WHAT IS CLAIMED IS:

1. A method of preparing plant derived proteins, or protein suprastructures, comprising:

a. obtaining a plant or plant matter comprising apoplast-localized proteins, or suprastructure proteins,

b. producing a protoplast/spheroplast fraction and an apoplast fraction by treating the plant or plant matter with a cell wall degrading multi-component enzyme mixture comprising one or more than one cellulase; and,

c. recovering the apoplast fraction, the apoplast fraction comprising the plant-derived proteins, or suprastructure proteins, wherein the protein suprastructures have a molecular weight from about 75 to about 1500 kDa.

2. The method of claim 1 wherein the cell wall degrading multi-component enzyme mixture further comprises one or more than one pectinase.

3. The method of claim 2, wherein the concentration of the one or more than one pectinase is between 0.01% v/v to 2.5% v/v.

4. The method of claim 1, wherein the concentration of the one or more than one cellulase is between 0.1% to 5% w/v.

5. The method of claim 1 , wherein the cell wall degrading multi-component enzyme mixture does not include one or more of a lipase, a protease or a pectinase.

6. The method of claim 1 wherein in the step of obtaining (step a), the plant is transformed with a nucleic acid sequence encoding the proteins, or suprastructure proteins, is selected from the group of a peptide, a protein, a protein rosette, a protein complex, a proteasome, a metabolon, a transcription complex, a recombination complex, a photosynthetic complex, a membrane transport complex, a nuclear pore complex, a protein nanoparticle, a glycoprotein, an antibody, a polyclonal antibody, a monoclonal antibody, a single chain monoclonal antibody, a viral envelope protein, a viral structural protein, a viral capsid protein, and a viral coat protein, a chimeric protein, a chimeric protein complex, a chimeric protein nanoparticle, a chimeric glycoprotein, a chimeric antibody, a chimeric monoclonal antibody, a chimeric single chain monoclonal antibody, a chimeric hemagglutinin, a viral envelope protein, a viral structural protein, a viral capsid protein, and a viral coat protein, and the plant or plant matter is harvested.

7. The method of claim 6, wherein the nucleic acid is introduced into the plant in a transient manner.

8. The method of claim 6, wherein, the nucleic acid is stably integrated within a genome of the plant.

9. The method of claim 1 wherein in the step of obtaining (step a), the plant is grown and the plant or plant matter harvested.

10. The method of claim 6 wherein the nucleic acid encodes a monoclonal antibody or an influenza hemagglutinin.

11. The method of claim 1 wherein the plant derived proteins, or suprastructure proteins, do not include neuraminidase or M protein.

12. The method of claim 1 wherein the plant matter is selected from the group of leaves, and cultured plant cells.

13. The method of claim 1 further comprising a step of d) purifying the plant derived proteins, or suprastructure proteins, from the apoplast fraction.

14. The method of claim 13, wherein the step of purifying comprises filtering the apoplast fraction using depth filtration to produce a clarified extract, followed by chromatography of the clarified extract using size exclusion chromatography, cation exchange resin or affinity chromatography, or a combination thereof.

15. A method of preparing plant derived proteins, or protein suprastructures, comprising:

a. obtaining a plant or plant matter comprising plant-derived proteins or suprastructure proteins,

b. digesting the plant matter using a cell wall degrading multi-component enzyme mixture comprising one or more than one cellulase to produced a digested fraction;

c. filtering the digested fraction to produced a filtered fraction and recovering the plant-derived proteins, or suprastructure proteins, from the filtered fraction, wherein the protein suprastructures have a molecular weight from about 75 to about 1500 kDa.

16. The method of claim 15 wherein the cell wall degrading multi-component enzyme mixture further comprises one or more than one pectinase.

17. The method of claim 16, wherein the concentration of the one or more than one pectinase is between 0.01% v/v to 2.5% v/v.

18. The method of claim 15, wherein the concentration of the one or more than one cellulase is between 0.1% to 5% w/v.

19. The method of claim 15, wherein the cell wall degrading multi-component enzyme mixture does not include one or more of a lipase, a protease or a pectinase.

