ELECTRIC CALCIUM REACTOR FOR MARINE AQUARIUMS

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RESUMEN

The research group of the University of Alicante "Group of Electrocatalysis and Polymer Electrochemistry" (GEPE) has developed a device of special practical use in marine aquariums and aquaculture, since it enables the production of calcium, alkalinity, and micronutrients for the maintenance of aquarium conditions, in order to keep the necessary levels for the development of aquatic organisms.

The device, based on an electrochemical reactor, works in a simple and controllable way without the need of gaseous CO_2 streams, thus allowing automatic and precise dosing of nutrients by regulating the applied current of the device.

The device, which is protected by a patent and utility model application, has been developed on a laboratory scale, and a demonstration prototype has been used to generate calcium in a 100-litre aquarium.

Companies manufacturing calcium reactors or other reactors or devices for marine or reef aquariums interested in the commercial exploitation of this technology are being sought.

VENTAJAS Y ASPECTOS INNOVADORES

MAIN ADVANTAGES OF THE TECHNOLOGY

• It is an **easy-to-use** device, mainly because it dispenses nutrients without the use of CO_2 gas, thus avoiding the need to regulate its flow and the components and mechanisms required: pressurised CO_2 cylinder, gas pipes, pressure reducer, solenoid valves, pH probes, etc.

• The fact of dispensing without the use of CO_2 gas results in a **simplification of its design** and a **reduction in the cost** of production (as it has fewer components) and **maintenance**.

• Its great **simplicity** favours and facilitates its use in medium and small domestic or ornamental aquariums.

• The **control of the acid** needed to dissolve the appropriate doses of calcium and **alkalinity** can be **regulated automatically in a very precise way**, by means of an **electronic control system of the current/voltages applied**, without the need for costlier and complex gas storage and supply systems.

• Since the dosage of nutrients can be easily and precisely regulated, **the intervention of qualified personnel would not be necessary**, avoiding incidents related to excess of acidification or nutrients, thus preventing negative effects on the living species present in the aquarium.

• The device is very **versatile** since the electrochemical reactor can adopt different configurations without affecting its performance. Likewise, the reaction chamber can also have different designs, depending on the type of aquarium filter. In this way, the device could be installed in any type of aquarium.

• The device could be easily coupled to the conventional calcium reactors already installed, and the gas conduction and control systems could be replaced by the electrical reactor.

• The use of the device does **not alter the chemical composition of the aquarium water**, thus avoiding unwanted side reactions that could affect

the composition and pH of the aquarium water.

• The device is easily scalable as all **components** are **commercially available** in different sizes.

• The electronic control facilitates its coupling with other automatic measuring devices for alkalinity, calcium or other nutrients, allowing its **use to be managed automatically and/or remotely**.

INNOVATIVE ASPECTS OF THE TECHNOLOGY

The main innovative aspect of the technology described is the use of electrochemical technology to supply calcium, carbonic alkalinity and other micronutrients to the aquarium water without the need to introduce any CO_2 gas stream into the system, thus avoiding all the inconveniences involved.

In addition, this simple way of operating allows precise control of the nutrients supplied and the acidity generated by simply regulating the current supplied to the system via the power supply.

APLICACIONES DE LA OFERTA

This device finds application in any type of **recirculating aquaculture system** (coral farms, mollusc and fish farming, etc.), and more specifically in the field of **ornamental aquaculture**.

COLABORACIÓN BUSCADA

Companies interested in acquiring this technology for **commercial exploitation** through:

- Patent licensing agreements.
- R&D projects to adapt the device to the client's needs.

Types of companies sought:

- Companies manufacturing calcium reactors for marine aquariums or reef aquariums.
- Companies that manufacture other types of reactors or devices for marine aquariums or reef aquariums.