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| **Phase 1 Experiment** | | | **Phase 2 Experiment** | | | | | | |
| v | *na* | Between Animals Residual DF | *nRuns* | *nTags* | *Between Runs stratum* | *Between Animals within Runs stratum* | | | |
| Animal DF | Tag DF | Residual DF | Tag ⊥ Trt ( *E* ) | *Treatment efficiency factors* |
| *E* |
| 2 | 4 | 2 | 2 | 4 | 0 | 1 | 1 | Yes | 1 |
| 6 | 4 | 3 | 1 | 1 | 2 | No (1/9) | 0.8889 |
| 8 | 6 | 4 | 1 | 1 | 4 | Yes | 1 |
| 10 | 8 | 5 | 2 | 1 | 5 | No (1/25) | 0.96 |
| 12 | 10 | 6 | 2 | 1 | 7 | Yes | 1 |
| 14 | 12 | 7 | 3 | 1 | 8 | No (1/49) | 0.9796 |
| 16 | 14 | 8 | 3 | 1 | 10 | Yes | 1 |
| 8 | 6 | 2 | 8 | 0 | 3 | 3 | Yes | 1 |
| 12 | 10 | 3 | 1 | 3 | 6 | No (1/9) | 0.8889 |
| 16 | 14 | 4 | 1 | 3 | 10 | Yes | 1 |

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| **Phase 1 Design** | | | **Phase 2 Design** | | | | | | | | |
| v | *na* | Between Animals Residual DF | *nRuns* | *nTags* | *Between Runs stratum* | | *Between Animals within Runs stratum* | | | | |
| Animal DF | Trt DF | Tag DF | Residual DF | Tag ⊥ Trt | *Treatment efficiency factors* | |
| *ei* | *E* |
| 3 | 6 | 3 | 3 | 4 | 1 | 1 | 1 | 1 | Yes | 1, 3/4 | 0.8571 |
| 12 | 9 | 6 | 2 | 2 | 1 | 6 | Yes | 15/16(2) | 0.9375 |
| 18 | 15 | 9 | 4 | 2 | 1 | 10 | Yes | 23/24, 7/8 | 0.9148 |
| 24 | 21 | 12 | 5 | 2 | 1 | 15 | Yes | 15/16 (2) | 0.9375 |
| 12 | 9 | 3 | 8 | 1 | 1 | 3 | 5 | Yes | 1, 15/16 | 0.9677 |
| 24 | 21 | 6 | 2 | 2 | 3 | 16 | Yes | 63/64 (2) | 0.9844 |

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| **Phase 1 Design** | | | **Phase 2 Design** | | | | | | | | |
| v | *na* | Between Animals Residual DF | *nRuns* | *nTags* | *Between Runs stratum* | | *Between Animals within Runs stratum* | | | | |
| Animal DF | Trt DF | Tag DF | Residual DF | Tag ⊥ Trt (E) | *Treatment efficiency factors* | |
| *ei* | *E* |
| 4 | 8 | 4 | 4 | 4 | 1 | 0 | 1 | 2 | Yes | 1 | 1 |
| 12 | 8 | 6 | 2 | 0 | 1 | 5 | No (1/9) | 1(2), 8/9 | 0.96 |
| 16 | 12 | 8 | 3 | 0 | 1 | 8 | Yes | 1 | 1 |
| 20 | 16 | 10 | 4 | 0 | 1 | 11 | No (1/25) | 1(2), 24/25 | 0.9863 |
| 24 | 20 | 12 | 5 | 0 | 1 | 14 | Yes | 1 | 1 |
| 28 | 24 | 14 | 6 | 0 | 1 | 17 | No (1/49) | 1(2), 48/49 | 0.9931 |
| 32 | 28 | 16 | 7 | 0 | 1 | 20 | Yes | 1 | 1 |
| 8 | 4 | 2 | 8 | 0 | 0 | 3 | 2 | No (1/2) | 1,1/2(2) | 0.6 |
| 12 | 8 | 3 | 1 | 0 | 3 | 4 | No (1/9) | 8/9 (3) | 0.8889 |
| 16 | 12 | 4 | 1 | 0 | 3 | 8 | Yes | 1 | 1 |
| 20 | 16 | 5 | 2 | 0 | 3 | 11 | No (1/25) | 24/25(3) | 0.96 |
| 24 | 20 | 6 | 2 | 0 | 3 | 15 | No (1/18) | 1, 17/18(2) | 0.9623 |
| 28 | 24 | 7 | 3 | 0 | 3 | 18 | No (1/49) | 48/49(3) | 0.9796 |
| 32 | 28 | 8 | 3 | 0 | 3 | 22 | Yes | 1 | 1 |

