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## **Effects of various carbon to nitrogen ratios with dietary protein on immunity of juvenile common carp (*Cyprinus carpio*) in the biofloc system**

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### **Abstract**

The aim of this study was to investigate the effect of different carbon to nitrogen ratios and its method for rearing common carp (*Cyprinus carpio*) in the biofloc system through immunological parameters. A total of 750 fish species with a mean weight of  $17 \pm 0.5$  g were selected and randomly divided into 30 fiberglass tanks with a volume of approximately 250 liters of water. The treatments included three levels of carbon to nitrogen with different levels of 15, 20 and 25 with three levels of dietary protein including 25%, 30% and 35% by three replications during the 56-day period of trial. Also, a control group was fed with 35% dietary protein in usual system with water exchange. Based on the results, the amount of total protein, albumin, and globulin showed significantly a numerical increase with increasing the percentage of dietary protein in biofloc treatments compared to the control treatment ( $P < 0.05$ ). Also, the lowest serum total protein and albumin were observed in the control treatment. Furthermore, the lowest serum bactericidal activity, lysozyme, and total complement (ACH50) were in control treatment that significantly different from the biofloc treatment with 30% protein and the ratio of C/N 15 ( $P < 0.05$ ). As a result, using the optimal ratio of carbon to nitrogen 15 with 30% protein due to the activity of lysozyme and complement is a good strategy for the production of common carp juveniles at the early stage in this system.

**Keywords:** Biofloc, Blood serum, Common carp, Heterotrophic bacteria, Immunity system

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