Semen characteristics of rainbow trout (*Oncorhynchus mykiss*) following diets containing different vegetable fatty acid levels

M Hajiahmadian1 | K Sarvi Moghanlou1 | N Agh2 | F Farrokhi Ardabili3

1Department of Fisheries, Faculty of Natural Resources, Urmia University, Urmia, Iran
2Urmia Lake Research Institute, Urmia University, Urmia, Iran
3Department of Animal Husbandry, Faculty of Agriculture, Urmia University, Urmia, Iran

Correspondence
Koorosh Sarvi Moghanlou, Department of Fisheries, Faculty of Natural Resources, Urmia University, Urmia, Iran.
Email: k.sarvimoghanlou@urmia.ac.ir

INTRODUCTION

It is an obvious statement that nutrient requirements of the brood fish are to be met in order to sustain reproductive performance, and this includes the provision of essential fatty acids, mainly unsaturated ones, that the fish cannot synthesize (reviewed in Izquierdo, Fernandez-Palacios, & Tacon, 2001). Fatty acids and particularly unsaturated fatty acids are functionally essential for normal growth, development and reproduction in fish. In fact, these compositions are utilized as energy sources throughout embryogenesis, particularly in the later stages of germ cells development and markedly influence the reproductive success (Asturiano, Sorbera, Zanuy, & Carrillo, 2000; Pustowka, McNiven, Richardson, & Lall, 2000; Sargent, Henderson, & Tocher, 1989; Sargent, Tocher, & Bell, 2002).

Most studies conducted in the literature on dietary effects have focused on female rather than male brood fish. However, when dietary regimes are administered to fish and tested in properly designed experiments, they have been shown to account for a significant portion of variation in phenotypic expression and reproductive traits in males (Henrotte et al., 2010; Norambuena et al., 2013). For instance, dietary fatty acids affected semen morphology and semen velocity in common barbel, *Barbus barbus* (Alavi et al., 2009); biochemical composition of semen in Eurasian perch, *Perca fluviatilis* (Henrotte et al., 2010) was altered by dietary components; there was an effect of dietary arachidonic acid [ARA; C20:4(n-6)] levels on steroid production in Senegalese sole, *Solea senegalensis* (Norambuena et al., 2013); European sea bass, *Dicentrarchus labrax*, exhibited enhanced reproductive performance (i.e. increased semen quality and fertilization ability) when males were...