

EFFECT OF SOME PROCESSES ON THE ANTINUTRITIONAL FACTORS OF CANOLA SEEDS AND ITS UTILIZATION FOR RED TILAPIA FISH DIETS

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ABSTRACT

Canola meal is an excellent source of protein (44.6%). The antinutritional factors; trypsin inhibitor, total polyphenol and phytic acid were determined to be 13, 0.7 and 5.1%, respectively. Soaking canola seeds in water and 0.1% citric acid (pH 4.94), resulted in gradual decline in all antinutritional factors examined during 12 h. These processes were effective in removing 12 -24% trypsin inhibitor, 7 -13% polyphenol and 18 -30% phytic acid. Soaking in 0.1% citric acid was effective in removing antinutritional factors except trypsin inhibitor. Heating was more effective than soaking in activating trypsin inhibitor but heating seed soaked for 12 h resulted in the removal of high amounts of antinutritional factors.

Two growth trials were conducted to assess the potential for incorporation canola seed meal (CM) as a partial or complete replacement for fish meal in diets of the red tilapia. Fish meal in the control diet was replaced proportionally (25, 50, 75 and 100%) by either raw canola seed meal (RCM) in the first experiment or heated canola seed meal (HCM) in the second experiment, either RCM or HCM incorporated in the experimental diets at rates of 10.23, 20.46, 30.69 and 40.92% in the diets 2, 3, 4 and 5 (for each experiment), respectively. Replacing fish meal by RCM at all replacing levels significantly adversed final body weight (BW), body length (BL), weight gain (WG), specific growth rate (SGR). The same trend was observed for feed utilization parameters whereas all replacing levels of fish meal by RCM significantly adversed feed conversion ration (FCR), decreased feed intake (FI) and decreased protein efficiency ratio (PER). Replacing fish meal by HCM up to 50% did not significantly affect all growth parameters (BW, BL, WG and SGR) and all feed utilization parameters (FI, FCR and PER) but the highest replacing levels (75 and 100%) significantly adversed all growth and feed utilization parameters.

Key words: antinutritional factors, canola seeds, red tilapia fish.

1. INTRODUCTION

Oil seeds are widely consumed as a source of edible oils and energy for human consumption. The remaining meals after oil extraction are rich in protein, dietary fibers and carbohydrates. Oil seed meals are consumed mainly for animal and poultry feeding (Abu-Shama, 1998). Canola seed (*Brassica napus*) contains about 40-45% oil and a good quality protein of up to 35% (Katiyar and Chamola, 2003). Breeding was successful to yield new varieties of canola seeds free of erucic and glucosinolate (Larsen and Sorensen, 1985). Canola meal is an important source of high quality plant protein for human consumption but the meals contain various antinutritional factors which elicit adverse nutritional effects such as phytic acid, phenolic compounds and trypsin inhibitor activity that play an important role in decreasing the nutritional value of oil seed meal foods (Barimalaa and Anoghal 1997; Bau *et al.* 1997).

Removal of undesirable components is essential to improve the nutritional quality of canola and effectively utilize their full potential as human food. It is widely accepted that simple and inexpensive processing techniques are an effective method of achieving desirable changes in the composition of seeds. Soaking could be one of the processes to remove soluble antinutritional factors which can be eliminated with the discarded soaking solution, but some metabolic reactions can take place during soaking and affect the content of some compounds (Vidal-Valverde *et al.* 1992). Vidal-Valverde *et al.* (1994) found that soaking lentil seed in NaHCO₃

