1	2
Test Design	3. Study Controls	Medium	Study controls were not reported but may be retrievable from the referenced article.	2	2	4
	4. Test Substance Stability	Medium	Details regarding this metric were not reported but this does not limit the interpretation of the results.	2	1	2
Test Conditions	5. Test Method Suitability	Medium	Limited details reported on the test method; however, this source is a summary and a routine guideline was cited.	2	1	2
	6. Testing Conditions	Medium	Limited details reported on the test condition but may be retrievable from the referenced article.	2	2	4
	7. Testing Consistency	Medium	Limited details were reported but may be retrievable from the referenced article.	2	1	2
	8. System Type and Design	Medium	Limited details regarding test system type and design were provided but may be retrievable from the referenced primary source.	2	1	2
Test Organisms	9. Test Organism Degradation	Medium	Test organism details were not reported but may be retrievable from the referenced primary source.	2	2	4
	10. Test Organism	Not rated	The metric is not applicable to this	NR	NR	NR

	Partitioning		study type.			
Outcome Assessment	11. Outcome Assessment Methodology	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	12. Sampling Methods	Medium	Sampling method information was provided but may be retrievable from the referenced primary source.	2	1	2
Confounding/ Variable Control	13. Confounding Variables	Medium	Details regarding this metric were omitted; however, this source is a summary and a routine guideline was cited.	2	1	2
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	Medium	Details regarding this metric were omitted; however, this source is a summary and a routine guideline was cited.	2	2	4
	16. Statistical Methods and Kinetic Calculations	Medium	Statistical and kinetic details were omitted; however, these omissions were not likely to have had a substantial impact on the study results.	2	1	2
Other	17. Verification or Plausibility of Results	Not rated	Due to limited information, evaluation of the reasonableness of the study results was not possible.	NR	NR	NR
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	26	19	35
High	Medium	Low	**Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:**	1.84	**Overall Score (Rounded):**	1.8
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			**Overall Quality Level:**	Medium[1]
[1]Primary source cited: A Correlation Study of Biodegradability Determinations with Various Chemicals in Various Tests" P. Gerike and W.K. Fischer Ecotoxicity and Environmental Safety 3, 159 (1979).						

Study Reference:	BASF. N-methyl pyrrolidone biodegradability. HERO ID: 4140473					
Domain	**Metric**	**Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]**	**Comments**	**Metric Score**	**Metric Weighting Factor**	**Weighted Score**
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2
	2. Test Substance Purity	Medium	The test substance source and purity were not reported.	2	1	2
Test Design	3. Study Controls	Medium	Details regarding this metric were omitted; however, this source is a summary and a routine guideline was cited.	2	2	4
	4. Test Substance Stability	Medium	Details regarding this metric were omitted; however, this source is a summary and a routine guideline was cited.	2	1	2
Test Conditions	5. Test Method Suitability	High	The method is suitable for test material.	1	1	1
	6. Testing Conditions	Medium	Details regarding this metric were omitted; however, this source is a summary and a routine guideline was cited.	2	2	4
	7. Testing Consistency	Medium	Details regarding this metric were omitted; however, this source is a summary and a routine guideline was cited.	2	1	2

	8. System Type and Design	Medium	Details regarding this metric were omitted; however, this source is a summary and a routine guideline was cited.	2	1	2
Test Organisms	9. Test Organism Degradation	Medium	Details regarding this metric were omitted; however, this source is a summary and a routine guideline was cited.	2	2	4
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Outcome Assessment	11. Outcome Assessment Methodology	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	12. Sampling Methods	Medium	Details regarding this metric were omitted; however, this source is a summary and a routine guideline was cited.	2	1	2
Confounding/ Variable Control	13. Confounding Variables	Medium	Details regarding this metric were omitted; however, this source is a summary and a routine guideline was cited.	2	1	2
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	Medium	Details regarding this metric were omitted; however, this source is a summary and a routine guideline was cited.	2	2	4

	16. Statistical Methods and Kinetic Calculations	Medium	Statistical and kinetic details were omitted; however, these omissions were not likely to have had a substantial impact on the study results.	2	1	2
Other	17. Verification or Plausibility of Results	Not rated	Due to limited information, evaluation of the reasonableness of the study results was not possible.	NR	NR	NR
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	25	19	34
High	Medium	Low	**Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:**	1.79	**Overall Score (Rounded):**	1.8
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			**Overall Quality Level:**	Medium[1]
[1]Primary source cited: A Correlation Study of Biodegradability Determinations with Various Chemicals in Various Tests" P. Gerike and W.K. Fischer Ecotoxicity and Environmental Safety 3, 159 (1979).						

