WHAT IS CLAIMED IS:

1. A method of producing an acellular organ, comprising:

(a) subjecting an organ to a first supercritical fluid (SCF) in the presence of a first co-solvent under a first pressure of 200-500 bar at a first temperature between 30-50℃ for a first period of 10-100 minutes; and

(b) subjecting the first SCF treated organ of the step (a) with a continuous flow of a second SCF in the presence of a second co-solvent under a second pressure of 200-500 bar at a second temperature between 30-50℃ for a second period of 10-100 minutes, wherein the flow rate of the second SCF is 10-30 liter per minute;

wherein, each of the first and second co-solvents is 30-100% (vol%) ethanol , and the method does not comprise the step of treating the organ with an agent selected from the group consisting of an enzyme, an ion chelating agent, a detergent, a glycerol, and a combination thereof.

2. The method of claim 1, wherein the first and second SCFs are independently selected from the group consisting of supercritical carbon dioxide ($ScCO_2$), supercritical nitrous oxide (ScN_2O), supercritical alkane, supercritical alkene, supercritical alcohol, supercritical acetone, and a combination thereof.

3. The method of claim 2, wherein each of the first and second SCFs is the $ScCO_2$.

4. The method of claim 3, wherein

each of the first and second pressures is 350 bar;

each of the first and second temperatures is 40℃;

each of the first and second periods is 10-80 minutes; and

the flow rate of the second SCF is 20 liter per minute.

5. The method of claim 4, wherein the first period is 30 minutes, and the second period is 60 minutes.

6. The method of claim 4, wherein the first period is 10 minutes, and the second period is 80 minutes.

7. The method of claim 4, wherein the first period is 80 minutes, and the second period is 10 minutes.

~~8. The method of claim 1, wherein each of the first and second co-solvents is 30-100% (vol%) ethanol.~~

~~9~~8. The method of claim ~~8~~ 1, wherein each of the first and second co-solvents is 75% (vol%) ethanol.

~~10~~9. The method of claim 1, further comprising, prior to the step (a),

(1) immersing the organ in a hypertonic solution for 10-60 minutes; and

(2) immersing the hypertonic solution treated organ of the step (1) in a hypotonic solution for 10-60 minutes.

~~11~~10. The method of claim ~~10~~ 9, wherein the hypertonic solution is a salt solution containing 0.5-4.0 M NaCl, and the hypotonic solution is water.

~~12~~11. The method of claim ~~11~~ 10, wherein

in the step (1), the organ is immersed in the salt solution containing 2.0 M NaCl for 30 minutes; and

in the step (2), the salt solution treated organ is immersed in water for 30 minutes.

~~13~~12. The method of claim ~~10~~ 9, wherein the steps (1) and (2) are repeated for at least two times.

~~14~~13. The method of claim 1, further comprising, after the step (b) , subjecting the second SCF treated organ to a solution containing 0.01-1.0 N NaOH.

~~15~~14. The method of claim ~~14~~ 13, wherein the solution contains 0.1 N NaOH.

~~16~~15. The method of claim 1, wherein the organ is heart, intestine, lung, spleen, kidney, liver, stomach, pancreas, bladder, colon, rectum, or brain.

~~17~~16. The method of claim ~~16~~ 15, wherein the organ is heart.

~~18~~17. The method of claim 1, wherein the organ is derived from a subject selected from the group consisting of, pig, cow, sheep, goat, rabbit, monkey, chicken, and human.

~~19. An acellular organ produced by the method of claim 1.~~

~~20. The acellular organ of claim 19, wherein the organ is a heart.~~