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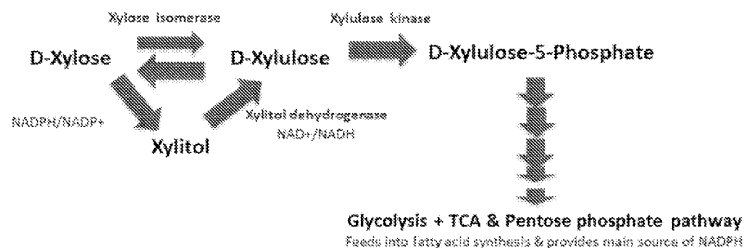


FIG. 1

(57) Abstract: Provided herein are recombinant microorganisms having two or more copies of a nucleic acid sequence encoding xylose isomerase, wherein the nucleic acid encoding the xylose isomerase is an exogenous nucleic acid. Optionally, the recombinant microorganisms include at least one nucleic acid sequence encoding a xylulose kinase and/or at least one nucleic acid sequence encoding a xylose transporter. The provided recombinant microorganisms are capable of growing on xylose as a carbon source.