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MICRO – NUTRIENTS OF RED – BILLY TILAPIA (*COPTODON ZILLII*) AMONG DIFFERENT EGYPTIAN WATER MASSES

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Fishes concentrate heavy metal from surrounding environment inside their tissues. The study aims to determine the micro – nutrient contents (Cu, Fe, Mn, Pb) of *Coptodon zillii* in Bardwail Lagoon, Mediterranean Sea, Brackish Water Lagoon and Lake Timsah. The results showed that the highest nutrients were in Brackish Water Lagoon while the lowest ones in Mediterranean Sea site. Considering to nutrients, the highest value was 36.2 mg/ Kg of Fe while the lowest value was 0.57 mg/ Kg of Mn. The study approved the high – nutrition value of *Coptodon zillii* and healthy minerals content minerals among its flesh.

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Introduction

Marine animals, especially fishes, contain protein and essential components which able to maintain body health [1]. In Egypt, these fishes consider as the most common ones widely distributed in different environments and from the most popular food for Egyptian consumers [2]. Nutrients, also defined as essential minerals, are important for human body as they participate in the composition of many enzymes metabolism and play a role in the growth of the human body [3]. The levels of heavy metal pollutants are needed to be checked regularly in marine foods to estimate their hazard levels, polluted marine fishes are highly consumed by humans so they are considered as a route for transferring heavy metal to consumers [4].

Regarding to their concentrations in organism tissues, mineral nutrients are classified into two major groups: trace “micro” minerals (Cu, Fe, Mn, Se, Zn, Pb, Co, and Cr): below 50 mg / kg BW and macro minerals (Ca, P, Mg, K, Na, and S): above 50 mg / kg BW [5 & 6]. The study aims to provide a profile for micro - nutrient profile of *Coptodon zillii* in Egyptian water masses.

Materials and methods

Three samples of each species were collected by contacting with local fishermen. The samples were collected during the period from June 2018 to December 2019. The tissue digestion was carried by dry ashing method [7] for all minerals. Minerals were determined by atomic absorption spectrophotometer model Perkin Elmer 2308. Minerals were analyzed in Toxicity Unit in the Faculty of Science (Suez Canal University).

The concentration of each nutrient was calculated according to the following equation:

$$\mathbf{c = (a \times df \times b)/m}$$ [8]

Where,

C (mg/kg) = concentration in the test sample
a (mg/L) = concentration in the test solution
df = dilution factor
b (mg/L) = mean concentration in the blank solution
m = weight of the test portion (g)

Statistical analyses: Microsoft Excel program (Office 365) was used to detect the mean, standard deviation (Sd) and SPSS software program (IBM SPSS Statistics 22 subscription 64-bit edition for windows) was used to perform one – way ANOVA test.

Results and discussion

The results showed a significant difference between the nutrients concentrations within the same site ($P < 0.05$) but among nutrients concentration between the different sites there was no significant difference ($P > 0.05$) (Fig. 1).
The study results revealed that, the samples from Bardwil Lake contained the highest concentrations of minerals and the samples from Mediterranean Sea contained the lowest concentrations of minerals. The element concentrations in the flesh of each fish species were arranged in the order of Fe > Pb > Cu > Mn. The highest concentrated element was Fe among the sampling sites and Mn was found in lowest concentration.

Copper concentration (Cu) ranged between 3 and 7.6 mg/Kg in all sites, this ratio was among the FAO permissible limits [9] of 30 mg/ Kg for fish and its products.

The Iron concentration (Fe) showed a significant difference among the four studied species ($P < 0.05$). The highest concentration was for Bardawil Lake sample (36.2 mg/Kg) and the lowest one was for Lake Timsah sample (7.7 mg/Kg). this range was below the limits recommended by WHO [10] of 100 mg/kg for fish and its products.

The lowest content of manganese (0.57 mg/Kg) was investigated from Mediterranean Sea samples and highest one (6.6 mg/Kg) in Brackish Water Lagoon. The present study concentrations of Mn were in the range with the permissible limit provided by UK organizations [11] for fish and its products.

The present study results of Lead (Pb) concentrations (3.8 – 7.7 mg/Kg) was higher than FAO permissible limits [12] (0.5 – 5). The lowest recorded concentration was from Mediterranean Sea and highest one was from Brackish Water Lagoon.

The nutritional value and consumption quality of fish are affected by its body composition [13]. Body composition plays an important role in nutritional quality in fishes [14].
Both of the concentration of minerals in the water masses, the physiological state of the fish and the fish capability for absorbing the minerals from the diets and water masses, together are the factors effect on the concentration of minerals in fish muscles [15,16].

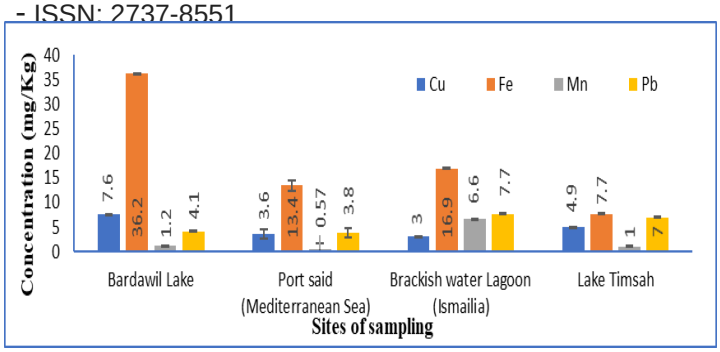

Fig 1: Concentration of minerals of *C. zillii* among different sites

Conclusions

In conclusion, the present study revealed that the mineral composition of the same species varied from water mass to another. The variation in the minerals content among the different water masses arise from the different concentrations of these minerals in the water mass itself. The study reveals that studied species are safe for human consumption.
Further studies are needed to evaluate these water masses pollution status and its effect on different edible species.

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