
(Piaractus brachypomus)

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(Piaractus brachypomus) :

(Agriculture Organization

(Peres *et al.*, 2003)

El-Sayed,)

(1999; Francis *et al.*, 2001

Chou *et al.*, 2004;)

(Tibaldi *et al.*, 2006

Webster *et al.*, 1995; El-

Piaractus)

(Sayed, 1999

(*brachypomus*

× ×

/ ± /

Fernandes *et al.*,)

(2004; Cagauan, 2007; Fishbase, 2010

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Fresneda)

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(*et al.*, 2004; Lochmann *et al.*, 2009

Food and)

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(Feed Processing Machinery Model Khze
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 (/ ± / KJ/g

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.(Garling and Wilson., 1976)

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/	/	/	/	(KJ/g)

(AOAC, 1995)

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) / ()
 = /
 (Chong *et al.*, 2003; Wang *et al.*, 2006)
 SPSS (version-17.0)

Cyanmethemoglobin (g/dl)
 Modi-biurent (g/dl)
 (ZiestChem diagnostics, Tehran, Iran)

(One-Way Anova)

Duncan

P<0.05
 (Mean ± S.D)

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(Mean ± S.D n = 3)

SBM	SBM	SBM	SBM	SBM	SBM
/ ± /	/ ± /	/ ± /	/ ± /	/ ± /	(g)
/ ± /	/ ± /	/ ± /	/ ± /	/ ± /	(g)
/ ± / ^b	/ ± / ^b	/ ± / ^a	/ ± / ^a	/ ± / ^b	(g)
/ ± / ^{bc}	/ ± / ^c	/ ± / ^a	/ ± / ^{ab}	/ ± / ^c	(g)
/ ± / ^a	/ ± / ^{ba}	/ ± / ^b	/ ± / ^b	/ ± / ^b	
/ ± / ^b	/ ± / ^b	/ ± / ^a	/ ± / ^a	/ ± / ^b	
/ ± / ^c	/ ± / ^{bc}	/ ± / ^a	/ ± / ^a	/ ± / ^{ab}	
					(%)

(P<0.05)

(Mean ± S.D)

(P<0.05)

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(P<0.05)

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SBM SBM (P>0.05)

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(P<0.05)

SBM SBM SBM

Cremer *et al.*, 2002; Lochmann *et al.* ()

(*al.*, 2009) SBM SBM

SBM SBM SBM (P<0.05)

(P<0.05) SBM SBM

(Mean ± S.D, n = 3)

SBM	SBM	SBM	SBM	SBM	SBM
/ ± / ^b	/ ± / ^b	/ ± / ^a	/ ± / ^b	/ ± / ^b	(%)
/ ± / ^a	/ ± / ^{ab}	/ ± / ^b	/ ± / ^a	/ ± / ^{ab}	(%)
/ ± / ^{bc}	/ ± / ^b	/ ± / ^d	/ ± / ^{cd}	/ ± / ^a	(%)
/ ± / ^a	/ ± / ^{ab}	/ ± / ^c	/ ± / ^{bc}	/ ± / ^{abc}	(%)

(P<0.05)

(Mean ± S.D)

...

(mean ± S.D., n = 3)

SBM	SBM	SBM	SBM	SBM	
/ ± / ^a	/ ± / ^b	/ ± / ^b	/ ± / ^b	/ ± / ^b	(g/dl)
/ ± / ^c	/ ± / ^c	/ ± / ^c	/ ± / ^b	/ ± / ^a	(g/dl)
/ ± / ^c	/ ± / ^{bc}	/ ± / ^a	/ ± / ^{ab}	/ ± / ^{bc}	(%)
(P<0.05)				(Mean ± S.D)	

SBM

(1999) Kikuchi

El- () (Carter and) (*Salmo salar*)
 (1999) Sayed *Paralichthys*) (Hauler, 2000
 Red drum (Kikuchi, 1999) (*olivaceus*)
 McGoogan and) (*Sciuenops ocellatus*)
Sebastes) (Gatlin, 1997
 Foil barb (Lim *et al.*, 2004) (*schlegeli*)
 SBM Elangovan and) (*Barbodes altus*)
 (Shim, 2000
Solea) (Gallagher, 1994)
 (Bonaldo *et al.*, 2006) (*aegyptiaca*)
 Cuneate drum (Refstie *et al.*, 1998) ()
 (Wang *et al.*, 2006) (*Nibea miichthioides*)