Study Reference:	BASF. N-methyl pyrrolidone biodegradability. HERO ID: 4140473					
Domain	**Metric**	**Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]**	**Comments**	**Metric Score**	**Metric Weighting Factor**	**Weighted Score**
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2
	2. Test Substance Purity	Medium	The test substance source and purity were not reported.	2	1	2
Test Design	3. Study Controls	Medium	Study controls were not reported but may be retrievable from the referenced article.	2	2	4
	4. Test Substance Stability	Medium	Details regarding this metric were not reported but this does not limit the interpretation of the results.	2	1	2
Test Conditions	5. Test Method Suitability	Medium	Limited details reported on the test method but may be retrievable from the referenced primary source.	2	1	2
	6. Testing Conditions	Medium	Limited details reported on the test condition but may be retrievable from the referenced article.	2	2	4
	7. Testing Consistency	Medium	Limited details were reported but may be retrievable from the referenced article.	2	1	2
	8. System Type and Design	Medium	Limited details regarding test system type and design were provided but may be retrievable from the referenced primary source.	2	1	2

Test Organisms	9. Test Organism Degradation	Medium	Test organism details were not reported but may be retrievable from the referenced primary source.	2	2	4
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Outcome Assessment	11. Outcome Assessment Methodology	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	12. Sampling Methods	Medium	Sampling method information was provided but may be retrievable from the referenced primary source.	2	1	2
Confounding/ Variable Control	13. Confounding Variables	Medium	Details regarding this metric were omitted; however, this source is a summary and a routine guideline was cited.	2	1	2
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	Medium	Details regarding this metric were omitted; however, this source is a summary and a routine guideline was cited.	2	2	4
	16. Statistical Methods and Kinetic Calculations	Medium	Statistical and kinetic details were omitted; however, these omissions were not likely to have had a substantial impact on the study results.	2	1	2

Other	17. Verification or Plausibility of Results	Not rated	Due to limited information, evaluation of the reasonableness of the study results was not possible.	NR	NR	NR
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	26	19	35
High	Medium	Low	**Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:**	1.84	**Overall Score (Rounded):**	1.8
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			**Overall Quality Level:**	Medium[1]
[1]Primary source cited: A Correlation Study of Biodegradability Determinations with Various Chemicals in Various Tests" P. Gerike and W.K. Fischer Ecotoxicity and Environmental Safety 3, 159 (1979).						

Study Reference:	BASF. N-methyl pyrrolidone biodegradability. HERO ID: 4140473					
Domain	**Metric**	**Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]**	**Comments**	**Metric Score**	**Metric Weighting Factor**	**Weighted Score**
Test Substance	1. Test Substance Identity	High	The test material was identified by name.	1	2	2
	2. Test Substance Purity	Medium	Test substance source and purity were not reported in this secondary source.	2	1	2
Test Design	3. Study Controls	Medium	Study controls were not reported but may be retrievable from the referenced article.	2	2	4
	4. Test Substance Stability	Medium	Details regarding this metric were not reported but this does not limit the interpretation of the results.	2	1	2
Test Conditions	5. Test Method Suitability	Medium	Limited details reported on the test method but may be retrievable from the referenced primary source.	2	1	2
	6. Testing Conditions	Medium	Limited details reported on the test condition but may be retrievable from the referenced article.	2	2	4
	7. Testing Consistency	Medium	Limited details were reported but may be retrievable from the referenced article.	2	1	2
	8. System Type and Design	Medium	Limited details regarding test system type and design were provided but may be retrievable from the referenced primary source.	2	1	2
Test Organisms	9. Test Organism Degradation	Medium	Reported as activated sludge; limited details were reported but may be retrievable from the referenced article.	2	2	4

