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研究简报

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饲料中不同脂肪源对鲤鱼生长性能、脂质代谢和抗氧化能力的影响

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Effects of Different Lipid Sources in Diets on Growth Performance, Lipid Metabolism and Antioxidant Ability of Common Carp (*Cyprinus carpio*)

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摘要 在一种实用饲料配方的基础上,分别添加1.5%的鱼油、豆油、菜籽油、亚麻籽油和猪油作为单一脂肪源,配制成5种等氮等能(粗蛋白含量35%,总能15 MJ/kg)的试验饲料,通过8周的饲养试验,以研究饲料中不同脂肪源对鲤鱼生长性能、体组成、肝胰脏脂质代谢相关酶和抗氧化酶活性的影响。选取平均初重为(5.83±0.01) g的鲤鱼750尾,随机分成5组,每组3个重复,每个重复50尾鱼。结果表明:特定生长率(SGR)、蛋白质效率(PER)、饲料系数(FCR)以鱼油组最好,猪油组最差,且2组间存在显著差异($P<0.05$)。SGR、PER和FCR在豆油组、菜籽油组、亚麻籽油组间无显著差异($P>0.05$)。不同脂肪源对全鱼粗蛋白质和粗脂肪含量有显著影响($P<0.05$),但对全鱼干物质和粗灰分含量无显著影响($P>0.05$)。鱼油组全鱼粗蛋白质含量最高,而粗脂肪含量最低。肝胰脏脂蛋白脂酶(LPL)活性以鱼油组最高,其次是豆油组、菜籽油组、亚麻籽油组,以猪油组最低。肝胰脏苹果酸脱氢酶(MDH)活性表现为:亚麻籽油组>豆油组>鱼油组>菜籽油组>猪油组。猪油组肝胰脏超氧化物歧化酶(SOD)活性显著低于其他各组($P<0.05$),而其他各组间差异不显著($P>0.05$)。不同脂肪源对肝胰脏总抗氧化能力(T-AOC)有显著影响($P<0.05$),以鱼油组最高,猪油组最低。由此可见,鱼油是鲤鱼较适宜的脂肪源,而猪油不适宜作为鲤鱼的单一脂肪源,会损害肝胰脏健康,进而影响鱼体生长。

关键词: 鲤鱼 脂肪源 生长性能 脂质代谢 抗氧化能力

Abstract: A feeding experiment was conducted to investigate the effects of different lipid sources in diets on growth performance, body composition, and activities of lipid metabolism related enzymes and antioxidant enzymes in hepatopancreas of common carp (*Cyprinus carpio*). On the basis of a practical diet, 5 experimental diets were formulated to contain 1.5% lipid originated from fish oil (FO group), soybean oil (SO group), rapeseed oil (RO group), linseed oil (LO group) and lard (L group), respectively. Seven hundred and fifty common carp with an average initial body weight of (5.83±0.01) g were randomly divided into 5 groups with 3 replicates in each group and 50 fish in each replicate, and each group was fed one of the five experimental diets. The experiment lasted for 8 weeks. The results showed as follows: the best and the lowest specific growth rate (SGR), protein efficiency ratio (PER) and feed conversion ratio (FCR) were found in FO group and L group, respectively, and there was significant difference in those indices between FO group and L group ($P<0.05$), while no significant difference among SO group, RO group and LO group ($P>0.05$). Different lipid sources significantly affected the contents of crude protein and crude lipid of whole fish ($P<0.05$), but did not affect the contents of dry matter and crude ash of whole fish ($P>0.05$). Crude protein content of whole fish in the FO group was the highest ($P<0.05$), but its crude lipid content was the lowest. The hepatopancreas lipoprotein lipase (LPL) activity in FO group was the highest, next came SO group, RO group and LO group, and the lowest was in L group. The hepatopancreas malic dehydrogenase (MDH) activity showed that LO group>SO group>FO group>RO group>L group. The hepatopancreas superoxide dismutase (SOD) activity in L group was significantly higher than that in other groups ($P<0.05$), while no significant difference was found among LO group, SO group, FO group and RO group ($P>0.05$). Different lipid sources significantly affected the hepatopancreas total antioxidant capacity (T-AOC) ($P<0.05$), the highest was in FO group and the lowest was in L group. These results suggest that fish oil is the suitable lipid source for common carp, while lard is unsuitable as a

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single lipid source for common carp, because it will damage the hepatopancreas health, hinder the growth of fish.

Keywords: [common carp](#), [lipid sources](#), [growth performance](#), [lipid metabolism](#), [antioxidant ability](#)

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