CLAIMS

1. An endolysin polypeptide specific for *Staphylococcus*, said polypeptide comprising:
- a polypeptide with an amino acid sequence that has at least 80% sequence identity with SEQ ID NO: 2 over its entire length, or
- a polypeptide with an amino acid sequence that has at least 80% sequence identity with SEQ ID NO: 1 and having a truncation of at least 5, 10, 20, 30, or 40 amino acids in the region of amino acids 156 to 199 of SEQ ID NO: 1, and wherein the endolysin polypeptide has enhanced specific activity and/or reduced immunogenicity compared to an endolysin polypeptide with the amino acid sequence according to SEQ ID NO: 1.

2. An endolysin polypeptide according to claim 1 with an amino acid sequence according to SEQ ID NO: 2.

3. A polynucleotide encoding an endolysin polypeptide according to claim 1 or 2.

4. A nucleic acid construct comprising a polynucleotide according to claim 3.

5. An expression vector comprising a nucleic acid construct according to claim 4.

6. A host cell comprising a polynucleotide according to claim 3, a nucleic acid construct according to claim 4, or an expression construct according to claim 5.

7. A method for the production of an endolysin polypeptide according to claim 1 or 2, comprising:
- culturing a host cell according to claim 6 under conditions conducive to the production of the endolysin polypeptide,
- optionally isolating and purifying the endolysin polypeptide from the culture broth, and
- optionally freeze-drying the endolysin polypeptide.

8. A method for purifying an endolysin polypeptide according to claim 1 or 2 with enhanced activity comprising dialysis of an endolysin according to claim 1 or 2, or an endolysin

polypeptide obtainable by a method according to claim 7, said dialysis comprising the steps of:

i) dialysis against a buffer comprising a chelating compound, and

ii) dialysis against a divalent metal ion-containing buffer, preferably a divalent metal ion selected form the group consisting of Co^{2+}, Cu^{2+}, Mg^{2+}, Ca^{2+}, Mn^{2+} and Zn^{2+}.

9. A composition comprising an endolysin polypeptide according to claim 1 or 2, or an endolysin polypeptide obtainable by a method according to claim 7 or 8, or a host cell according to claim 6.

10. A composition comprising a polynucleotide according to claim 3, or a nucleic acid construct according to claim 4, or an expression vector according to claim 5.

11. A pharmaceutical composition comprising an endolysin polypeptide according to claim 1, or 2, or an endolysin polypeptide obtainable by a method according to claim 7 or 8, or a host cell according to claim 6, said pharmaceutical composition further comprising a pharmaceutically acceptable excipient.

12. A pharmaceutical composition comprising a polynucleotide according to claim 3, or a nucleic acid construct according to claim 4, or an expression vector according to claim 5, said pharmaceutical composition further comprising a pharmaceutically acceptable excipient.

13. A composition according to any one of claims 9-12, further comprising one or more additional active ingredients selected from the group consisting of a bacteriophage or phage, a phage endolysin derived from such phage and an antibiotic.

14. A composition according to claim 9 or 11, for use as a medicament, preferably for use as a medicament in the treatment of a condition associated with infection with a *Staphylococcus.*

15. Use of an endolysin polypeptide according to claim 1 or 2, or an endolysin polypeptide obtainable by a method according to claim 7 or 8, or a host cell according to claim 6, or a composition according to claim 9, 11 or 13, in the manufacture of a medicament for the treatment of a condition associated with infection with a *Staphylococcus*.

16. Use of an endolysin polypeptide according to claim 1 or 2, or an endolysin polypeptide obtainable by a method according to claim 7 or 8, or a host cell according to claim 6, or a composition according to claim 10, 11 or 13, as a food additive or a disinfectant.

17. Use of an endolysin polypeptide according to claim 1 or 2, or an endolysin polypeptide obtainable by a method according to claim 7 or 8, or a host cell according to claim 6, or a composition according to claim 10, 11, or 14, for detecting a *Staphylococcus*, preferably in a diagnostic application.