

**Table S3.** Methodological quality assessment of environmental and non-in vivo/non-in vitro studies (N=22).

| Study                              | D1 | D2 | D3 | D4 | D5 | D6 | D7 | D8 | D9 | D10 | Total score | Overall quality |
|------------------------------------|----|----|----|----|----|----|----|----|----|-----|-------------|-----------------|
| Arfaeinia et al., 2024             | 2  | 2  | 1  | 2  | 2  | 2  | 1  | 0  | 2  | 2   | 16/20       | Moderate        |
| Dobaradaran et al., 2020           | 2  | 2  | 1  | 2  | 2  | 2  | na | na | 2  | 1   | 14/16       | High            |
| Dobaradaran et al., 2021           | 2  | 2  | 1  | 2  | 2  | 2  | na | na | 2  | 1   | 14/16       | High            |
| Dobaradaran et al., 2022           | 2  | 2  | 1  | 2  | 2  | 2  | na | na | 2  | 1   | 14/16       | High            |
| Dobaradaran et al., 2023           | 2  | 2  | 1  | 2  | 2  | 2  | 1  | 0  | 2  | 1   | 15/20       | Moderate        |
| Dobaradaran et al., 2024a          | 2  | 2  | 1  | 2  | 2  | 2  | 1  | 0  | 2  | 1   | 15/20       | Moderate        |
| Dobaradaran et al., 2024b          | 2  | 2  | 1  | 2  | 2  | 2  | 1  | 0  | 2  | 1   | 15/20       | Moderate        |
| El Hadri et al., 2021              | 2  | 2  | 1  | 2  | 2  | 2  | 2  | 0  | 2  | 2   | 17/20       | High            |
| Garshasbi et al., 2026             | 2  | 2  | 1  | 2  | 1  | 2  | na | na | 1  | 1   | 12/16       | Moderate        |
| Kouhi et al., 2025                 | 2  | 2  | 1  | 1  | 1  | 1  | 1  | 0  | 2  | 1   | 12/20       | Low             |
| Michael et al., 2022               | 2  | 2  | 1  | 2  | 1  | 2  | na | na | 1  | 1   | 12/16       | Moderate        |
| Mihajlović et al., 2026            | 2  | 2  | 1  | 2  | 2  | 2  | 1  | 0  | 1  | 1   | 14/20       | Moderate        |
| Mohammadi et al., 2025             | 2  | 2  | 1  | 2  | 1  | 2  | 1  | 1  | 2  | 2   | 16/20       | Moderate        |
| Nitschke et al., 2023 <sup>†</sup> | 2  | 2  | 1  | 2  | 1  | 2  | na | na | 2  | 2   | 14/16       | High            |
| Nongdren et al., 2024              | 2  | 2  | 2  | 1  | 1  | 1  | 1  | 2  | 2  | 1   | 15/20       | Moderate        |
| Nongdren et al., 2026              | 2  | 2  | 1  | 2  | 2  | 1  | 1  | 2  | 2  | 2   | 17/20       | High            |
| Tan et al., 2026                   | 2  | 2  | 0  | 2  | 2  | 2  | 1  | 0  | 2  | 2   | 15/20       | Moderate        |
| Torkashvand et al., 2021           | 2  | 2  | 1  | 2  | 1  | 2  | 1  | 0  | 1  | 1   | 13/20       | Moderate        |
| Venugopal et al., 2021             | 2  | 2  | 1  | 2  | 2  | 1  | na | na | 2  | 2   | 14/16       | High            |
| Yang et al., 2023 <sup>‡</sup>     | 2  | 2  | 2  | 2  | 1  | 2  | na | na | 1  | 1   | 13/16       | Moderate        |
| Yang et al., 2024                  | 2  | 2  | 2  | 2  | 2  | 2  | na | na | 2  | 1   | 15/16       | High            |
| Yona et al., 2025                  | 2  | 2  | 2  | 2  | 2  | 2  | na | na | 2  | 2   | 16/16       | High            |

**Note.** D1, Study objectives; D2, Study design; D3, Sampling strategy; D4, Exposure characterization; D5, Analytical methods; D6, Input data quality; D7, Model assumptions; D8, Uncertainty and sensitivity analysis; D9, Statistical/modelling analysis; D10, Interpretation of findings. Scores: 2 = low methodological concern; 1 = moderate methodological concern; 0 = high methodological concern; na = not applicable. For mixed-design studies including observational/environmental and in vivo or in vitro components, only the observational/environmental component was assessed using this checklist; the in vivo or in vitro component was assessed separately using the corresponding study-design-specific quality assessment tool.

<sup>†</sup> Nitschke et al. (2023): the score is based exclusively on the observational cigarette-littering component; the in vivo ecotoxicological component was assessed separately.

<sup>‡</sup> Yang et al. (2023): the score reported here refers only to the observational/environmental component; the laboratory in vivo/in vitro component, where applicable, was assessed separately using the corresponding tool.