That which is claimed is:

1. A method of purifying a serine protease comprising:

loading the serine protease to a soybean trypsin inhibitor (STI)-based affinity chromatograph, and

eluting the serine protease with an elution buffer comprising an agent that disrupts interaction between the STI and the serine protease.

2. The method of claim 1, wherein the elution buffer further comprises a salt, a detergent and/or a chaotropic agent.

3. The method of claim 1 or 2, wherein the agent is a competitive agent that competitively binds the STI of the serine protease.

4. The method of claim 3, wherein the competitive agent is selected from the group consisting of benzamidine, p-aminobenzamidine, arginine, a small molecule fXa inhibitor, a peptide fXa inhibitor, and a peptidomimetic fXa inhibitor.

5. The method of claim 4, wherein the competitive agent is arginine.

6. The method of claim 1, wherein the serine protease is a polypeptide comprising the amino acid sequence of SEQ ID NO: 1 or 2, or a polypeptide having at least about 80% sequence identity to SEQ ID NO: 1 or 2, having a deletion of at least part of the Gla domain and a mutation at the active site.

7. The method of claim 6, wherein the serine protease comprises the amino acid sequence of SEQ ID NO: 2, or a polypeptide having at least about 95% sequence identity to SEQ ID NO: 2, having a deletion of at least part of the Gla domain and a mutation at the active site.

8. The method of claim 6, wherein the serine protease comprises the amino acid sequence of SEQ ID NO: 2.

9. The method of any one of claims 1-8, wherein the pH of the elution buffer is from about 4.5 to about 10.5.

10. The method of claim 9, wherein the pH of the elution buffer is about 5.0.

11. The method of claim 9, wherein the pH of the elution buffer is about 7.4.

12. The method of claim 5, wherein the elution buffer comprises from about 250 mM arginine to about 1000 mM arginine.

13. The method of claim 12, wherein the elution buffer comprises about 500 mM arginine.

14. The method of claim 13, wherein the pH of the elution buffer is about 5.0.

15. The method of any one of claims 1-14, further comprising subjecting the eluted serine protease to purification with an ion-exchange column.

16. The method of can one of claims 1-15, further comprising, prior to eluting the serine protease, washing the chromatograph with a wash buffer that comprises a salt and is at a neutral pH.

17. A purified serine protease prepared by the method of any one of claims 1-16.

18. A kit comprising:

a soybean trypsin inhibitor (STI)-based affinity chromatograph, and

an elution buffer comprising a competitive agent that disrupts the interaction between the STI and a serine protease.

19. The kit of claim 18, wherein the elution buffer further comprises arginine.

20. The kit of claim 18, wherein the pH of the elution buffer is from about 4.5 to about 10.5.

21. The kit of claim 19, wherein the elution buffer comprises from about 250 mM arginine to about 1000 mM arginine.

22. The kit of any one of claims 18-21, further comprising a wash buffer comprising about 250 mM NaCl at a neutral pH.

CLAIMS

1. A method of purifying a serine protease comprising:

loading the serine protease to a soybean trypsin inhibitor (STI)-based affinity chromatograph, and

eluting the serine protease with an elution buffer comprising arginine that disrupts interaction between the STI and the serine protease.

2. The method of claim 1, wherein the elution buffer further comprises a salt, a detergent and/or a chaotropic agent.

3. The method of claim 1, wherein the serine protease is a polypeptide comprising the amino acid sequence of SEQ ID NO: 1 or 2, or a polypeptide having at least about 80% sequence identity to SEQ ID NO: 1 or 2, having a deletion of at least part of the Gla domain and a mutation at the active site.

4. The method of claim 3, wherein the serine protease comprises the amino acid sequence of SEQ ID NO: 2, or a polypeptide having at least about 95% sequence identity to SEQ ID NO: 2, having a deletion of at least part of the Gla domain and a mutation at the active site.

5. The method of claim 3, wherein the serine protease comprises the amino acid sequence of SEQ ID NO: 2.

6. The method of any one of claims 1-5, wherein the pH of the elution buffer is from about 4.5 to about 10.5.

7. The method of claim 6, wherein the pH of the elution buffer is about 5.0 or is about 7.4.

8. The method of claim 1, wherein the elution buffer comprises from about 250 mM arginine to about 1000 mM arginine.

9. The method of claim 8, wherein the elution buffer comprises about 500 mM arginine.

10. The method of claim 9, wherein the pH of the elution buffer is about 5.0.

11. The method of any one of claims 1-10, further comprising subjecting the eluted serine protease to purification with an ion-exchange column.

12. The method of any one of claims 1-11, further comprising, prior to eluting the serine protease, washing the chromatograph with a wash buffer that comprises a salt and is at a neutral pH.

13. A kit comprising:

a soybean trypsin inhibitor (STI)-based affinity chromatograph, and

an elution buffer comprising arginine that disrupts the interaction between the STI and a serine protease.

14. The kit of claim 13, wherein

(i) the pH of the elution buffer is from about 4.5 to about 10.5; or

(ii) the elution buffer comprises from about 250 mM arginine to about 1000 mM arginine.

15. The kit of claim 13 or 14, further comprising a wash buffer comprising about 250 mM NaCl at a neutral pH.