20. The method of claim 15 wherein in the step of obtaining (step a), the plant is transformed with a nucleic acid sequence encoding the proteins, or suprastructure proteins, is selected from the group of a peptide, a protein, a protein rosette, a protein complex, a proteasome, a metabolon, a transcription complex, a recombination complex, a photosynthetic complex, a membrane transport complex, a nuclear pore complex, a protein nanoparticle, a glycoprotein, an antibody, a polyclonal antibody, a monoclonal antibody, a single chain monoclonal antibody,
a viral envelope protein, a viral structural protein, a viral capsid protein, and a viral coat

protein, a chimeric protein, a chimeric protein complex, a chimeric protein nanoparticle, a chimeric glycoprotein, a chimeric antibody, a chimeric monoclonal antibody, a chimeric single chain monoclonal antibody, a chimeric hemagglutinin, a viral envelope protein, a viral structural protein, a viral capsid protein, and a viral coat protein, and the plant or plant matter is harvested.

21. The method of claim 20, wherein the nucleic acid is introduced into the plant in a transient manner.

22. The method of claim 20, wherein, the nucleic acid is stably integrated within a genome of the plant.

23. The method of claim 20, wherein the plant derived proteins, or suprastructure proteins, comprise a monoclonal antibody or an influenza hemagglutinin.

24. The method of claim 15, wherein the plant matter is selected from the group of leaves, and cultured plant cells.

25. The method of claim 15, further comprising a step d) of separating the proteins or protein suprastructures, in the filtered fraction from the cellular debris and insoluble materials.

26. The method of claim 25, wherein the step of separating is performed by centrifugation.

27. The method of claim 25 wherein the step of separating is performed by depth filtration.

28. The method of claim 15, further comprising the step of d) purifying the plant derived proteins or protein suprastructures, from the filtered fraction.

29. The method of claim 28, wherein the step of purifying comprises depth filtration of the filtered fraction to produced a clarified extract, followed by chromatography of the clarified extract using a cation exchange resin, a size exclusion resin, an affinity resin, or a combination thererof.

WHAT IS CLAIMED IS:

1. A method of preparing plant derived proteins, or protein suprastructures, comprising:

a. obtaining a plant or plant matter comprising apoplast-localized proteins, or suprastructure proteins, wherein the plant matter comprises an entire plant, plant leaves, stems, fruit, roots or a combination thereof;

b. producing a protoplast/spheroplast fraction and an apoplast fraction by treating the plant or plant matter with a cell wall degrading multi-component enzyme mixture consisting of cellulase, or a cell wall degrading multi-component enzyme mixture comprising one or more than one cellulase and a pectinase, wherein the ratio of cellulase to pectinase is from about 1:1 to 1:0.25; and,

c. recovering the apoplast fraction, the apoplast fraction comprising the plant-derived proteins, or suprastructure proteins, wherein the protein suprastructures have a molecular weight from about 75 to about 1500 kDa.

2. The method of claim 1, wherein the ratio of cellulase to pectinase is from about 1:1, 1:0.75, 1:0.5, or 1:0.25.

3. The method of claim 1 ~~2~~, wherein the concentration of the pectinase is between 0.01% v/v to 2.5% v/v.

4. The method of claim 1, wherein the concentration of the cellulase is between 0.1% to 5% w/v.

5. The method of claim 1, wherein the cell wall degrading multi-component enzyme mixture does not include one or more of a lipase~~,~~ or a protease.

6. The method of claim 1 wherein in the step of obtaining (step a), the plant is transformed with a nucleic acid sequence encoding the proteins, or suprastructure proteins, is selected from the group of a peptide, a protein, a protein rosette, a protein complex, a proteasome, a metabolon, a transcription complex, a recombination complex, a photosynthetic complex, a membrane transport complex, a nuclear pore complex, a protein nanoparticle, a glycoprotein, an antibody, a polyclonal antibody, a monoclonal antibody, a single chain monoclonal antibody, a viral envelope protein, a viral structural protein, a viral capsid protein, a viral coat protein, a chimeric protein, a chimeric protein complex, a chimeric protein nanoparticle, a chimeric glycoprotein, a chimeric antibody, a chimeric monoclonal antibody, a chimeric single chain monoclonal antibody~~,~~ and a chimeric hemagglutinin, and the plant or plant matter is harvested.

7. The method of claim 6, wherein the nucleic acid is introduced into the plant in a transient manner.

8. The method of claim 6, wherein, the nucleic acid is stably integrated within a genome of the plant.

9. The method of claim 1 wherein in the step of obtaining (step a), the plant is grown and the plant or plant matter harvested.