SBM

(Zhou *et al.*, 2005) (*Rachycentron canadum*) Wang Refstie *et al.*, 2006; Hernandez *et al.*, 2007)
 (Lim *et al.*, 2004) (.*et al.*, 2006;
 (Gallagher, 1994)
 (Gonzales *et al.*, 2007) (*Oreochromis niloticus*) Chong *et al.*,)
 (.2003; Romarheim *et al.*, 2006

SBM SBM

(SBM)

(SBM)

(Zeitler *et al.*, 1984)

SBM

Chong *et al.*, 2003;)

Nasim Khan *et al.*, 2003; Wang *et al.*, 2006;
(Hernandez *et al.*, 2007

(Belal and Assem, 1995)

Clarias)

Red drum (Goda *et al.*, 2007)(*gariepinus*
Romarheim) (McGoogan and Gatlin, 2006)

Red

(*Cirrhinus mrigala*) (et al., 2008

(McGoogan and Gatlin, 1997) drum
(Hernandez *et al.*, 2007) (*Diplodus puntazzo*)

Al-Ogaily,) (Jose *et al.*, 2006)

(Wang *et al.*, 2006) Cuneate drum

(2002

Goda *et*) (Tantikitti *et al.*, 2005)

(Jose *et al.*, 2006) (al., 2007

(Chong *et al.*, 2003)

Webster *et al.*,)

(1995; Al-Ogaily, 2002; Soltan *et al.*, 2008

El-

(Sayed, 1999

(Wang *et al.*, 2006)

(Goda *et al.*, 2007)

(Elangovan and Shim, 2000)

SBM

Hernandez *et al.*,)

Al-Ogaily,) (Lim *et al.*, 2004)

2007; Zhou *et al.*, 2005; Al-Ogaily, 2002; Wang
et al., 2006; Romarheim *et al.*, 2006; Goda *et al.*,
(2007; Elangovan and Shim, 2000

(Zhou *et al.*, 2005) (2002

(Tantikitti *et al.*, 2005) (*Lates calcarifer*)

(Chong *et al.*, 2003) (*Symphysodon aequifasciata*)

(Carter and Hauler, 2000)

(Hernandez *et al.*, 2007)

- (Wang *et al.*, 2006) Cuneate drum
 Romarheim *et al.*,) (*Oncorhynchus mykiss*)
 . (2006
- SBM SBM
- (Zhou *et al.*, 2005)
-
- Jose (2000) Shim Elangovan
 foil barb (2006)
-
- (Soltan *et al.*, 2008)
- (Zhou *et al.*, 2005)
- SBM
-
- Lim)
 (et al., 2004
- (Post, 1983)
- (Garrido *et al.*, 1990)
- (Zhou *et al.*, 2005)
- (Soltan *et al.*, 2008)

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Effect of Replacing Fish Meal by Soybean Meal in Diet of Red Pacu (*Piaractus brachypomus*)

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Abstract

The effect of replacing fish meal with soybean meal in diets for red pacu on growth performance, body composition and hematological indices was evaluated in an 8-week trial. Five isonitrogenous and isocaloric diets formulated containing 32.04 ± 0.46 crude proteins and 17.26 ± 0.31 KJ gross energy g^{-1} diet. The control diet was formulated to contain 50% fish meal, whereas in the other four diets soybean meal was included at 16.5, 33, 49.5 and 66% to replace 25 (SBM25), 50 (SBM50), 75 (SBM75) and 100% (SBM100) of the fish meal protein. One hundred and ninety fish (with average weight $1.8 \pm 0.07g$) were randomly distributed into five treatments (each treatment included 3 replicates). Weight gain and specific growth rate in fish fed SBM25 and SBM50 diets were significantly higher than any of other treatments. Feed consumption in fish fed SBM50 diet was significantly higher than other treatments. Feed conversion ratio in fish fed SBM100 diet was significantly higher than fish fed other treatments, while no statistical significant difference was observed between the four other treatments. Whole body composition fish fed SBM50 diet had significantly lower crude protein, lipid, ash and higher moisture compared with other treatments. Fish fed SBM100 diet had a significantly higher hemoglobin and lower hematocrit than other treatments. The results indicated that an economical diet can be formulated using 50 percent soybean meal in red pacu diets without adverse effect on growth performance.

Keywords: Red pacu (*Piaractus brachypomus*), Fish meal, Soybean meal, Growth performance.