

## ABSTRACT

Although conditions for aquaculture in Uganda and East-Africa are favourable, production remains low. One of the primary limitations to aquaculture development in the region is the lack of economical aquafeeds produced from local raw materials. In this thesis, four experiments were conducted to contribute to the solution of this problem: 1) Defining the optimum experimental design in fish growth studies (i.e., the number of fish and replication level of treatments) and the best statistical methods to analyse the results. Variance estimates from 24 growth studies were similar, hence experiments set in triplicates and with n of 50-100 are recommended for all fish growth studies. A mixed model ANOVA is suitable for analyzing dose response data. 2) Studying the effects of dietary lipid oxidation on farmed fish. The results suggest that lipid oxidation does not affect the growth of Nile tilapia (*Oreochromis niloticus*) in ponds where they have access to plankton rich in vitamin E. 3) Comparing the effects of the commonly used ethoxyquin (EQ) and novel antioxidants in aquafeeds, rosemary oil (RM; *Rosmarinus officinalis*) and bladderwrack (BW; *Fucus vesiculosus*), on farmed fish and their efficacy in preventing oxidation of fish oil. The results suggest that RM can be as effective in preventing oxidation of oils as EQ. Moreover, RM appears to promote better growth than does either EQ or BW. 4) Testing locally available ingredients as alternative protein sources to replace fish meal in aquafeeds. The results suggest that the meal made from the freshwater shrimp *Caradina nilotica*, a by-catch from pelagic fisheries, is economically viable replacement ingredient for *Rastrineobola argentea* fishmeal currently used in aquafeeds. The results of these experiments provide useful information for the future development of aquaculture in Uganda and in other parts of East-Africa.