

## Carob seed germ meal as a partial soybean meal replacement in the diets of red hybrid tilapia

### ABSTRACT

The feasibility of carob seed germ meal (CSGM) as a soybean meal (SBM) replacement in the diet of red tilapia hybrid was evaluated in an 8-week feeding trial. Five isonitrogenous and isocaloric diets with increasing CSGM (0, 10, 20, 30 and 40%), at the expense of SBM, were fed to triplicated groups of tilapia fingerlings. Their growth, feeding efficiency, whole body proximate composition, selected plasma biochemical parameters, and liver and gut histopathology were assessed. The survival and growth of red tilapia were unaffected by the dietary CSGM inclusion up to 30%. Growth and feeding efficiencies were significantly reduced at 40% CSGM inclusion. Hematocrit and body crude lipid were significantly lower ( $p < 0.05$ ) in fish fed 30–40% CSGM while plasma ALT and protein were significantly higher compared to the control (0% CSGM). In addition, some instances of lipofuscin and cellular degradation were shown in liver while morphological changes were observed in fish fed 30 and 40% CSGM. Some of these included a 60% and 34% reduction in goblet cell prevalence and villi length, respectively, as well as a thickening of the intestinal mucosal and submucosa layers of 51 and 27%, respectively as dietary CSGM increased from 0 to 40%, that was likely due to increased anti-nutritional factors. In conclusion, a dietary inclusion of only up to 20% untreated CSGM was recommended for red hybrid tilapia.

**Keyword:** Soybean meal replacement; *Ceratonia siliqua*; Carob germ meal; Tilapia; Antinutritional factors