

1 Executive summary

In this deliverable, results of the chemical-physical and technological analysis on both poultry and fish feed species are presented. First, the formulations of experimental feed are shown. Next, the process parameters and machinery used for feed production are illustrated. Finally, all the analyses to which the feeds have been subjected are explained, and specifically the proximate analysis (protein, fat, ash, moisture, and fiber), and physical and technological analyses: density, floating rate, durability, oil leaking, and water stability.

Results have shown a significant difference in protein values among feeds indicating that it is necessary to investigate further the matrices of raw materials at protein level. Also, single cell proteins (SCP) and microalgae have increased durability but at the same time they have worsened the floating rate calling attention on the need of additional precautions during the feed extrusion processes.

2 Introduction

In the coming years there will be a worldwide increase in high-quality protein demand for both food and feed. The access to high quality proteins is however becoming harder due to growing world population and socio-economic changes such as urbanisation, increased incomes, resource scarcity and climate change, to name a few. For this reason, current protein production would have to double by 2050, a huge challenge considering that the European Union (EU) already suffers from important protein deficiency and imports over 70% of consumed proteins (EU report 2010/2011(INI)), with severe concerns regarding food security and the general competitiveness.

It is one of the more pressing issues of our times to ensure continuous and affordable supply of proteins for animal feed. The traditional protein sources currently used in feed formulations are high quality protein sources which lead to an excessive water use (fish meal) or to a wide soil exploitation (soybean meal) as well as biodiversity loss, with negative environmental and social consequences (Oliva-Teles, A. et al., 2015; FAO "The state of the world's forests", 2020)). It follows that this supply of proteins must be created with scientific life cycle and circular approaches at its core.

Task 4.1 will test the effect of the alternative proteins on all feeds manufacturing (both poultry and fish), and the impact on physical and technological characteristics of the feed.

In this deliverable we look first at the feed formulations, then at the feed production process, and finally we present the results of the chemical-physical and technological analysis carried out on each feed type.