CLAIMS

1. A variant of porcine trypsin comprising or consisting of an amino acid sequence that has at least 91% sequence identity to SEQ ID NO: 1, wherein said amino acid sequence differs from SEQ ID NO: 1 at least by one or more amino acid substitutions at one or more positions corresponding to F24, S44, D56, G78, Y131, S172 and W193 of native porcine trypsin according to SEQ ID NO: 1, with the proviso that said amino acid sequence is not the sequence of SEQ ID NOs: 1 and 2.

2. The variant of porcine trypsin according to claim 1,
wherein the amino acid at the position corresponding to F24 is substituted by an amino acid selected from the group consisting of Ala, Asn, Arg, Gln, Ile, Leu, Lys, Met, Ser, Thr, and Val.

3. The variant of porcine trypsin according to claim 1, wherein said amino acid sequence additionally differs from SEQ ID NO: 1 at least by one or more amino acid substitutions at one or more positions corresponding to R99, R107, K125, and K170 of native porcine trypsin according to SEQ ID NO: 1.

4. The variant of porcine trypsin according to claim 3,
wherein the amino acid at the position corresponding to R99 is substituted by an amino acid selected from the group consisting of Ala, Asn, Asp, Glu, Gly, His, Leu, Phe, Thr, Trp, and Tyr.

5. The variant of porcine trypsin according to claim 1, wherein said amino acid sequence is SEQ ID NO: 3,
wherein
– Xaa24 is an amino acid selected from the group consisting of Ala, Asn, Arg, Gln, Ile, Leu, Lys, Met, Phe, Ser, Thr, and Val, with the proviso that SEQ ID NO: 3 is not the sequence of SEQ ID NOs:1 and 2.

6. The variant of porcine trypsin according to claim 1, wherein said amino acid sequence is selected from the group consisting of SEQ ID NO: 4, SEQ ID NO: 5, SEQ ID NO: 6, SEQ ID NO: 7, SEQ ID NO: 8, SEQ ID NO: 9, SEQ ID NO: 10, SEQ ID NO: 11, SEQ ID NO: 12, SEQ ID NO: 13, SEQ ID NO: 14, SEQ ID NO: 15, SEQ ID NO: 16, SEQ ID NO: 17, SEQ ID NO: 18, SEQ ID NO: 19, SEQ ID NO: 20, SEQ ID NO: 21, SEQ ID NO: 22, SEQ ID NO: 23, SEQ ID NO: 24, SEQ ID NO: 25, SEQ ID NO: 26, SEQ ID NO: 27, SEQ ID NO: 28, SEQ ID NO: 29, SEQ ID NO: 30, SEQ ID NO: 31, SEQ ID NO: 32, SEQ ID NO: 33, SEQ ID NO: 34, SEQ ID NO: 35, SEQ ID NO: 36, SEQ ID NO: 37, SEQ ID NO: 38, SEQ ID NO: 39, SEQ ID NO: 40, SEQ ID NO: 41, SEQ ID NO: 42, SEQ ID NO: 43, SEQ ID NO: 44, SEQ ID NO: 45, SEQ ID NO: 46, SEQ ID NO: 47, SEQ ID NO: 48, SEQ ID NO: 49, SEQ ID NO: 50, SEQ ID NO: 51, SEQ ID NO: 52, SEQ ID NO: 53, SEQ ID NO: 54, SEQ ID NO: 55, SEQ ID NO: 56, SEQ ID NO: 57, SEQ ID NO: 58, SEQ ID NO: 59, SEQ ID NO:, 60, SEQ ID NO: 61, SEQ ID NO: 62, SEQ ID NO: 63, SEQ ID NO: 64, SEQ ID NO: 65, SEQ ID NO: 66, SEQ ID NO: 67, SEQ ID NO: 68, SEQ ID NO: 69, SEQ ID NO: 70, SEQ ID NO: 71, SEQ ID NO: 72, SEQ ID NO: 73, SEQ ID NO: 74, SEQ ID NO: 75, SEQ ID NO: 76, SEQ ID NO: 77, SEQ ID NO: 78, SEQ ID NO: 79, SEQ ID NO: 80, SEQ ID NO: 81, SEQ ID NO: 82, SEQ ID NO: 83, SEQ ID NO: 84, SEQ ID NO: 85, SEQ ID NO: 86, SEQ ID NO: 87, SEQ ID NO: 88, SEQ ID NO: 89, SEQ ID NO: 90, SEQ ID NO: 91, SEQ ID NO: 92, SEQ ID NO: 93, SEQ ID NO: 94, SEQ ID NO: 95, SEQ ID NO: 96, SEQ ID NO: 97, SEQ ID NO: 98, SEQ ID NO: 99, SEQ ID NO: 100, SEQ ID NO: 101, SEQ ID NO: 102, SEQ ID NO: 103, SEQ ID NO: 104, SEQ ID NO: 105, SEQ ID NO: 106, SEQ ID NO: 107, SEQ ID NO: 108, SEQ ID NO: 109, SEQ ID NO: 110, SEQ ID NO: 111, SEQ ID NO: 112, SEQ ID NO: 113, SEQ ID NO: 114, SEQ ID NO: 115, SEQ ID NO: 116, SEQ ID NO: 117, SEQ ID NO: 118, and SEQ ID NO: 119.

