Method for mass production of seleno-cysteine containing proteins from transgenic algae

Technology #37670

Production of selenocysteine using transgenic algae to create industrial sized yields.

The Need

The possibility to introduce the amino acid selenocysteine (Sec) residue into proteins may be of substantial importance for several different applications beyond facilitating studies of natural selenoproteins. These include specific radiolabeling, PET studies, x-ray crystallography, NMR, protein folding, enzyme kinetics, peptide conjugation, and applications involving a Sel-tag. (Johansson et al., Biochimica et Biophysica Acta. 2005).

Currently, the site-directed incorporation of Sec into eukaryotic proteins in single-celled expression systems is challenging due to the incompatibilities between animal and bacterial selenoprotein translational apparatuses.

The Technology

Researchers at The Ohio State University led by Dr. Richard Sayre have devised a method for mass production of selenocysteine containing proteins from transgenic algae. They propose to produce industrial quantities of recombinant enzymes in which catalytically active cysteine (Cys) residue(s) are replaced by the novel amino acid selenocysteine (Sec), yielding enzymes with enhanced catalytic activities.

To solve the issue of incompatibilities between animal and bacterial translational apparatuses, they produced papainSEL in transgenic micro-algae.

Commercial Applications

• Industrial enzymes
• Research

Benefits/ Advantages

• Enhanced catalytic properties as compared to Cys
  ◦ Stronger nucleophile
  ◦ More biologically favorable ionization and reducing potentials

Inventors

Richard Sayre