	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Outcome Assessment	11. Outcome Assessment Methodology	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	12. Sampling Methods	Medium	Sampling method information was provided but may be retrievable from the referenced primary source.	2	1	2
Confounding/ Variable Control	13. Confounding Variables	Medium	No information was provided but may be retrievable from the referenced article.	2	1	2
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	Medium	Detailed data was not reported but may be retrievable from the referenced article. [R. Zahn and H.Z. Wellens Wasser Abwasser Forschung 13, 1 (1980)]	2	2	4
	16. Statistical Methods and Kinetic Calculations	Medium	Statistical and kinetic details were omitted; however, these omissions were not likely to have had a substantial impact on the study results.	2	1	2
Other	17. Verification or Plausibility of Results	Not rated	Due to limited information, evaluation of the reasonableness of the study results was not possible.	NR	NR	NR
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	26	19	35
High	Medium	Low	**Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:**	1.84	**Overall Score (Rounded):**	1.8
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			**Overall Quality Level:**	Medium[1]

[1]Primary source cited: R. Zahn and H.Z. Wellens Wasser Abwasser Forschung 13, 1 (1980).

Study Reference:	BASF. N-methyl pyrrolidone biodegradability. HERO ID: 4140473					
Domain	**Metric**	**Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]**	**Comments**	**Metric Score**	**Metric Weighting Factor**	**Weighted Score**
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2
	2. Test Substance Purity	Medium	Test substance source and purity were not reported in this secondary source.	2	1	2
Test Design	3. Study Controls	Medium	Study controls were not reported in this secondary source, but this does not limit the interpretation of the results.	2	2	4
	4. Test Substance Stability	Medium	Details regarding this metric were not reported but this does not limit the interpretation of the results.	2	1	2
Test Conditions	5. Test Method Suitability	Medium	Limited details reported on the test method but may be retrievable from the referenced primary source.	2	1	2
	6. Testing Conditions	Medium	Limited details reported on the test condition but may be retrievable from the referenced article.	2	2	4
	7. Testing Consistency	Medium	Limited details were reported but may be retrievable from the referenced article.	2	1	2
	8. System Type and Design	Medium	Limited details regarding test system type and design were provided but may be retrievable from the referenced primary source.	2	1	2

Test Organisms	9. Test Organism Degradation	Medium	Test organism details were not reported but may be retrievable from the referenced primary source.	2	2	4
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Outcome Assessment	11. Outcome Assessment Methodology	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	12. Sampling Methods	Medium	Sampling method information was provided but may be retrievable from the referenced primary source.	2	1	2
Confounding/ Variable Control	13. Confounding Variables	Medium	No information was provided but may be retrievable from the referenced article.	2	1	2
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	Medium	No information was provided but may be retrievable from the referenced primary source.	2	2	4
	16. Statistical Methods and Kinetic Calculations	Medium	Statistical and kinetic details were omitted; however, these omissions were not likely to have had a substantial impact on the study results.	2	1	2
Other	17. Verification or Plausibility of Results	Not rated	Due to limited information, evaluation of the reasonableness of the study results was not possible.	NR	NR	NR
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	26	19	36
High	Medium	Low	**Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:**	1.84	**Overall Score (Rounded):**	1.8

≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			**Overall Quality Level:**	Medium[1]
[1]Primary source cited "Lube Solvents No Threat to Waste Treatment" E.H. Rowe and L.F. Tullos, Jr., Hydrocarbon Processing, 59, p. 63-65 (October 1980)						

Study Reference:	U.S. EPA (U.S. Environmental Protection Agency). (2012). Estimation Programs Interface Suite™ for Microsoft® Windows, v 4.11 [Computer Program]. Washington, DC. Retrieved from https://www.epa.gov/tsca-screening-tools/epi-suitetm-estimation-program- interface HERO ID: 2347246					
Domain	**Metric**	**Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]**	**Comments**	**Metric Score**	**Metric Weighting Factor**	**Weighted Score**
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2
	2. Test Substance Purity	Not rated	The metric is not applicable to this study type (SAR).	NR	NR	NR
Test Design	3. Study Controls	Not rated	The metric is not applicable to this study type (SAR).	NR	NR	NR
	4. Test Substance Stability	Not rated	The metric is not applicable to this study type (SAR).	NR	NR	NR
Test Conditions	5. Test Method Suitability	Not rated	The metric is not applicable to this study type (SAR).	NR	NR	NR
	6. Testing Conditions	Not rated	The metric is not applicable to this study type (SAR).	NR	NR	NR
	7. Testing Consistency	Not rated	The metric is not applicable to this study type (SAR).	NR	NR	NR
	8. System Type and Design	Not rated	The metric is not applicable to this study type (SAR).	NR	NR	NR
Test Organisms	9. Test Organism Degradation	Not rated	The metric is not applicable to this study type.	NR	NR	NR
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Outcome Assessment	11. Outcome Assessment Methodology	Not rated	The metric is not applicable to this study type (SAR).	NR	NR	NR
	12. Sampling Methods	Not rated	The metric is not applicable to this study type (SAR).	NR	NR	NR

