WE CLAIM:

1- A recombinant host cell, wherein said host cell comprises:
a heterologous nucleic acid sequence encoding a NAD^+-specific D-arabitol 4-oxidoreductase (EC 1.1.1.11) using D-arabitol as substrate and producing D-xylulose as product; and,
a heterologous nucleic acid sequence encoding a NADPH-specific xylitol dehydrogenase using D-xylulose as substrate and producing xylitol as product.

2- The recombinant host cell according to claim 1, wherein the host cell produces D-arabitol from D-glucose, in particular under high osmotic pressure medium.

3- The recombinant host cell according to claim 2, wherein the host cell does not consume D-arabitol as a sole carbon source.

4- The recombinant host cell according to any one of claims 1-3, wherein the host cell is selected from bacteria, fungi and yeast.

5- The recombinant host cell according to claim 4, wherein the host cell is an osmophilic or osmotolerant yeast.

6- The recombinant host cell according to claim 4, wherein the host cell is *Pichia ohmeri*.

7- The recombinant host cell according to any one of claims 1-6, wherein the NAD^+-specific D-arabitol 4-oxidoreductase (EC 1.1.1.11) is from *E. coli* and/or *Ralstonia solanacearum*.

8- The recombinant host cell according to claim 7, wherein the NAD^+-specific D-arabitol 4-oxidoreductase (EC 1.1.1.11) comprises or consists in the sequence selected from the group of SEQ ID No 2 or 43.

9- The recombinant host cell according to claim 8, wherein the sequence encoding the NAD^+-specific D-arabitol 4-oxidoreductase (EC 1.1.1.11) comprises or consists in the sequence of SEQ ID No 3 or SEQ ID No 42.

10- The recombinant host cell according to any one of claims 1-9, wherein the NADPH-specific xylitol dehydrogenase is a xylitol dehydrogenase from *Pichia stipitis* or *Gluconobacter oxydans* mutated for changing the cofactor specificity from NADH to NADPH.

11- The recombinant host cell according to claim 10, wherein the NADPH-specific xylitol dehydrogenase comprises or consists in the sequence of SEQ ID No 5 or 8.

12- The recombinant host cell according to claim 11, wherein the sequence encoding the NADPH-specific xylitol dehydrogenase comprises or consists in the sequence of SEQ ID No 6 or 9.

13- The recombinant host cell according to any one of claims 1-12, wherein the host cell is capable of producing a xylitol titer of at least 15 g/l in the supernatant after a 48 h culture.

14- The recombinant host cell according to any one of claims 1-13, wherein the host cell is a strain selected from strains I-4982, I-4960 and I-4981 deposited at the CNCM.

15- The recombinant host cell according to any one of claims 1-13, wherein the host cell comprises several copies of a sequence encoding a NAD^+-specific D-arabitol 4-oxidoreductase and/or several copies of a sequence encoding the NADPH-specific xylitol dehydrogenase.

16- A method for producing xylitol comprising culturing a recombinant host cell according to any one of claims 1-15, and recovering xylitol.

17- Use of a recombinant host cell according to any one of claims 1-15 for producing xylitol.