7. The variant of porcine trypsin according to claim 1, wherein
said variant is capable of cleaving a peptide with the general formula A-Lys-Thr-Arg-Arg-B according to SEQ ID NO: 131 to yield a cleavage product of the general formula A-Lys-Thr-Arg-Arg according to SEQ ID NO: 132 in a yield of at least 80%,
wherein A is an amino acid sequence consisting of one or more amino acids; and
wherein B is an amino acid sequence consisting of one or more amino acids.

8. The variant of porcine trypsin according to claim 1, wherein the variant exhibits an increased selectivity for the cleavage of a pre-pro-human insulin, pre-pro-insulin glargine, pre-pro-insulin lispro, pre-pro-insulin aspart, or pre-pro-insulin glulisine at a position C-terminally to position B32-Arg as compared to porcine variant trypsin S172A according to SEQ ID NO: 2.

9. The variant of porcine trypsin according to claim 1, wherein
the amino acid at the position corresponding to F24 is substituted by Arg.

10. The variant of porcine trypsin according to claim 1, wherein the amino acid at the position corresponding to S44 is substituted by an amino acid selected from the group consisting of Leu and Pro.

11. The variant of porcine trypsin according to claim 1, wherein the amino acid at the position corresponding to D56 is substituted by an amino acid selected from the group consisting of Ala, Asn, His, and Trp.

12. The variant of porcine trypsin according to claim 1,
wherein the amino acid at the position corresponding to G78 is substituted by an amino acid selected from the group consisting of Ala, Glu; Pro, Ser, and Tyr;
wherein the amino acid at the position corresponding to Y131 is substituted by an amino acid selected from the group consisting of Ala, Asn, Asp, Cys, Gln; Glu, Gly, His, Ile, Leu, Met, Ser, Thr, Trp, Val;
wherein the amino acid at the position corresponding to S172 is substituted by an amino acid selected from the group consisting of Ala, Cys, and Thr; or
wherein the amino acid at the position corresponding to W193 is substituted by an amino acid selected from the group consisting of Phe, Ser, Thr, and Tyr.

13. The variant of porcine trypsin according to claim 3, wherein the amino acid at the position corresponding to R107 is substituted by an amino acid selected from the group consisting of Asp, Gly, Pro, Ser, and Thr.

14. The variant of porcine trypsin according to claim 3, wherein the amino acid at the position corresponding to K125 is substituted by an amino acid selected from the group consisting of Ala, Cys, Gln, Glu, Gly, His, Leu, Ser, and Tyr.

15. The variant of porcine trypsin according to claim 3, wherein the amino acid at the position corresponding to K170 is substituted by an amino acid selected from the group consisting of Ala, Asn, Gly, and Tyr.

16. The variant of porcine trypsin according to claim 1, wherein said amino acid sequence is SEQ ID NO: 3, wherein Xaa44 is an amino acid selected from the group consisting of Leu, Pro, and Ser, with the proviso that SEQ ID NO: 3 is not the sequence of SEQ ID NOs:1 and 2.

17. The variant of porcine trypsin according to claim 1, wherein said amino acid sequence is SEQ ID NO: 3, wherein Xaa56 is an amino acid selected from the group consisting of Ala, Asn, Asp, His, and Trp, with the proviso that SEQ ID NO: 3 is not the sequence of SEQ ID NOs:1 and 2.

18. The variant of porcine trypsin according to claim 1, wherein said amino acid sequence is SEQ ID NO: 3,
wherein
- Xaa78 is an amino acid selected from the group consisting of Ala, Glu, Gly, Pro, Ser, and Tyr;
- Xaa99 is an amino acid selected from the group consisting of Ala, Arg, Asn, Asp, Glu, Gly, His, Leu, Phe, Thr, Trp, and Tyr;
- Xaa107 is an amino acid selected from the group consisting of Arg, Asp, Gly, Pro, Ser, and Thr;

- Xaa125 is an amino acid selected from the group consisting of Ala, Cys, Gln, Glu, Gly, His, Leu, Lys, Ser, and Tyr;
- Xaa131 is an amino acid selected from the group consisting of Ala, Asn, Asp, Cys, Gln; Glu, Gly, His, Ile, Leu, Met, Ser, Thr, Trp, Tyr, and Val;
- Xaa170 is an amino acid selected from the group consisting of Ala, Asn, Gly, Lys, and Tyr;
- Xaa172 is an amino acid selected from the group consisting of Ala, Cys, Ser, and Thr; or
- Xaa193 is an amino acid selected from the group consisting of Phe, Ser, Thr, Trp, and Tyr;

with the proviso that SEQ ID NO: 3 is not the sequence of SEQ ID NOs:1 and 2.

19. The variant of porcine trypsin according to claim 1, wherein the amino acid at the position corresponding to S44 is substituted by Pro.

20. The variant of porcine trypsin according to claim 1, wherein
the amino acid at the position corresponding to D56 is substituted by His;
the amino acid at the position corresponding to G78 is substituted by Pro;
the amino acid at the position corresponding to Y131 is substituted by Met;
the amino acid at the position corresponding to S172 is substituted by Ala; or
the amino acid at the position corresponding to W193 is substituted by Ser.