10. The method of claim 6 wherein the nucleic acid encodes a monoclonal antibody or an influenza hemagglutinin.

11. The method of claim 1 wherein the plant derived proteins, or suprastructure proteins, do not include neuraminidase or M protein.

12. The method of claim 1 wherein the plant matter is leaves.

13. The method of claim 1 further comprising a step of d) purifying the plant derived proteins, or suprastructure proteins, from the apoplast fraction.

14. The method of claim 13, wherein the step of purifying comprises filtering the apoplast fraction using depth filtration to produce a clarified extract, followed by chromatography of the clarified extract using size exclusion chromatography, cation exchange resin or affinity chromatography, or a combination thereof.

15. A method of preparing plant derived proteins, or protein suprastructures, comprising:

a. obtaining a plant or plant matter comprising plant-derived proteins or suprastructure proteins, wherein the plant matter comprises an entire plant, plant leaves, stems, fruit, roots or a combination thereof;

b. digesting the plant matter using a cell wall degrading multi-component enzyme mixture consisting of cellulase, or a cell wall degrading multi-component enzyme mixture comprising one or more than one cellulase and a pectinase, wherein the ratio of cellulase to pectinase is from about 1:1 to 1:0.25 to produced a digested fraction;

c. filtering the digested fraction to produced a filtered fraction and recovering the plant-derived proteins, or suprastructure proteins, from the filtered fraction, wherein the protein suprastructures have a molecular weight from about 75 to about 1500 kDa.

16. The method of claim 15, wherein the ratio of cellulase to pectinase is from about 1:1, 1:0.75, 1:0.5, or 1:0.25.

17. The method of claim 15, wherein the concentration of the one or more than one pectinase is between 0.01% v/v to 2.5% v/v.

18. The method of claim 15, wherein the concentration of the one or more than one cellulase is between 0.1% to 5% w/v.

19. The method of claim 15, wherein the cell wall degrading multi-component enzyme mixture does not include one or more of a lipase or a protease.

20. The method of claim 15 wherein in the step of obtaining (step a), the plant is transformed with a nucleic acid sequence encoding the proteins, or suprastructure proteins, is selected from the group of a peptide, a protein, a protein rosette, a protein complex, a proteasome, a metabolon, a transcription complex, a recombination complex, a photosynthetic complex, a membrane transport complex, a nuclear pore complex, a protein nanoparticle, a glycoprotein, an antibody, a polyclonal antibody, a monoclonal antibody, a single chain monoclonal antibody, a viral envelope protein, a viral structural protein, a viral capsid protein, a viral coat protein, a chimeric protein, a chimeric protein complex, a chimeric protein nanoparticle, a chimeric glycoprotein, a chimeric antibody, a chimeric monoclonal antibody, a chimeric single chain monoclonal antibody, and a chimeric hemagglutinin, and the plant or plant matter is harvested.

21. The method of claim 20, wherein the nucleic acid is introduced into the plant in a transient manner.

22. The method of claim 20, wherein, the nucleic acid is stably integrated within a genome of the plant.

23. The method of claim 20, wherein the plant derived proteins, or suprastructure proteins, comprise a monoclonal antibody or an influenza hemagglutinin.

24. The method of claim 15, wherein the plant matter is leaves.

25. The method of claim 15, further comprising a step d) of separating the proteins or protein suprastructures, in the filtered fraction from the cellular debris and insoluble materials.

26. The method of claim 25, wherein the step of separating is performed by centrifugation.

27. The method of claim 25 wherein the step of separating is performed by depth filtration.

28. The method of claim 15, further comprising the step of d) purifying the plant derived proteins or protein suprastructures, from the filtered fraction.

29. The method of claim 28, wherein the step of purifying comprises depth filtration of the filtered fraction to produced a clarified extract, followed by chromatography of the clarified extract using a cation exchange resin, a size exclusion resin, an affinity resin, or a combination thererof.

30. The method of claim 1, wherein the cell wall degrading multi-component enzyme mixture further comprises a buffer or buffer system which maintains the pH in the range of about 5 to about pH 7.8, an osmoticum or a combination of both.

31. The method of claim 15, wherein the cell wall degrading multi-component enzyme mixture further comprises a buffer or buffer system which maintains the pH in the range of about 5 to about pH 7.8, an osmoticum or a combination of both.