Quantifying methionine requirement of African catfish *(clarias gariepinus)* using a plant-based diet

F. E. Elesho[1], J.A.J. Verreth[1], D.A.H. Sutter[2], S. Kröckel[2], J.W. Schrama[1]*

[1] Aquaculture & Fisheries Group, Wageningen University & Research, The Netherlands

[2] Skretting Aquaculture Research Centre, P.O. Box 48, 4001 Stavanger, Norway

* E-mail: folasade.elesho@wur.nl

The increasingly use of plant ingredients to replace high cost fishmeal has motivated fish nutritionist to investigate the amino acid (AA) profile and their individual requirements in commonly cultured species. Problems associated with the use of plant ingredients include the presence of anti-nutritional factors and AA deficiencies. Methionine is the first limiting AA in most leguminous plants. It is a sulphur-containing essential amino acid that is required for the synthesis of cysteine in animal and humans. Methionine is an initiation codon required during protein synthesis for protein formation. Inclusion levels of methionine below the requirements may cause growth reduction and decrease feed efficiency in fish. Therefore, adequate supply of methionine is essential in fish diets. Methionine requirements have been determined for several fish species, however, no reliable information is currently available for African catfish (*Clarias gariepinus*). Therefore, a 7-week experiment was conducted to estimate the dietary methionine requirement of juvenile African catfish (initial weight 78 g), reared in a recirculation aquaculture system. A low-methionine (plant-based) diet was formulated using soy protein concentrate and faba beans as intact protein. Based on the methionine requirements for other species, which was obtained from literature, 7 diets were formulated, which all had the same basal composition but supplemented with different amount of crystalline DL-methionine: 0, 0.12, 0.24, 0.36, 0.48, 0.60, and 0.84%. Fish were fed restrictively twice a day at 90% satiation. Apparent digestibility coefficient (ADC) of nutrients were measured by using settling tanks connected to the outlet of the aquaria in which African catfish were housed. The body composition of the fish were analysed both at the start and end of the experiment to determine the amino acid deposition, energy and nitrogen balance. At the end of the experiment, fish were weighed to determine the final body weight. Broken-line regression analysis was used to determine the quantitative methionine requirement by estimating the break-point for retained nitrogen and growth. The breakpoint of the growth response curve occurred at 6.01 g methionine /kg diet. The reported methionine requirement value in this study can be used to formulate least cost - diets using plants ingredients for production of African catfish.