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| **Phase 1 Design** | | | **Phase 2 Design** | | | | | | | | |
| v | *na* | Between Animals Residual DF | *nRuns* | *nTags* | *Between Runs stratum* | | *Between Animals within Runs stratum* | | | | |
| Animal DF | Trt DF | Tag DF | Residual DF | Tag ⊥ Trt | *Treatment efficiency factors* | |
| *ei* | *E* |
| 5 | 10 | 5 | 5 | 4 | 2 | 2 | 1 | 2 | Yes | 1(2), 7/8, 5/8 | 0.8434 |
| 20 | 15 | 10 | 4 | 4 | 1 | 10 | Yes | 15/16(4) | 0.9375 |
| 30 | 25 | 15 | 7 | 4 | 1 | 17 | Yes | 23/24(2), 11/12 5/6 | 0.9137 |
| 40 | 35 | 20 | 9 | 4 | 1 | 25 | Yes | 15/16(4) | 0.9375 |
| 50 | 45 | 25 | 12 | 4 | 1 | 32 | Yes | 19/20(2), 37/40, 7/8 | 0.9240 |
| 20 | 15 | 5 | 8 | 2 | 2 | 3 | 10 | Yes | 1(2), 15/16(2) | 0.9677 |
| 40 | 35 | 10 | 4 | 4 | 3 | 28 | Yes | 0.994 (2), 0.959(2) | 0.9763 |

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| **Phase 1 Design** | | | **Phase 2 Design** | | | | | | | | |
| v | *na* | Between Animals Residual DF | *nRuns* | *nTags* | *Between Runs stratum* | | *Between Animals within Runs stratum* | | | | |
| Animal DF | Trt DF | Tag DF | Residual DF | Tag ⊥ Trt (E) | *Treatment efficiency factors* | |
| *ei* | *E* |
| 6 | 12 | 6 | 6 | 4 | 2 | 2 | 1 | 3 | Yes | 1(3), 3/4(2) | 0.8824 |
| 18 | 12 | 9 | 4 | 4 | 1 | 7 | No (1/9) | 11/12(2), 8/9, 3/4(2) | 0.8370 |
| 24 | 18 | 12 | 5 | 4 | 1 | 12 | Yes | 1, 15/16(2), 13/16(2) | 0.8937 |
| 30 | 24 | 15 | 7 | 5 | 1 | 16 | No (1/25) | 0.953, 9/10, 0.8836, 0.8235, 4/5 | 0.8686 |
| 36 | 30 | 18 | 8 | 4 | 1 | 21 | Yes | 1, 7/8 (4) | 0.8974 |
| 42 | 36 | 21 | 10 | 5 | 1 | 25 | No (1/49) | 13/14, 0.9164, 6/7(2), 0.8489 | 0.8804 |
| 48 | 42 | 24 | 11 | 5 | 1 | 30 | Yes | 15/16 (2), 7/8 (3) | 0.8990 |
| 12 | 6 | 3 | 8 | 1 | 1 | 3 | 2 | No (1/3) | 1, 3/4, 2/3(3) | 0.7317 |
| 24 | 18 | 6 | 2 | 2 | 3 | 13 | Yes | 1(3), 15/16(2) | 0.9740 |
| 36 | 30 | 9 | 4 | 4 | 3 | 23 | No (4/81) | 0.9792, 0.9601, 0.9421 0.9375 0.9033 | 0.9438 |
| 48 | 42 | 12 | 5 | 4 | 3 | 34 | Yes | 1, 63/64(2), 61/64(2) | 0.9746 |

