

What is claimed:

1. An immobilized enzyme composition for the preparation of a hexose comprising at least two, at least three, at least four, at least five, at least six carriers, at least seven, or at least eight of the following enzymes immobilized to at least one carrier or a mixture of carriers:
 - a) α glucan phosphorylase (α GP), phosphoglucomutase (PGM), and optionally 1,4-glucan transferase (4-GT); and
 - b) an enzyme from within a combination of enzymes selected from:
 - (i) phosphoglucoisomerase (PGI), fructose-6-phosphate epimerase (F6PE), and tagatose-6-phosphate phosphatase (T6PP) to prepare tagatose;
 - (ii) phosphoglucoisomerase (PGI), piscose-6-phosphate epimerase (P6PE), and picose-6-phosphate phosphatase (P6PP) to prepare allulose;
 - (iii) phosphoglucoisomerase (PGI), P6PE, allose-6-phosphate isomerase (A6PI), and allose-6-phosphate phosphatase (A6PP) to prepare allose;
 - (iv) phosphoglucoisomerase (PGI), mannose-6-phosphate isomerase (M6PI) or phosphoglucose/phosphomannose isomerase (PGPMI), and mannose 6-phosphate phosphatase (M6PP) to prepare mannose;
 - (v) phosphoglucoisomerase (PGI), F6PE, galactose 6-phosphate isomerase (Gal6PI), and galactose 6-phosphate phosphatase (Gal6PP) to prepare galactose;
 - (vi) PGI and fructose 6-phosphate phosphatase (F6PP) to prepare fructose;
 - (vii) PGI, P6PE, altrose 6-phosphate isomerase (Alt6PI), and altrose 6-phosphate phosphatase (Alt6PP) to prepare altrose;
 - (viii) PGI, F6PE, talose 6-phosphate isomerase (Tal6PI), and talose 6-phosphate phosphatase (Tal6PP) to prepare talose;
 - (ix) PGI, F6PE, sorbose 6-phosphate epimerase (S6PE), and sorbose 6-phosphate phosphatase (S6PP) to prepare sorbose;
 - (x) PGI, F6PE, S6PE, gulose 6-phosphate isomerase (Gul6PI), and gulose 6-phosphate phosphatase (Gul6PP) to prepare gulose;
 - (xi) PGI, F6PE, S6PE, idose 6-phosphate isomerase (I6PI), and idose 6-phosphate phosphatase (I6PP) to prepare idose; and
 - (xii) inositol 3-phosphate synthase (IPS) and inositol monophosphatase (IMP) to prepare inositol.

2. The immobilized enzyme composition of claim 1, wherein the weight of each enzyme relative to the total weight of the enzymes (w/w)% ranges from 0.1% to 40%.
3. The immobilized enzyme composition of claim 1 or 2, comprising 10-30% (α GP); 0-10% (4GT); 10-30% (PGM); and when present 0.1-10% (PGL).
4. The immobilized enzyme composition of any one of claim 3, further comprising PGL, F6PE, and T6PP to prepare tagatose.
5. The immobilized enzyme composition of claim 4, wherein the weight of each enzyme relative to the total weight of the enzymes (w/w)% is: 10-30% (α GP); 0-10% (4GT); 10-30% (PGM); 0.1-10% (PGL); 15-35% (F6PE); and T6PP (25-45%), wherein the total weight of enzymes in the composition total 100 w/w% relative to the total weight of the enzymes.
6. The immobilized enzyme composition of claim 5, wherein
 - the α GP comprises the amino acid sequence, or fragment thereof, of SEQ ID NO. 1;
 - the 4-GT comprises the amino acid sequence, or fragment thereof, of SEQ ID NO. 6;
 - the PGM comprises the amino acid sequence, or fragment thereof, of SEQ ID NO. 2;
 - the PGL comprises the amino acid sequence, or fragment thereof, of SEQ ID NO. 3
 - the F6PE comprises the amino acid sequence, or fragment thereof, of SEQ ID NO. 4; and
 - the T6PP comprises the amino acid sequence, or fragment thereof, of SEQ ID NO. 5.
7. The immobilized enzyme composition of any one of claim 3, further comprising PGL, P6PE, and P6PP to prepare allulose.
8. The immobilized enzyme composition of claim 7, wherein the weight of each enzyme relative to the total weight of the enzymes (w/w)% is: 10-30% (α GP); 0-10% (4GT); 10-30% (PGM); 0.1-10% (PGL); 0.1-10% (P6PE); and (45-65%) P6PP, wherein the total weight of enzymes in the composition total 100 w/w% relative to the total weight of the enzymes.
9. The immobilized enzyme composition of claim 8, wherein:
 - the α GP comprises the amino acid sequence, or fragment thereof, of SEQ ID NO. 1;
 - the 4-GT comprises the amino acid sequence of SEQ ID NO. 6;
 - the PGM comprises the amino acid sequence of SEQ ID NO. 2;

the PGI comprises the amino acid sequence of SEQ ID NO. 3
the P6PE comprises the amino acid sequence of SEQ ID NO. 7; and
the P6PP comprises the amino acid sequence of SEQ ID NO. 8.

10. The immobilized enzyme composition of any one of claims 1-9, wherein the total weight of the enzymes relative to the weight of the carrier (w/w)% is from 2.5%-12.5%.
11. The immobilized enzyme composition of any one of claims 1-10, wherein the carrier is a weak base anion exchange resin.
12. The immobilized enzyme composition of claim 11, wherein the carrier comprises a phenol formaldehyde polycondensate.
13. The immobilized enzyme composition of claim 11 or 12, wherein the carrier comprises a tertiary amine functional group, wherein the composition is, optionally, DUOLITE™ A568.
14. The immobilized enzyme composition of claim 11 or 12, wherein the carrier comprises a secondary amine functional group, wherein the composition is, optionally, DUOLITE™ PWA7.
15. The immobilized enzyme composition of any one of claims 1-10, wherein the carrier comprises a His-tag affinity resin.
16. The immobilized enzyme composition of any one of claims 15, wherein the carrier comprises controlled pore glass (CPG) particles.
17. The immobilized enzyme composition of claim 15 or 16, wherein the carrier is functionalized by a chelated metal.
18. The immobilized enzyme composition of claim 18, wherein the chelated metal is iron or zinc or wherein the carrier is, optionally, EziG™ Opal.
19. An enzymatic process for preparing a hexose from a saccharide comprising the step of contacting a starch derivative with an immobilized enzyme composition of any one of claims 1-18 under suitable reaction conditions convert the starch derivative to the hexose.

20. The process of claim 19, wherein the process steps are conducted at a temperature ranging from about 40°C to about 85°C, at a pH ranging from about 5.0 to about 8.0, and/or for about 0.5 hours to about 48 hours.
21. The process of claim 19 or 20, wherein the process steps are conducted in a single bioreactor, a plurality of bioreactors arranged in series, or a plurality of bioreactors arranged in parallel.
22. The process of any one of claims 19-21, wherein the process steps are conducted ATP-free, NAD(P)(H)-free, at a phosphate concentration from about 0.1 mM to about 150 mM, the phosphate is recycled within the enzymatic cascade reaction, and/or at least one step of the process involves a highly energetically favorable chemical reaction.