

BENCHMARK GENE EDITING POSITION STATEMENT

Introduction

Benchmark is a global leader in the genetic development of aquaculture species making them more fit for the farming environment. We value our position to act as guardians of the animals under our care, developing strains capable of high performance in modern production systems, under management systems which deliver high standards of health and welfare, with nutrition which meets the requirements of all stages of the reproduction and production process.

Background information

Conventional animal breeding carried out over many centuries in crops and terrestrial livestock, and over the last few decades in aquaculture, has involved choosing the most desirable individuals as parents of the next generation, resulting in the broad range of breeds and strains of plants and animals used in agriculture and aquaculture. In the 1990's it became possible to move genes between species using various techniques to create new genotypes, a process known as transgenesis, creating plants and animals generally described as Genetically Modified Organisms (GMO's). GMO's became the subject of moral and regulatory debate with regulatory acceptance of particular GMO crops in some regions, but very limited acceptance of GMO's in animal production. Transgenesis in microorganisms has resulted in novel products used extensively in food, drug and other manufacturing processes.

Over the past two decades, bacterial enzyme complexes were identified which were capable of targeted modification of DNA sequences. In a process known as Gene Editing (or Genome Editing), these enzyme complexes can make precise, targeted changes in the genomes of microorganisms, plants and animals, introducing desired alterations (or mutations) to change genotype and performance. This process is fundamentally different to the transgenic approach used for GMO's where foreign genetic material is introduced. Gene Editing makes precise, targeted changes in the DNA sequence of the organism itself. Such mutations would occur naturally in populations of plants and animals, but at a very low level.

Benchmark recognises that Gene Editing is a novel technology which involves making new genotypes which may result in improved performance of the organism. The company believes that this technology should be evaluated by regulators and the Industry in a constructive manner considering the opportunities to produce new products and develop new genotypes which show better adaption to the farming environment, an improved health and welfare.



Benchmark Gene Editing Position statement

Benchmark's mission is to be a global leader in driving sustainable solutions in the food chain and proposes a clear, principled approach to gene editing, ensuring that the Company remains at the cutting edge of this technology whilst establishing a position to improve health, welfare and economics of aquaculture. Our position statement will be reviewed as the science and regulation develops.

- Benchmark considers gene editing of crops and animals to be a separate technology to transgenesis (moving genes between species), which should be considered as different from those methods included in the original GMO regulations. Editing of genes with naturally occurring genetic variation represents a much lower risk to animal welfare and environment.
- Benchmark considers gene editing of microorganisms and cell lines as a valuable tool for production of novel biotechnology products, and for understanding the how genes work at a fundamental level and in producing a phenotype.
- Benchmark recognises gene editing as a potential tool for breeding livestock with improved health, animal welfare and performance, and will research and investigate possible applications that do not constitute a risk to the genetic integrity of the individual, population or to the environment, or involve transfer of genetic material across species boundaries.
- Benchmark will consider possible applications of gene editing on a case-by-case basis. Benchmark will take into consideration the potential ethical, economic and environmental impacts associated with the application of gene editing for the animal itself, the production system, the producer, potential consequences on aquacultural practices, food systems and downstream effects on the environment.
- Benchmark recognises that gene editing may be one of many useful tools for improving health and welfare of farmed animals along with conventional breeding, nutrition, vaccination, health management and husbandry.
- Benchmark will implement this technology where it proves to be socially and legally acceptable and when it can be shown to improve the efficiency, health and welfare of our animals.