Confounding/ Variable Control	13. Confounding Variables	Not rated	The metric is not applicable to this study type (SAR).	NR	NR	NR
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	Not rated	The metric is not applicable to this study type (SAR).	NR	NR	NR
	16. Statistical Methods and Kinetic Calculations	Not rated	The metric is not applicable to this study type (SAR).	NR	NR	NR
Other	17. Verification or Plausibility of Results	Not rated	The metric is not applicable to this study type (SAR).	NR	NR	NR
	18. QSAR Models	High	The models in EPI Suite™ have defined endpoints. Chemical domain and performance statistics for each model are known, and unambiguous algorithms are available in the EPI Suite™ Documentation and/or cited references to establish their scientific validity. Many EPI Suite™ models have correlation coefficients >0.7, cross-validated correlation coefficients >0.5, and standard error values <0.3; however, correlation coefficients (r2, q2) for the regressions of some environmental fate models (i.e. BIOWIN) are lower, as expected, compared to regressions which have specific experimental values such as water solubility or log Kow (octanol-water	1	1	1

			partition coefficient).			
			Sum of scores:	2	3	1
High	Medium	Low	**Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:**	1	**Overall Score (Rounded):**	1
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			**Overall Quality Level:**	High

Study Reference:	Aschmann, SM; Atkinson, R. (1999). Atmospheric chemistry of 1-methyl-2- pyrrolidinone. Atmos Environ 33: 591-599. http://dx.doi.org/10.1016/S1352-2310(98)00269-6 HERO ID: 1721939					
Domain	**Metric**	**Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]**	**Comments**	**Metric Score**	**Metric Weighting Factor**	**Weighted Score**
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2
	2. Test Substance Purity	High	Test substance purity and source were reported.	1	1	1
Test Design	3. Study Controls	Medium	Some reference compound information was reported.	2	2	4
	4. Test Substance Stability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	6. Testing Conditions	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	7. Testing Consistency	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Test Organisms	9. Test Organism Degradation	Not rated	The metric is not applicable to this study type.	NR	NR	NR
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR

Outcome Assessment	11. Outcome Assessment Methodology	High	This metric met the criteria for high confidence as expected for this type	1	1	1
	12. Sampling Methods	High	This metric met the criteria for high confidence as expected for this type	1	1	1
Confounding/ Variable Control	13. Confounding Variables	High	This metric met the criteria for high confidence as expected for this type	1	1	1
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	High	This metric met the criteria for high confidence as expected for this type	1	2	2
	16. Statistical Methods and Kinetic Calculations	High	This metric met the criteria for high confidence as expected for this type	1	1	1
Other	17. Verification or Plausibility of Results	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	15	18	20
High	Medium	Low	**Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:**	1.11	**Overall Score (Rounded):**	1.1
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			**Overall Quality Level:**	High

Study Reference:	**ECHA (European Chemicals Agency). (2017). Phototransformation in air: 1-Methyl-2-pyrrolidone. Helsinki, Finland. Retrieved from https://echa.europa.eu/registration-dossier/-/registered-dossier/15493/5/2/2#** **HERO ID: 3970781**					
Domain	**Metric**	**Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]**	**Comments**	**Metric Score**	**Metric Weighting Factor**	**Weighted Score**
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2
	2. Test Substance Purity	Not rated	The metric is not applicable to this study type (QSAR).	NR	NR	NR
Test Design	3. Study Controls	Not rated	The metric is not applicable to this study type (QSAR).	NR	NR	NR
	4. Test Substance Stability	Not rated	The metric is not applicable to this study type (QSAR).	NR	NR	NR
Test Conditions	5. Test Method Suitability	Not rated	The metric is not applicable to this study type (QSAR).	NR	NR	NR
	6. Testing Conditions	Not rated	The metric is not applicable to this study type (QSAR).	NR	NR	NR
	7. Testing Consistency	Not rated	The metric is not applicable to this study type (QSAR).	NR	NR	NR
	8. System Type and Design	Not rated	The metric is not applicable to this study type (QSAR).	NR	NR	NR

