CHARACTERIZATION OF THE NILE TILAPIA (SAROTHERODON NILOTICUS) VISCERA WASTE (DREGS)

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Abstract - In this work the characterization of the Nile Tilapia viscera was performed. To do this, the oil (lipids) and the dreg (protein) were extracted. Acidity parameters were evaluated in the presence and absence of biliary juice. The other byproduct analyzed, dreg (protein), was evaluated in terms of its potential use as a raw material in the production of biofertilizers. The evaluation showed a high moisture value for the dreg, approximately 95%, a protein mean of 2.34% and an ash percentage of 1.0%. The C/N ratio was assessed at 22:1. In the evaluation of the biliary juice, the percentage increase of the acidity in the oil showed significant changes ranging from 5% to 10%, around 8.72% to 16.92% of the reference value, represented in this case by the extracted oil in the absence of the bile. When the percentage increase reached between 20% and 40%, the oil presents the greatest variations in its final acidity, 28.92% and 51.94%, respectively. Thus, this study is significant in assisting with the processing of Tilapia viscera.

Keywords – Nile Tilapia, Viscera, Bladder, Oil, Dreg.

I. INTRODUCTION
The world’s population is around 7.318.413.000 inhabitants. Food production needs to be compatible with the growth of the population. It is believed that in the next 40 years it will be possible to produce the same amount of food that was produced in the past 8,000 years.

Aquafarming is a method that achieves remarkable results in production, but it is also responsible for waste generation (Bery, 2012). Nowadays, the fish production has surpassed 157 million tonnes all over the globe (FAO, 2014). The generation of waste, however, tends to grow in the same proportion (Boscolo, 2003). According to Gomes (2009), the majority of the leftovers of the fish industry are released in nearby streams, without proper treatment, which contributes to environmental pollution.

It is not recommended that the aforementioned waste be disposed in landfills (Martins, 2012). The residual waters of the fish processing are full of solid waste, fish byproducts and high biological oxygen demand (Feltes et al., 2010).

The Nile Tilapia is one of the most productive species for the fish industry (Dias, 2009). In 2013, 250 thousand tons of Nile Tilapia were produced in Brazil (Sussel, 2013). Surveys conducted by Mota et al. (2014) showed that the waste generated by the evisceration of the Nile Tilapia correspond to 10% of the animal’s body weight. That 10% consists of 4% of lipids, which can be converted into oil, and 6% of protein, that can be used as compost.

The food production chain can generate millions of tons of waste on a daily basis. Studies and surveys that analyse the reuse of the production waste are vital to the sustainable growth. There is a need for technological advances that promote the use of raw materials with added value, high production capacity and competitive cost. Thus, the waste or by-products generated by the industrialization of a resource can be converted into added value input in the industry. The use of fish waste (viscera) is an optimal alternative to the lack of raw material and reduces the pollution caused by its release in the stream and soil (Arruda, 2004; Martins et al., 2015).

Fish waste is a potential source of raw material for biodiesel production (Silva, 1997; Volz et al., 2007; Lima, 2008). However, in order to make this activity viable, rearranging the economic and production systems may be necessary.

The evaluation and knowledge of recycling methods are fundamental insights to the large-scale aquafarming, leading to a better waste management and renewable energy generation.

II – METHODS
A. Extraction of fish entrails
In this work, the body weight of the Nile Tilapia and its visceral mass were measured. After this evaluation, 700g of fish entrails were added in a heating system at 60ºC, and constantly stirred for 20 minutes. The solid waste was collected by a filtering system made of strainers. The system was kept in repose for the dregs (dark and aqueous material composed mostly by non-fat viscera) to settle at bottom (Fig. 1).

B. Testing the increase of bile juice
A total of six different tests were performed to obtain tilapia oil. In each test a constant mass (210g) of bile-

Fig. 1. Process of obtaining the dreg. (a) Nile Tilapia Viscera in the absence of gall bladder; (b) Viscera cooking process; (c)