Introduction
The Atlantic bluefin Tuna (*Thunnus thynnus*) is one of the most commercially valuable marine fish species. Therefore, considerable research effort is being done since many years to advance in the farming techniques of this species. A good knowledge of the main events occurring at ontogenetic level is essential to advance in the design of more appropriate feeds and feeding protocols during the larval stage. In a first study we examined the organogenesis and development in general at histological level (Yúfera et al., 2014). In this study we have examined the activity of some digestive enzymes during the first weeks of life. With this aim the tuna larvae have been reared under mesocosm system with copepods as primary food source.

Materials and methods
Naturally fertilised eggs obtained from a captive broodstock were collected from cages. Eggs were transferred to the hatchery facilities of Futuna Blue. Hatched larvae were reared in 25 m$^3$ tanks with water recirculation system at 23-24 °C of temperature, 37 gl$^{-1}$ salinity and a light/dark daily cycle of 16/8 hours. Oxygen saturation in water ranged between 85 and 110%. The initial density was 4 larvae l$^{-1}$. Exogenous feeding started at 2 dph. Larvae were fed on rotifers during the first two days of feeding and on copepods from 3 to 18 dph. Copepods were cultured on mesocosm system and consisted in a mixture of *Acartia* sp (95%) and *Trigriopus* sp (5%). Rotifers and copepods were supplied twice a day to maintain a minimum density of 10 prey ml$^{-1}$ in the rearing tanks. Weaning onto commercial diet (Skretting Tuna Starter; 300-500 of particle diameter) started at 16 dph. Microalgae Tetraselmis chuii was also provided from first feeding up to 15 dph. Larvae were sampled at 12:30 periodically from hatching to day 24 after hatching (dph) for enzymatic analyses. In addition, a set of four samples were taken during the diurnal period at 12 dph. The activity of the digestive enzymes was determined according the methodology described in (Navarro-Guillén et al., 2015).

Results and Discussion
Changes of activity during the first week are shown in Figure 1. Trypsin is the main proteolitic enzyme detected, the activity of chymotrypsin being very low. Trypsin activity increased from 21 dph. The alkaline phosphatase and lipase with affinity to 7C increased at 8 dph and then declined. The activity of all the enzymes increased after 21 dph, particularly the trypsin activity. Activities determined along the diurnal period at 12 dph are showed in Figure 2. There are not relevant changes in the activity of chymotrypsin and lipase. However, the trypsin activity exhibited a notable increase at 16:30. The alkaline phosphatase increased in the last sample of the diurnal period.

These results confirm the importance of the sampling time to evaluate the digestive capacity. Thus, trypsin activity seems to be low during the first two weeks but the diurnal sampling showed that in fact it is high in the afternoon. These preliminary results show some discrepancies with those measured in Pacific bluefin tuna (Murashita et al., 2004) probably because in that study the determinations were done in unfed larvae sampled before the morning feeding.

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References


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