larvae.

[Means to solve the problem]

【0013】

The first subject of the present invention resides in a method for inducing antibacterial peptides in insects by damaging the insects, characterized in that the damaging of the insects is performed by irradiation of a laser beam, in such a manner that the laser beam penetrates the insect's epidermis to make a hole in the insects without causing irreparable damage to the insect, so that antibacterial peptides is induced in the insects.

【0014】

In a preferred embodiment of the present invention, the insect is a house fly larva, the laser is a CO_2 laser, and the diameter of the hole penetrating the epidermis of the house fly larva is 1 to 300 μm.

【0015】

In a preferred embodiment of the present invention, the laser is irradiated to the insect larva under such a condition that movement of the insect larva is sealed by lowering a temperature just before freezing.

【0016】

In a preferred embodiment of the present invention, after laser irradiation, the house fly larva irradiated with the laser is transferred to an environment at a bulb temperature of 20°C to 35°C for 3 hours to 48 hours to induce antibacterial peptides in the larva.

【0017】

In a preferred embodiment of the invention, the house fly larvae are placed on a wet surface containing a liquid with a liquid having a near osmotic pressure maintained at 20°C. to 35°C so that the house fly larvae is contacted with the liquid to inhibit pupation.

【0018】

The second subject of the present invention is an apparatus used to induce antibacterial peptides in a body of insect by the method according to the present invention, comprising a CO_2 laser irradiation unit, a position information acquisition means for obtaining a position information of the insect, and a means for transmitting the insect position information obtained by the position information acquisition means to the CO_2 laser irradiation unit.

【0019】

In a preferred embodiment of the present invention, the apparatus comprising further a means to prevent movement of the insect larvae by cooling the insect larvae to a temperature just below freezing.

【0020】

Claims

[Claim 1]

In a method for inducing antibacterial peptides in insects by damaging the insects, the method is characterized in that the damaging of the insects is performed by irradiation of a laser beam, in such a manner that the laser beam penetrates the insect's epidermis to make a hole in the insects without causing irreparable damage to the insect, so that antibacterial peptides is induced in the insects, and in that the insects are larvae of flies, black soldier flies or mealworms and the laser is a CO_2 laser.

[Claim 2]

The method according to claim 1, wherein the insect are house fly larvae.

[Claim 3]

The method according to claim 1 or claim 2, wherein the diameter of the hole penetrating the epidermis of the insects is in a range of 1 to 300 μm.

[Claim 4]

The method according to any one of claims 1 to 3, wherein the laser is irradiated to the insects under such a condition that movement of the insects is sealed by lowering a temperature just before freezing.

[Claim 5]

The method according to any one of claims 2 to 4, wherein, after laser irradiation, the house fly larvae irradiated with the laser is transferred to an environment of a bulb temperature of 20°C to 35°C for 3 hours to 48 hours to induce antibacterial peptides in the larvae.

[Claim 6]

The method according to claim 5, wherein the house fly larvae is placed on a wet surface containing a liquid with a liquid having a near osmotic pressure maintained at 20°C to 35°C so that the house fly larvae is contacted with the liquid to inhibit pupation.

[Claim 7]

An apparatus for inducing antibacterial peptides in a body of insect by the method according to any one of claims 1 to 6, comprising a CO_2 laser irradiation unit, a position information acquisition means for obtaining a position information of the insect, and a means for transmitting the insect position information obtained by the position information acquisition means to the CO_2 laser irradiation unit.

[Claim 8]

The apparatus according to claim 7, comprising further means to

prevent movement of the insect by cooling the insect to a temperature just below freezing.

[Claim 9]

Use of a CO_2 laser in a method to induce antibacterial peptides in the insect's body by making holes that penetrate the insect's epidermis.