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| **Phase 1 Design** | | | **Phase 2 Design** | | | | | | | | |
| v | *na* | Between Animals Residual DF | *nRuns* | *nTags* | *Between Runs stratum* | | *Between Animals within Runs stratum* | | | | |
| Animal DF | Trt DF | Tag DF | Residual DF | Tag ⊥ Trt | *Treatment efficiency factors* | |
| *ei* | *E* |
| 7 | 14 | 7 | 7 | 4 | 3 | 3 | 1 | 3 | Yes | 1(3), 7/8, 5/8, 1/2 | 0.7749 |
| 28 | 21 | 14 | 6 | 6 | 1 | 14 | Yes | 7/8 (6) | 0.875 |
| 42 | 35 | 21 | 10 | 6 | 1 | 24 | Yes | 7/8(5), 19/24 | 0.8599 |
| 56 | 49 | 28 | 13 | 6 | 1 | 35 | Yes | 7/8 (6) | 0.875 |
| 28 | 21 | 7 | 8 | 3 | 3 | 3 | 15 | Yes | 1(3),31/32(2), 7/8 | 0.9666 |
| 56 | 49 | 14 | 6 | 6 | 3 | 40 | Yes | 63/64 (6) | 0.9844 |

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| **Phase 1 Design** | | | **Phase 2 Design** | | | | | | | | |
| v | *na* | Between Animals Residual DF | *nRuns* | *nTags* | *Between Runs stratum* | | *Between Animals within Runs stratum* | | | | |
| Animal DF | Trt DF | Tag DF | Residual DF | Tag ⊥ Trt (E) | *Treatment efficiency factors* | |
| *ei* | *E* |
| 8 | 16 | 8 | 8 | 4 | 3 | 3 | 1 | 4 | Yes | 1(4), 3/4(2), 1/2 | 0.8077 |
| 24 | 16 | 12 | 5 | 5 | 1 | 10 | No (1/9) | 1, 11/12(2), 8/9, 3/4(2), 2/3 | 0.8261 |
| 32 | 24 | 16 | 7 | 7 | 1 | 16 | Yes | 0.963 (2), 0.875 (2), 0.7866 (2), 0.75 | 0.8498 |
| 40 | 32 | 20 | 9 | 7 | 1 | 22 | No (1/25) | 9/10(3), 43/50, 4/5(3) | 0.8489 |
| 48 | 40 | 24 | 11 | 7 | 1 | 28 | Yes | 1, 5/6(6) | 0.8537 |
| 56 | 48 | 28 | 13 | 7 | 1 | 34 | No (1/49) | 6/7(6), 41/49 | 0.8542 |
| 64 | 56 | 32 | 15 | 7 | 1 | 40 | Yes | 0.9192(2), 0.875, 0.8308(2), 0.8125(2) | 0.8550 |
| 16 | 8 | 4 | 8 | 1 | 0 | 3 | 4 | No (3/10) | 1(4), 3/4(2), 1/2 | 0.8077 |
| 24 | 16 | 6 | 2 | 0 | 3 | 11 | No (1/9) | 1(4), 8/9(3) | 0.9492 |
| 32 | 24 | 8 | 3 | 0 | 3 | 18 | Yes | 1(7) | 1 |
| 40 | 32 | 10 | 4 | 0 | 3 | 25 | No (1/25) | 1(4), 24/25(3) | 0.9825 |
| 48 | 40 | 12 | 5 | 0 | 3 | 32 | No (1/30) | 1(4), 35/36(2), 17/18 | 0.9837 |
| 56 | 48 | 14 | 6 | 0 | 3 | 39 | No (1/49) | 1(4), 48/49(3) | 0.9912 |
| 64 | 56 | 16 | 7 | 0 | 3 | 46 | Yes | 1(7) | 1 |