

ACUICOMP®: AN IN SITU COMPOSTER FOR ANIMAL BY- PRODUCTS NON SUITABLE FOR HUMAN COMSUPTION (SANDACH) GENERATED BY AQUACULTURE

Suffo, Miguel1; Sillero, Leonor 2; Neria, Blanca3; García-Morales, José Luis2

1Dpto. de Ingeniería Mecánica y Diseño Industrial, CASEM, Universidad de Cádiz. miguel.suffo@uca.es

2Departamento de Tecnologías del Medio Ambiente. Facultad de Ciencias del Mar y Ambientales. CASEM. Universidad Cádiz.

3Fundación Centro Tecnológico Acuicultura de Andalucía. Edificio "Ctaqua"

Aquaculture manufacturing, as any other production activity, generates by-products which are potentially exploitable. A good example constitutes the huge amount of fish that is usually discarded due to different causes and transformed into a new aquaculture animal by-products (AAB, "Animal by-products not intended for human consumption") that must be properly managed. Nevertheless, AAB can become a valuable material by applying the suitable technology. An alternative way to manage and value this type of waste has been developed through an in situ composting technique. Moreover, the obtained compost can be successfully used as a fertilizer or as a substrate material, and also presents several characteristics that allow its application in ecological agriculture. The device that has been designed and presented here represents a technological innovation for a sector of a marked strategic interest. In addition, it can be implemented by aquaculture farmers to add value to this by-product. In order to build up the process of in situ composting, the design, making and start up of a composter prototype have been performed, which was adapted to the conditions of the aquaculture installations existing in this geographical area. Likewise, owing to the unpredictable production rate of this by-product generally caused by the variable fish mortality, a compromise solution has been reached to combine the inner capacity of the composter and its acquisition cost. The following requirements have been considered to design and configure the prototype:

1. To be easily manipulated by the personal.
2. Characteristics that facilitate its mobility and transportation.
3. Low weight in relation to the volume of the by products to be composted
4. Low energy costs

5. No needs to connect to the general water system.
6. To minimize fish manipulation
7. To be able to incorporate a mixer for the processing and aeration of the generated mass.
8. To permit an effortless assembly and disassembly in order to facilitate the extraction of the fermented compost, along with its cleaning and maintenance.
9. To contain a ventilation-extraction air system that allows a proper fermentation.
10. To hold an automatic system that controls the handling of its electric elements and registers the technical parameters required, such as the temperature profile of the system.

Furthermore, the following requirements have been taken into account for the development of the process:

1. Mixing and aeration needs for the system to operate under aerobic conditions.
2. A temperature control that ensures the right cleaning of the by-product to be composted.
3. An adequate isolation of the reactor and a good control of possible unwanted vectors, such as odours, aerosols and wasting gases.

The composter, the so called Acuicomp®, has been patented by the University of Cadiz, which has promoted the development of the first prototype in collaboration with the Ctaqua foundation through a project funded by the Consejería de Economía, Innovación y Ciencia of Junta de Andalucía.



Fig.1. Acuicomp® composter