Claims

1. A method for the production of a methacrylate comprising

   a) providing a genetically modified microorganism with increased tolerance to a C_3-C_{12} methacrylate ester compared to the wild type microorganism in a fermentation medium and

   b) growing the microorganism under conditions whereby a C_3-C_{12} methacrylate ester is produced;

   wherein the microorganism is *E coli*;

   wherein the genetically modified microorganism comprises a mutation in a wild type *soxR* (redox-sensitive transcriptional activator) nucleic acid sequence;

   wherein the wild type *soxR* nucleic acid sequence comprises SEQ ID NO. 1 or a homologue thereof; and

   wherein the mutant *soxR* nucleic acid sequence encodes a mutant SoxR protein comprising R20 substituted with H.

2. The method according to claim 1 wherein the microorganism is tolerant to at least 20% v/v C_3-C_{12} methacrylate ester when grown in a liquid medium at about 37°C.

3. The method according to claim 1 wherein the genetically modified microorganism further comprises a mutation in one or more of an *acrR* nucleic acid sequence comprising SEQ ID NO. 3 or a homologue thereof, a *rob* nucleic acid sequence comprising SEQ ID NO. 5 or a homologue thereof, a *marR* nucleic acid sequence comprising SEQ ID NO. 7 or a homologue thereof.

4. The method according to claim 3 wherein the mutant acrR nucleic acid sequence encodes a mutant AcrR protein, and wherein the mutation is selected from one of the following: a substitution of V29 with another amino acid, a frameshift mutation at T32, A191 or position 49 in AcrR.

5. A method for growing or maintaining a microorganism in the presence of a C_3-C_{12} methacrylate ester comprising providing a genetically modified microorganism with increased tolerance to a C_3-C_{12} methacrylate ester compared to a wild type microorganism in a fermentation medium under conditions whereby a C_3-C_{12} methacrylate ester is produced;

   wherein the microorganism is *E coli*;

   wherein the genetically modified microorganism comprises a mutation in a wild type *soxR* nucleic acid sequence;

   wherein the wild type *soxR* nucleic acid sequence comprises SEQ ID NO. 1 or a homologue thereof; and

   wherein the mutant *soxR* nucleic acid sequence encodes a mutant SoxR protein comprising R20 substituted with H.

6. A fermentation medium comprising a C_3-C_{12} methacrylate ester and a genetically modified microorganism with increased tolerance to a C_3-C_{12} methacrylate ester compared to a wild type microorganism;
wherein the microorganism is *E coli*;
wherein the genetically modified microorganism comprises a mutation in a wild type *soxR* nucleic acid sequence;
wherein the wild type *soxR* nucleic acid sequence comprises SEQ ID NO. 1 or a homologue thereof; and
wherein the mutant *soxR* nucleic acid sequence encodes a mutant SoxR protein comprising R20 substituted with H.

7. A method for the isolation of a methacrylate tolerant microorganism comprising:
a) providing a microorganism in a fermentation medium
b) contacting the microorganism with a methacrylate; and
c) isolating the viable microorganism of step (b)
wherein the viable microorganism is tolerant to at least 20% v/v a methacrylate when grown in liquid medium at about 37°C;
wherein the microorganism is *E coli*;
wherein the microorganism comprises a mutation in a wild type *soxR* nucleic acid sequence;
wherein the wild type *soxR* nucleic acid sequence comprises SEQ ID NO. 1 or a homologue thereof; and
wherein the mutant *soxR* nucleic acid sequence encodes a mutant SoxR protein comprising R20 substituted with H.

8. The method according to claim 3, wherein the mutant *rob* nucleic acid sequence encodes a mutant Rob protein, and wherein the mutation is selected from one of the following: a substitution of A70 or a substitution of R156 with another amino acid in Rob.

9. The method according to claim 3, wherein the mutant *marR* nucleic acid sequence encodes a mutant MarR protein, and wherein the mutation is a substitution of V84 with another amino acid in MarR.