

C L A I M S

1. Nucleic acid encoding a synthetic fusion protein and comprising at least one of: a sequence of SEQ ID no 3, a sequence having at least 90% sequence identity with SEQ ID no. 3 and a sequence having at least 95% identity with SEQ ID no. 3.
- 5 2. A vector, preferably an expression vector, comprising the nucleic acid according to claim 1.
3. Vector according to claim 2 wherein the nucleic acid is operably linked to a promoter sequence.
4. A synthetic fusion protein having amino acid sequence of SEQ ID 4.
- 10 5. A synthetic fusion protein having amino acid sequence with at least 90% and more preferably 95% sequence identity with SEQ ID no.4.
6. Antimicrobial composition comprising the protein according to one of claims 4 and/or 5.
7. Antimicrobial composition according to claim 6 further comprising at least one of salt buffer preferably PBS, protease inhibitor, MgCl₂, excipients, carriers, thickeners and gelling agents preferably methyl orixane or alginates such as calcium or sodium alginate, carriers, 15 adjuvants, cellulose preferably methylcellulose.
8. Composition comprising the protein according to one of claims 4 or 5 and a lysate of bacterial or fungal cells, preferably of *pichia pastoris* or *bacillus subtilis*.
9. Antimicrobial composition according to one of claims 6 to 8 formulated in spray, semi- 20 liquid, semi-solid, solid, suspension, or gel form.
10. Protein or composition according to any one of claims 4 to 9 for use as a disinfectant and/or antimicrobial agent preferably in the outpatient, hospital and home field, in the disinfection of surgical instruments, in high traffic environments, on surfaces and handles, in filters of air inlet and extraction systems or air conditioners or air treatment units ATU, in environments used for 25 food preparation, in the agricultural field.
11. Protein or composition according to any one of claims 4 to 9 for use in skin disinfection.
12. Protein or composition according to any one of claims 4 to 9 for use in the control and elimination of viruses, gram + bacteria, mycoplasma, phytoplasma, microscopic, spore and oospore fungi, preferably *S. aureus* and Sars-CoV-2 .
- 30 13. Use of the protein or compositions according to one of claims 4 to 9 in a biological method to counteract the attack and proliferation of viruses, gram + bacteria, mycoplasmas, phytoplasmas, microscopic spore and oospore fungi, preferably *S. aureus* and Sars-CoV-2.
14. Method for the control or elimination of viruses, gram + bacteria, mycoplasma, phytoplasmas, microscopic spore and oospore fungi preferably *S. aureus* and Sars-CoV-2 from 35 environments or surfaces where this method includes application on the surface or on parts thereof of at least one of

- a lysate of microorganisms, preferably *pichia pastoris* or *bacillus subtilis*, expressing the protein having SEQ ID no 4 and/or a protein having 90% and more preferably 95% identity of sequence with SEQ ID no.4
 - a protein according to claims 4 or 5
 - 5 – compositions according to any one of claims 6 to 9.
15. Process for the production of a protein according to claim 4 or 5 comprising the following basic steps:
- I. In an expression vector, comprising a selection marker, insert a nucleic acid comprising at least one of: a sequence of SEQ ID no 3, a sequence having at least 90% sequence
10 identity with the SEQ ID no. 3 and a sequence having at least 95% identity with SEQ ID no. 3;
 - II. using said vector for the transformation of competent cells suitable for the use of said vector;
 - III. select the competent cells transformed with said vector and multiply them in culture;
 - 15 IV. perform a lysis of the competent cells of point III;
 - V. selecting and purifying the protein according to claim 4 or 5 from the lysate obtained in point IV.
16. Process according to claim 16 comprising a further step of encapsulating the protein obtained at point V in lipids, preferably phospholipids.
- 20 17. Process according to one of claims 16 or 17 comprising a further freeze-drying step.