Test Organisms	9. Test Organism Degradation	Not rated	The metric is not applicable to this study type.	NR	NR	NR
	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Outcome Assessment	11. Outcome Assessment Methodology	Not rated	The metric is not applicable to this study type (QSAR).	NR	NR	NR
	12. Sampling Methods	Not rated	The metric is not applicable to this study type (QSAR).	NR	NR	NR
Confounding/ Variable Control	13. Confounding Variables	Not rated	The metric is not applicable to this study type (QSAR).	NR	NR	NR
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	Medium	Some information was not reported; however, these omissions were not likely to have had a substantial impact on the study results.	2	2	4
	16. Statistical Methods and Kinetic Calculations	Not rated	The metric is not applicable to this study type (QSAR).	NR	NR	NR
Other	17. Verification or Plausibility of Results	Medium	The study results were reasonable; presented in a secondary source.	2	1	2
	18. QSAR Models	High	The QSAR model (AOPWIN v1.92) has a defined, unambiguous endpoint and the model performance was known.	1	1	1
			Sum of scores:	6	6	9
High	Medium	Low	**Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:**	1.5	**Overall Score (Rounded):**	1.5

≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			**Overall Quality Level:**	High

Study Reference:	Aliabadi, M; Ghahremani, H; Izadkhah, F; Sagharigar, T. (2012). PHOTOCATALYTIC DEGRADATION OF N-METHYL-2-PYRROLIDONE IN AQUEOUS SOLUTIONS USING LIGHT SOURCES OF UVA, UVC AND UVLED. Fresen Environ Bull 21: 2120-2125. HERO ID: 1583365					
Domain	**Metric**	**Qualitative Determination [i.e., High, Medium, Low, Unacceptable, or Not rated]**	**Comments**	**Metric Score**	**Metric Weighting Factor**	**Weighted Score**
Test Substance	1. Test Substance Identity	High	The test substance was identified by chemical name.	1	2	2
	2. Test Substance Purity	High	The test substance purity was reported.	1	1	1
Test Design	3. Study Controls	Medium	Controls were not required to interpret the study results. Only one result was reported without catalyst but used 254 nm light, which is not environmentally relevant.	2	2	4
	4. Test Substance Stability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Test Conditions	5. Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	6. Testing Conditions	High	This metric met the criteria for high confidence as expected for this type of study.	1	2	2
	7. Testing Consistency	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	8. System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Test Organisms	9. Test Organism Degradation	Not rated	The metric is not applicable to this study type.	NR	NR	NR

	10. Test Organism Partitioning	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Outcome Assessment	11. Outcome Assessment Methodology	Unacceptable	Study was performed in the presence of catalyst or at wavelengths not relevant to environmental conditions.	4	1	4
	12. Sampling Methods	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
Confounding/ Variable Control	13. Confounding Variables	High	This metric met the criteria for high confidence as expected for this type of study. Multiple parameters were discussed.	1	1	1
	14. Outcomes Unrelated to Exposure	Not rated	The metric is not applicable to this study type.	NR	NR	NR
Data Presentation and Analysis	15. Data Reporting	High	Photocatalytic decomposition; appropriate information was identified.	1	2	2
	16. Statistical Methods and Kinetic Calculations	High	Equations and results were presented.	1	1	1
Other	17. Verification or Plausibility of Results	High	This metric met the criteria for high confidence as expected for this type of study.	1	1	1
	18. QSAR Models	Not rated	The metric is not applicable to this study type.	NR	NR	NR
			Sum of scores:	18	18	23
High	Medium	Low	**Overall Score = Sum of Weighted Scores/Sum of Metric Weighting Factors:**	1.28	**Overall Score (Rounded):**	4
≥1 and <1.7	≥1.7 and <2.3	≥2.3 and ≤3			**Overall Quality Level:**	Unacceptable[1]

[1]Study performed in the presence of catalyst or at wavelengths not relevant to environmental conditions. Consistent with our Application of Systematic Review in TSCA Risk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics was rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.