★★★ ＜第24回知的財産翻訳検定試験【第13回和文英訳】＞ ★★★
≪１級課題-バイオテクノロジー-≫

【問 1】

While low-alcohol beers typically have a golden or amber color, some beers have various colors such as black, red and white.

Therefore, consumers can consider the color as well as the flavor to select a low-alcohol beer.

On the color of the low-alcohol beers which is an important point in choosing one, various research and development have been promoted.

For example, Patent Document 1 discloses a fermented malt beverage produced by a production method of a fermented malt beverage in which a pre-fermentation liquid containing a Maillard reaction product and malt containing colored malt is fermented with beer yeast, wherein the beverage has a chromaticity (EBC) in the range of 8 to 12 and has a 3-deoxyglucosone content in the range of 25 ppm to 50 ppm. In this production method, the color of the fermented malt beverage is adjusted based on the amount of 3-deoxyglucosone in the beverage.

【問 2】

Siderophores are compounds that can chelate trivalent ferric iron.

The source of siderophores is not particularly limited, and they may be obtained from any type of organisms. Many microorganisms produce siderophores to efficiently take up iron which is necessary under conditions of low iron concentration in the external environment. Use of microorganisms allows the production of siderophores in large amounts because the microorganisms can be easily grown. Siderophores derived from microorganisms are therefore preferable. Siderophores derived from microorganisms are also preferable in that hosts which produce large amounts of siderophores can be easily generated by recombination of a group of genes encoding siderophore synthetases.

Naturally occurring siderophores, as well as their derivatives that can chelate trivalent ferric iron, may be used as siderophores of the present invention. Examples of derivatives of the naturally occurring siderophores include acetylated siderophores and nitrated siderophores.

Siderophores may be produced by isolation from organisms. Organisms cultured under low-iron conditions may produce iron-free siderophores. Siderophores isolated from organisms may be used in a crude form or may be purified.

【問 3】

Myotubes were formed using the muscle cell culture system developed by the present inventors as described above. Specifically, the myotubes were formed by culturing mouse myoblast C2C12 (ATCC No. CRL 1772) cultured in Dulbecco's modified Eagle's medium supplemented with 10% fetal bovine serum until confluence, in Dulbecco's modified Eagle medium containing 2% bovine serum and 200% amino acid supplement liquid for culture (see Table 1) for 6 days. The media were exchanged every 24 hours. Mimic motor stimulation was given to the myotubes by giving electric pulse stimulation of 40 V, 1 Hz, and 2 ms for 24 hours to the myotubes (24 h + EP). On the other hand, myotubes obtained by culture for 4 hours in a serum-free Dulbecco's modified Eagle's medium without electric pulse stimulation instead of culture with the electric pulse stimulation for 24 hours were used as a control group (24 h -EP) The effect of the motor stimulation was examined by measuring phosphorylation of AMP kinase and its substrate, acetyl coenzyme A carboxylase, phosphorylation of Erk5, JNK, and p38 which were indicators of stimulation for spreading, an increase in glucose uptake, and the amount of GLUT4 translocated into a membrane.

【問 4】

1. A method for detecting a partial/complete loss-of-function mutation in an abscisic acid 8'-hydroxylase gene on the A genome in a test wheat plant, comprising:

amplifying a nucleic acid by using, as a template, genomic DNA from a test wheat plant and a primer set, the primer set comprising:

(i) an oligonucleotide forward primer comprising a nucleotide sequence of at least 15 continuous bases at 1436 to 1611 of SEQ ID NO: 1, the nucleotide sequence being located in intron 3 of the abscisic acid 8'-hydroxylase gene;

(ii) an oligonucleotide reverse primer comprising a complementary sequence to a nucleotide sequence of at least 15 continuous bases at 1643 to1837 of SEQ ID NO: 1, the nucleotide sequence being located in exon 4 or in intron 4 of the abscisic acid 8'-hydroxylase gene; and

detecting an insertion mutation and/or a deletion mutation in the abscisic

acid 8'-hydroxylase gene on the A genome.

7. A method for breeding wheat having improved seed dormancy, comprising performing a method according to any one of claims 1 to 6 to identify a wheat plant heterozygous for a partial/complete loss-of-function mutation in an abscisic acid 8'-hydroxylase gene on the A genome, and using the wheat plant for back crossing.