What is claimed is:

1. A recombinant bacterium for synthesizing odd and even carbon chain monomer copolymerized mcl-PHA, wherein the recombinant bacterium is prepared using the following method: transferring the recombinant plasmid pZQ12 and a

recombinant plasmid pQQ05 into *Escherichia coli* LZ09;

the recombinant plasmid pZQ12, wherein a cimA gene is inserted into NcoI and BamHI multiple cloning sites of a plasmid pACYCDuet-1; a leuBCD gene is inserted into BamHI and SacI multiple cloning sites of the plasmid pACYCDuet-1; an ilvA gene is inserted into SacI and AscI multiple cloning sites of the plasmid pACYCDuet-1; and a thrA*BC gene is inserted into the AscI multiple cloning site of the plasmid pACYCDuet-1;

the cimA gene has a nucleotide sequence represented by SEQ ID No. 1 in the sequence table;

the leuBCD gene has a nucleotide sequence represented by SEQ ID No. 2 in the sequence table;

the ilvA gene has a nucleotide sequence represented by SEQ ID No. 3 in the sequence table;

the thrA*BC gene has a nucleotide sequence represented by SEQ ID No. 4 in the sequence table;

the *Escherichia coli* LZ09 is obtained by knocking out acetic acid synthesis genes ackA and poxB, and a lactate synthesis gene ldhA from *Escherichia coli* LZ05;

the recombinant plasmid pQQ05 refers to a recombinant plasmid overexpressing yqeF, fadB, phaJ1Pa, phaC2Pa, and ter genes;

the *Escherichia coli* LZ05 refers to an E. coli strain with ptsG, tesB, and yciA genes deleted.

2. An application of the recombinant bacterium according to claim 1 in the synthesis of odd and even carbon chain monomer copolymerized mcl-PHA.