

| RUMINANTS                                                                |                              |                     |                        |                              |                                                                            |                        |
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| Pathogen                                                                 | Evidence tier                | Phage form          | Infection dose         | Dose of phage                | Observation                                                                | Reference              |
| <i>Escherichia coli</i>                                                  | Experimental <i>in vivo</i>  | Single (IA-38)      | 10 <sup>7</sup> CFU/ml | 10 <sup>7</sup> PFU/ml       | Reduction of CFU                                                           | Boydak et al. (2025)   |
|                                                                          | Experimental <i>in vivo</i>  | Mixture             | 60 CFU/ml              | 10 <sup>8</sup> PFU/ml       | Decreased CFU, inflammatory markers, reduction of symptoms                 | Guo et al. (2021)      |
|                                                                          | Field/Clinical               | Mixture+ probiotics | -                      | 10 <sup>9</sup> PFU/ml       | Elimination of symptoms, stimulation of immunity                           | Alomari et al. (2021)  |
| <i>Listeria monocytogenes</i>                                            | Experimental <i>in vitro</i> | -                   | -                      | -                            | Isolation of 6 phages from silage and                                      | Elsayed et al. (2023)  |
| <i>Staphylococcus aureus</i>                                             | Clinical/Field study         | Single (phage K)    | -                      | 1.25x10 <sup>11</sup> PFU/ml | Decreased morbidity and symptoms by about 16.7%                            | Gill et al. (2006 a,b) |
|                                                                          | Clinical/Field study         | Mixture             | -                      | 10 <sup>9</sup> PFU/ml       | Coctail and combination with probiotics showed high antimicrobial activity | Krömker et al. (2026)  |
| Intrauterine <i>Escherichia coli</i> and <i>Arcanobacterium pyogenes</i> | Clinical/Field study         | Mixture             | -                      | 10 <sup>7</sup> PFU/ml       | No effect compared to the control group                                    | Machado et al. (2012)  |
|                                                                          | Clinical/Field study         | Mixture             | -                      | 10 <sup>9</sup> PFU/ml       | No effect compared to the control group                                    | Meira Jr et al. (2013) |

| PIGS                    |                                                     |                    |                                                                    |                                                                |                                                                                                                                    |                                |
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| <i>Salmonella</i> spp.  | Experimental<br><i>in vivo</i>                      | Mixture            | $10^8$<br>CFU/ml                                                   | $9.5 \times 10^4$ P<br>FU/g                                    | Prophylactic<br>effect,<br>significant<br>reduction of<br>the pathogen<br>on day 3                                                 | Thanki et<br>al. (2022)        |
|                         | Experimental<br><i>in vivo</i>                      | Mixture            | $10^8$<br>CFU/ml+<br>$10^8$<br>CFU/ml<br><i>E. coli</i><br>O157:H7 | $10^{11}$<br>PFU/ml                                            | Preventive<br>effect                                                                                                               | Li et al.<br>(2024)            |
|                         | Experimental<br><i>in vivo</i>                      | Single<br>(STP-1)  | $5.0 \times 10^8$<br>CFU/5 ml                                      | $1.0 \times 10^9$<br>PFU/kg                                    | Reduction of<br>the pathogen<br>in the small<br>intestine,<br>alleviation of<br>symptoms                                           | Won, Kim,<br>Han (2021)        |
| <i>Escherichia coli</i> | Experimental<br><i>in vivo</i>                      | Single+<br>mixture | $3 \times 10^8$ ,<br>resp.<br>$3 \times 10^9$<br>CFU/ml            | $10^{11}$<br>PFU/ml                                            | Reduction of<br>diarrheal<br>symptoms,<br>evolution of<br>resistance                                                               | Smith and<br>Huggins<br>(1983) |
|                         | Experimental<br><i>in vivo</i> (non-<br>infectious) | Mixture            | -                                                                  | 400<br>mg/kg                                                   | Weight gains,<br>lower<br>incidence of<br>diarrhea,<br>reduction of<br>gut<br>inflammation,<br>improvement<br>of gut<br>microbiota | Zeng et al.<br>(2021)          |
|                         | Experimental<br><i>in vivo</i>                      | Mixture            | $2 \times 10^9$<br>CFU/<br>animal                                  | $2 \times 10^9$<br>and<br>$2 \times 10^{10}$<br>PFU/<br>animal | Reduction of<br>load,<br>restoration of<br>microbiota<br>composition                                                               | Imklin et<br>al. (2022)        |

