

The Evaluation of Bakery Waste as a Replacement for Corn Meal and Barley Flour in the Diets of the Common Carp (*Cyprinus carpio* L.) Fingerlings

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ARTICLE INFO

Article History:

Received: Jan. 17, 2023

Accepted: March 19, 2023

Online: April 29, 2023

Keywords:

Amino acids,
Digestibility,
Growth performance,
Bakery waste

ABSTRACT

The current study investigated the dietary substitution effect of corn meal (CM) and barley flour (BF) with bakery (Samoon and Khubz) waste (SKW) on growth performance, feed efficiency, digestibility and chemical composition of common carp (*Cyprinus carpio* L.). Four isonitrogenous ($31.06 \pm 1.38\%$ crude protein) and isocaloric (361.07 ± 2.48 kcal/kg gross energy) experimental diets were formulated to replace 0% (control diet), 25%, 50% and 75% of CM and BF with SKW. The experiment was conducted in a recirculating aquaculture system. A total of 72 fish (average individual initial weight, 10.86 ± 0.32 g) were randomly stocked and sorted in 20-liter aquariums. Each diet was randomly assigned to triplicate groups. The fish were fed twice each day to apparent satiety (*ad libitum*). The results showed that there was no significant ($P > 0.05$) effect of SKW inclusion on the growth performance, feed efficiency and chemical composition of the fish. However, results exhibited a gradual and significant ($P \leq 0.05$) increase in the dry matter and carbohydrate digestibility of the fish with increasing dietary SKW inclusion levels. The results elucidated that SKW can replace CM and BF in the diets of common carp fingerlings by a percentage up to 75, without any adverse effects on all studied criteria.

INTRODUCTION

Food waste is considered one of the major problems around the world. According to the Food and Agricultural Organization (FAO), about one-third of the total amount of food produced for human consumption is lost or wasted every year across the entire supply chain (Ishangulyyev *et al.*, 2019). The quantity of waste dumped according to the Iraqi governorate for 2015 is about 2 655 156 ton, 68% of which is food waste (Musheb, 2018).

There is an increased risk of food crises due to the shortage of crops, and therefore food waste must be considered as a valuable source of supply and recycled to produce energy, fertilizers and animal feed (Wong *et al.*, 2016).

Amongst different types of food waste, bread could be considered a major contributor to the problem, since the bakery industry is one of the most important food