



Effect of *Pediococcus acidilactici* Additive in Nile Tilapia Diet Feed on Fish Performance

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ABSTRACT

Four diets from commercial sources were offered to 120 Nile tilapia (*Oreochromis niloticus*) divided into four equal groups. The first group was fed a control diet (treatment 1) without supplementation. The second, third, and fourth groups were fed diets supplemented with 3, 5, and 7 gm, respectively, of Bactocell® brand *Pediococcus acidilactici* / kg feed. The number of *Aeromonas hydrophila* and *Listeria monocytogenes* isolated from internal organs of experimental fish (muscles and liver) every month for three months was significantly lower in all treated groups than in control. The lowest record was in the diet supplemented with 3g/kg *Pediococcus acidilactici* bacteria. PCR was considered the most sensitive method for the detection of *Listeria monocytogenes*. The percent level of protection among the three treated groups after challenge infection using *A. hydrophila* (0.5 ml of culture suspension of pathogen containing 107 bacteria ml⁻¹) was higher than control and the highest record was in the 7g/kg *Pediococcus acidilactici* supplemented diet. The results of the present study support the use of *Pediococcus acidilactici* bacteria at a rate (7g/kg standard fish diets) supplementation as immunostimulants and growth promoters in common fish diets.

INTRODUCTION

Aquaculture possesses significant potential as a viable substitute for capture fisheries in addressing the escalating need for seafood and animal feed. (Naglaa and Dalia, 2016).

Fish are widely recognized as a significant dietary resource for human consumption due to their flesh being rich in protein, calcium, and phosphorus. According to the data provided by the General Authority for Fish Resources Development (GAFRD, 2020), the whole aquaculture production in Egypt during the year 2020 amounted to 2.1 million metric tonnes, which corresponded to a total market value of 62 billion Egyptian pounds.

Aquaculture presently represents Egypt's predominant source of fish provision, constituting almost 60% of the nation's total fish production. Over 98% of this output is derived from privately operated aqua farms. The inception and growth of contemporary aquaculture commenced in Egypt approximately twenty years ago, resulting in substantial and expeditious advancements within the industry in recent years, contributing to a notable upsurge in productivity. According to the Food and Agriculture Organization

(FAO, 2005), the aquaculture sector in Egypt is seeing the most substantial growth among all fisheries-related activities in the country. Consequently, it is widely regarded as the sole feasible solution for bridging the disparity between fish production and consumption in Egypt.

In recent years, there have been several efforts to evaluate and analyses the utilization of probiotics in fish species, such as tilapia *Oreochromis niloticus*. These initiatives have yielded significant findings, as evidenced by studies conducted by Carnevali *et al.* (2006), Aly *et al.* (2008), and Wang *et al.* (2008).

The influence of nutrition on the expression of genetic capacity for growth and reproduction is a critical component in cultured fish. The efficacy of fish cultivation relies on optimizing cost-effectiveness within the production process.

In aquaculture, it has been established that the utilization of improper feeding practices can give rise to the issue of overfeeding. This, in turn, leads to the accumulation of feed wastes within pond water, resulting in increased production costs and the contamination of the aquatic environment. Conversely, inadequate feeding practices contribute to suboptimal

تأثير إضافة *Pediococcus Acidilactici* في غذاء البلطي النيلي على أداء الأسماك.

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في هذه الدراسة استخدم أربع علائق مكونة من مصادر تجارية لتجربتها على ١٢٠ سمكة بلطي نيلي مقسمة على أربع مجموعات متساوية. تم تغذية المجموعة الأولى على غذاء تحكم (معاملة ١) بدون مكملات، المجموعة الثانية والثالثة والرابعة تم تغذيتها على غذاء مكمل ب ٣، ٥ و ٧ جم بكتيريا *Pediococcus acidilactici* ذات العلامة التجارية Bactocell® / كجم علف على التوالي. كان عدد كل من *Aeromonas hydrophila* و *Listeria monocytogenes* المعزولة من الأعضاء الداخلية لأسماك التجارب (العضلات والكبد) كل شهر لمدة ثلاثة أشهر أقل معنوياً في جميع المعاملات من المجموعة الضابطة. سجلت أقل نسبة في النظام الغذائي المضاف إليه ٣ جم / كجم من بكتيريا *Pediococcus acidilactici* يعتبر تفاعل (PCR) الطريقة الأسرع والأكثر حساسية للكشف عن *Listeria monocytogenes*. كانت النسبة المئوية للحماية بين المعاملات الثلاث بعد الإصابة باستخدام ٠,٥ مل *Aeromonas Hydrophila* من مسببات الأمراض المحتوية على ١٠^٧ بكتيريا / مل أعلى من المجموعة الضابطة. سجلت أعلى نسبة في النظام الغذائي المضاف إليه ٧ جم / كجم *Pediococcus acidilactici*. تدعم نتائج الدراسة الحالية استخدام بكتيريا *Pediococcus acidilactici* بمعدل (٧ جم / كجم علف) كمنشطات مناعية ومحفزة للنمو في أعلاف أسماك البلطي النيلي.