



# The effects of dietary inulin on growth performances, survival and digestive enzyme activities of common carp (*Cyprinus carpio*) fry

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## Abstract

This study was conducted to investigate the effects of dietary inulin on growth performance, diet utilization, survival rate, carcass composition and digestive enzymes activities (amylase, lipase and protease) of carp (*Cyprinus carpio*) fry ( $0.55 \pm 0.02$  g). After acclimation, fish were allocated into 9 tanks (40 fish per tank) and triplicate fish groups were fed, control diet (0 g) or diets containing 5 g and 10 g inulin  $\text{kg}^{-1}$  for 7 weeks. No significant effect on growth performance and diet utilization of fish fed inulin compared with the control group was observed. However, supplementation of inulin significantly increased survival rate and carcass lipid content, while carcass protein content significantly decreased. Dietary inulin had no significant effects on digestive lipase, protease and amylase activities.

**KEY WORDS:** *Cyprinus carpio*, digestive enzymes, growth performances, inulin, prebiotic, survival

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## Introduction

Prebiotics are non-digestible food ingredients that beneficially affect the host by selectively stimulating the growth of and/or activity of health-promoting bacteria in the intestinal tract (Gibson & Roberfroid 1995; Gibson 2004). In aquaculture, prebiotics have received increased attention since the first study was published by Hanley *et al.* (1995)

and stimulated growth performances, feed utilization, positive effects on gut microbiota, gut morphology and immune system, and disease resistance have been reported (Merrifield *et al.* 2010; Ringø *et al.* 2010, 2014). Inulin is one of the most studied prebiotic and consists predominantly of polydisperse  $\beta$ -(2→1)-linked fructan and is naturally present in a number of common foods such as garlic, onion, artichoke and asparagus (Van Loo *et al.* 1999; Mahious & Ollevier 2005; Roberfroid 2007). Despite some negative results (Olsen *et al.* 2001; Akrami *et al.* 2009; Reza *et al.* 2009), several studies have reported positive effects of inulin as growth promoter (Mahious *et al.* 2006; Burr *et al.* 2010; Ibrahim *et al.* 2010; Ortiz *et al.* 2013). Although numerous studies have been conducted on administration of prebiotics in aquaculture, no information is available on the effects of prebiotics on growth performance, carcass composition and digestive enzymes activities in early life stages of common carp (*Cyprinus carpio*) (Ringø *et al.* 2010, 2014).

For numerous aquatic species, the commercial production of larvae and fry is a bottleneck. Thus, the aim of this study was to determine the effect of inulin on growth parameters, survival, carcass composition and digestive enzymes activities common carp fry.

## Materials and methods

### Prebiotic

Inulin used in this study was kindly provided by Orafiti (Raffinerie Tirlemontoise, Tienen, Belgium). According to the manufacturer, composition of the product was 982 g  $\text{kg}^{-1}$  dry matter and 18 g  $\text{kg}^{-1}$  crude ash.