Process for the production of pearl from edible bivalvia and gastropoda

Abstract

The invention proposes a new grafting technique to induce the production of pearls from common edible bivalves, favouring the defense mechanism following the entry of a stressful agent (a nucleus or a fragment of a shell) which can result in the production of a pearl, with zero mortality rates of the animal and zero rejection rates of the grafted nucleus.

State of art

The stressing stimuli, used for pearls production, can either be natural or artificially induced to obtain natural or cultured pearls. In any case the mollusc acts against the foreign element trying to isolate it with successive layers of nacre (mother of pearl) encasing it. Artificial pearls production is based on a foreign element obtained from a shell fragment often covered with a donor mollusc mantel piece, which is surgically implanted. This process, also known as grafting, is well established on some mollusc species known as pearly oysters of tropical origins. The production of pearls in these species presents various obstacles: it requires investing large amounts of capital for training specialists, due to the complexity of the operations involved (the shape of the pearl, the rejection and the mortality rates depends on the skill of the technician); the pearl production cycle appears to be very long (about 4 years).

Invention

The patent proposes the use of edible bivalves for the production of «cultured» pearls and an innovative and easily applicable grafting technique which consists in inserting a foreign body by making a hole of about 3 mm in the shell, in a position far from vital and sensory organs and to close the hole with specific thermopolymers (poly (caprolactone) diol) (fig. 2 and 3).

The results obtained with the technique are (fig. 1): zero-grafting rejection rate and zero-mortality rate of animals (test on 50 individuals); a very short production times for the pearl (about 18-24 months); pearls (from mussels) with purple hues, spherical or irregular in shape and 5-6 mm in diameter. The core of the pearl is wrapped in concentric layers of calcium carbonate secreted by the mantle.

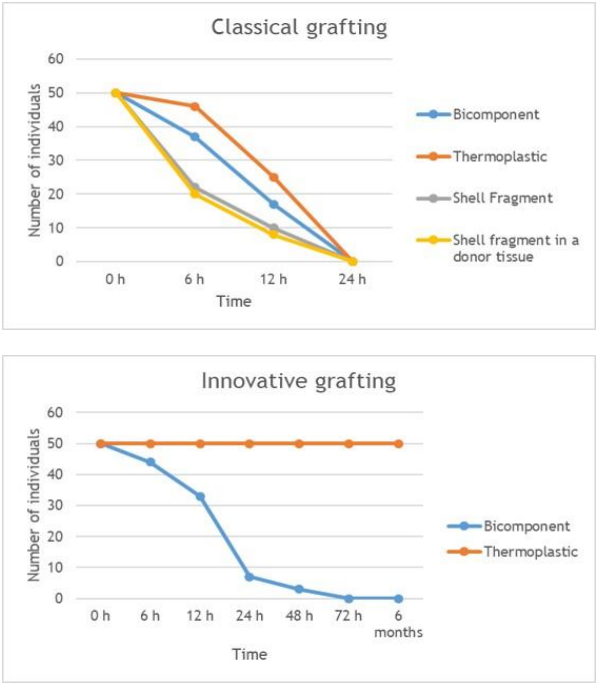

Figure 1 – Classic and patented grafting in comparison and rejection and mortality rates using poly (caprolactone) diol

Industrial Property

Italian patent application nr. IT201900001577A filed on 4.02.2019

Applicant

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Adavntages

The patented invention allows:

- pearls production along with food production, using the same mussel farms;
- low investments in technicians training;
- zero-mortality rate;
- zero-grafting rejection rate;
- faster production times of pearls compared to the known pearly oyster cycle.

Application

The patented invention finds application in the following areas:

- pearl production for ornamental use and for jewellery;
- Cosmeceutical market (use of calcium carbonate i.e., as a food supplement);
- Pharmaceutical market (use of calcium carbonate, i.e., as an antacid).

Development stage

Current TRL: 5 - The technique has been validated in mussel farms and has resulted in the production of pearls from mussel 5-6 mm in diameter, purplish in color with a shape that can be perfectly spherical or irregular.

Perspective TRL: 7 - Further tests will be carried out to verify if it is possible to obtain pearls of other dimensions and of mainly spherical shape.

Figure 2 – Mussels with hole closed with thermoplastic

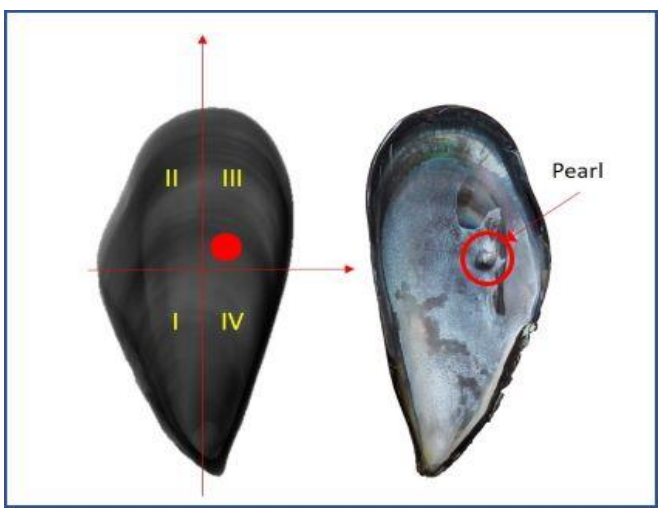

Figure 3 – Position of the hole on the shell and formation of the layer of calcium carbonate with the newly formed pearl in evidence where the hole made

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