CLAIMS

1. A ~~process~~ reaction system for producing poly (α 1, 3 glucan), wherein said~~in a~~ reaction system ~~comprising two chambers, separated by a semi-permeable membrane, wherein~~ comprises:

a) a first chamber that comprises an enzyme reaction solution comprising:

i) sucrose; and

ii) at least one glucosyltransferase enzyme comprising a *Streptococcus salivarius* GtfJ enzyme; and

b) a second chamber, separated from the first chamber by a semi-permeable membrane that is in contact with the enzyme reaction solution, wherein the semi-permeable membrane is permeable to fructose, but impermeable to poly (α 1, 3 glucan) and the glucosyltransferase enzyme, ~~facilitates continuous removal of fructose and other low molecular weight moieties while retaining poly (α 1, 3 glucan) and the at least one glucosyltransferase enzyme inside the first chamber~~ wherein the semi-permeable membrane has a molecular weight cut-off from 12,000 to 100,000 Daltons.

2. The ~~process~~ reaction system of claim 1 wherein the enzyme reaction solution is maintained at a temperature of from 20 °C to 25 °C.

3. The ~~process~~ reaction system of claim 1 ~~further comprising~~ wherein the enzyme reaction solution further comprises at least one primer.

4. The ~~process~~ reaction system of claim 1 wherein the ~~semi-permeable membrane facilitates accumulation of~~ poly (α 1, 3 glucan) accumulates in the first chamber to a concentration ranging from 30 grams per liter to 200 grams per liter.

~~5. The process of claim 1 wherein the semi-permeable membrane has a molecular weight cut-off from 12,000 to 100,000 Daltons.~~

5.~~6.~~ The ~~process~~ reaction system of claim ~~5~~1 wherein the semi-permeable membrane is a dialysis tubing.

~~7. The process of claim 1 wherein the at least one glucosyltransferase enzyme is derived from streptococci.~~

~~8. The process of claim 7 wherein the at least one glucosyltransferase enzyme is selected from the group consisting of gtfJ, gtfB, gtfC and gtfI.~~

~~9. The process of claim 7 wherein the glucosyltransferase enzyme is from *Streptococcus salivarius*.~~

~~10. The process of claim 9 wherein the glucosyltransferase enzyme of *Streptococcus salivarius* is gtfJ.~~

6.~~11.~~ The ~~process~~ reaction system of claim 3 wherein the at least one primer is dextran.

7.~~12.~~ The ~~process if~~ reaction system of claim 1 wherein ~~the glucosyltransferase enzyme is a primer-independent enzyme~~ there is absence of a primer in the enzyme reaction solution.

~~13. The process of claim 1 wherein the glucosyltransferase enzyme is a primer-dependent enzyme.~~

8.~~14.~~ The ~~process~~ reaction system of claim 1 wherein more than one glucosyltransferase enzyme is present in the enzyme reaction solution.

~~15. The process of claim 14 wherein the more than one glucosyltransferase enzyme comprises a mixture of at least one primer-dependent enzyme and at least one primer-independent enzyme.~~