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| <i>Escherichia coli</i>     | Field/Clinical                  | Mixture+<br>antibiotic | -                                          | 10 <sup>9</sup><br>PFU/g<br>(1 g/kg) | Higher<br>resistance to<br>diarrhea and a<br>higher<br>number of<br>duodenal<br>goblet cells                                           | Kingkan et<br>al. (2023)                            |
| <b>POULTRY</b>              |                                 |                        |                                            |                                      |                                                                                                                                        |                                                     |
| <i>Campylobacter jejuni</i> | <i>Ex vivo</i><br>(food matrix) | Single<br>(CJ01)       | 10 <sup>4</sup><br>CFU/ml                  | 10 <sup>6</sup><br>PFU/ml            | Significant<br>reduction of<br>pathogens in<br>chicken and<br>mutton meat                                                              | Thung et al.<br>(2020)                              |
|                             | Experimental<br><i>in vivo</i>  | Mixture                | 10 <sup>7</sup><br>CFU/<br>animal          | 10 <sup>7</sup><br>PFU/bird          | Reduction of<br>pathogen in<br>the caecum                                                                                              | Richards<br>Connerton<br>and<br>Connerton<br>(2019) |
|                             | Experimental<br><i>in vivo</i>  | Mixture                | 10 <sup>5</sup><br>CFU/ml                  | 10 <sup>7</sup><br>PFU/ml            | Reduction of<br>pathogen<br>faeces and<br>colon content                                                                                | Peh et al.<br>(2023)                                |
|                             | Field/Clinical                  | Mixture                | -                                          | 10 <sup>7</sup><br>PFU/ml            | Significant<br>reduction of<br>the pathogen<br>in the caecum<br>in one tested<br>subject, only<br>on farm not in<br>the slaughterhouse | Chinivasagam et al.<br>(2020)                       |
| <i>Salmonella</i> spp.      | <i>Ex vivo</i><br>(food matrix) | Single<br>(S55)        | 1 × 10 <sup>4</sup><br>CFU/cm <sup>2</sup> | 10 <sup>8</sup><br>PFU/ml            | Reduction of<br>pathogen on<br>chicken skin<br>at 25 and 4<br>°C                                                                       | Ge et al.<br>(2021)                                 |
|                             | <i>Ex vivo</i><br>(food matrix) | Single<br>(PSE5)       | 4 × 10 <sup>5</sup><br>CFU/ml              | 4 × 10 <sup>3</sup><br>PFU/ml        | Significant<br>reduction of<br>the pathogen<br>on the surface<br>of eggs                                                               | Sonalika et<br>al. (2020)                           |

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| <i>Salmonella</i> spp.         | Experimental<br><i>in vivo</i>  | Mixture           | $10^7$<br>CFU/<br>animal | $10^{11}$<br>PFU/ml          | Reduction of<br>pathogen,<br>higher<br>prevalence of<br>phages in<br>animals in the<br>case of the<br>encapsulated<br>form, and<br>longer-lasting<br>protection | Colom et al. (2015)             |
|                                | Experimental<br><i>in vivo</i>  | Mixture           | $10^8$<br>CFU/<br>animal | $10^9$<br>PFU/ml             | Reduced<br>intestinal<br>colonization,<br>↓ mRNA<br>expression of<br>proinflammatory<br>cytokines                                                               | Li et al. (2022)                |
| <i>Clostridium perfringens</i> | <i>Ex vivo</i><br>(food matrix) | Single<br>(CPQ1)  | $10^7$<br>CFU/ml         | $5 \times 10^7$<br>PFU/ml    | Reduction of<br>pathogen                                                                                                                                        | Mohammadi et al. (2022)         |
|                                | Experimental<br><i>in vivo</i>  | Single            | $10^8$<br>CFU/ml         | $10^9$<br>PFU/ml             | Milder<br>intestinal<br>damage,<br>lower<br>mortality, and<br>a reduction of<br>pathogen                                                                        | Hosny, Gaber, and Sorour (2021) |
|                                | Experimental<br><i>in vivo</i>  | Mixture           | $10^8$<br>CFU/ml         | $10^6$<br>PFU/ml             | Alleviation of<br>necrotic<br>enteritis,<br>reduced<br>intestinal<br>lesions                                                                                    | Keerqin et al. (2022)           |
| AQUACULTURE                    |                                 |                   |                          |                              |                                                                                                                                                                 |                                 |
| <i>Aeromonas hydrophila</i>    | Experimental<br><i>in vivo</i>  | Single<br>(AHP-1) | -                        | $9.85 \times 10^5$<br>PFU/ml | No adverse<br>effect on the<br>immunity                                                                                                                         | Chandrarathna et al. (2020)     |
|                                | Experimental<br><i>in vivo</i>  | Single<br>(Akh-2) | $10^7$<br>CFU/ml         | $10^8$<br>PFU/ml             | Reduction of<br>pathogen                                                                                                                                        | Akmal et al. (2020)             |

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| <i>Aeromonas hydrophila</i> | Experimental<br><i>in vivo</i> | Single (AH-1)           | 10 <sup>5</sup><br>CFU/ml                                                                         | 10 <sup>5</sup><br>PFU/ml                                                         | Reduction of the pathogen by up to 1 log CFU/g                                                    | Duarte et al. (2021)           |
| <i>Yersinia ruckeri</i>     | <i>In vitro</i>                | φNC10                   | -                                                                                                 | -                                                                                 | Charakterizati<br>on                                                                              | Welch (2020)                   |
|                             | Experimental<br><i>in vivo</i> | Mixture                 | 1×10 <sup>7</sup><br>CFU/ml                                                                       | 1–2×10 <sup>7</sup><br>PFU/ml                                                     | Higher protection when phages administered orally than intraperitoneally                          | Altinok et al. (2026)          |
| <i>Edwardsiella tarda</i>   | Experimental<br><i>in vivo</i> | Single (ETP-1)          | 9.85×10 <sup>8</sup><br>PFU/ml                                                                    | 1.08×10 <sup>5</sup><br>CFU/fish                                                  | 50 % higher survival rate                                                                         | Nikapitiya et al. (2020)       |
|                             | Experimental<br><i>in vivo</i> | Mixture                 | 5.99×10 <sup>6</sup><br>CFU/ml and<br>7.86×10 <sup>7</sup><br>CFU/ml<br>( <i>Vibrio harveyi</i> ) | 10 <sup>6</sup> , 10 <sup>7</sup> ,<br>10 <sup>8</sup><br>PFU/ml<br>respectively  | Higher survival rate, lower levels of pro-inflammatory cytokines, and a reduction of the pathogen | Cui et al. (2022)              |
| <i>Vibrio harveyi</i>       | Experimental<br><i>in vivo</i> | Mixture                 | 10 <sup>6</sup><br>CFU/ml                                                                         | 10 <sup>7</sup><br>PFU/ml                                                         | Significantly higher survival and hatching rate                                                   | Quiroz-Guzmán et al. (2018)    |
|                             | Experimental<br><i>in vivo</i> | Mixture                 | 7.86×10 <sup>7</sup><br>CFU/fish                                                                  | 10 <sup>7</sup> , 10 <sup>8</sup> ,<br>10 <sup>9</sup><br>PFU/ml,<br>respectively | Improved survival rate                                                                            | Cui et al. (2021)              |
|                             | Experimental<br><i>in vivo</i> | Single (vB_VhaS_PcB-1G) | 10 <sup>4</sup> - 10 <sup>7</sup><br>CFU/ml                                                       | 10 <sup>8</sup><br>PFU/ml                                                         | Effective protection and control of disease                                                       | Wu et al. (2021)               |
| <b>HONEYBEES</b>            |                                |                         |                                                                                                   |                                                                                   |                                                                                                   |                                |
| <i>Paenibacillus larvae</i> | Experimental<br><i>in vivo</i> | Single+<br>Mixture      | -                                                                                                 | 10 <sup>5</sup><br>PFU/ml                                                         | Proof of safe application of phages to bees                                                       | Jończyk-Matysiak et al. (2021) |

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| <i>Paenibacillus larvae</i>                                               | Experimental<br><i>in vivo</i> | Single<br>(HB10c2)               | $5 \times 10^2$<br>CFU/larva | $5 \times 10^4$<br>PFU/larva | No significant<br>difference in<br>mortality                               | Beims et al.<br>(2015)         |
|                                                                           | Experimental<br><i>in vivo</i> | Single+<br>Mixture               | $10^8$<br>CFU/ml             | $10^7$<br>PFU/ml             | Significant<br>reduction of<br>mortality                                   | El-Meihy et<br>al. (2024)      |
| COMPANION ANIMALS                                                         |                                |                                  |                              |                              |                                                                            |                                |
| <i>Pseudomonas aeruginosa</i> /<br><i>Staphylococcus pseudintermedius</i> | Clinical                       | Mixture                          |                              | $1.0 \times 10^8$ P<br>FU/ml | Reduction of<br>pathogen<br>counts,<br>improvement<br>of clinical<br>signs | Kwon et al.<br>(2025)          |
| <i>Pseudomonas aeruginosa</i>                                             | Clinical                       | Mixture                          | -                            | $1 \times 10^5$<br>PFU/ml    | Reduction of<br>pathogen<br>counts,<br>improvement<br>of clinical<br>signs | Hawkins et<br>al. (2010)       |
|                                                                           | Clinical                       | Single<br>(PASB7)+a<br>ntibiotic | -                            | $10^7$<br>PFU/ml             | Closure of a<br>chronically<br>infected<br>wound                           | Braunstein<br>et al.<br>(2024) |

**ESM 1, Summary table of in vivo application of bacteriophages**