NANNOCHLOROPSIS TRANSFORMATION KIT

FOR FISH VACCINATION AGAINST VIBRIOSIS

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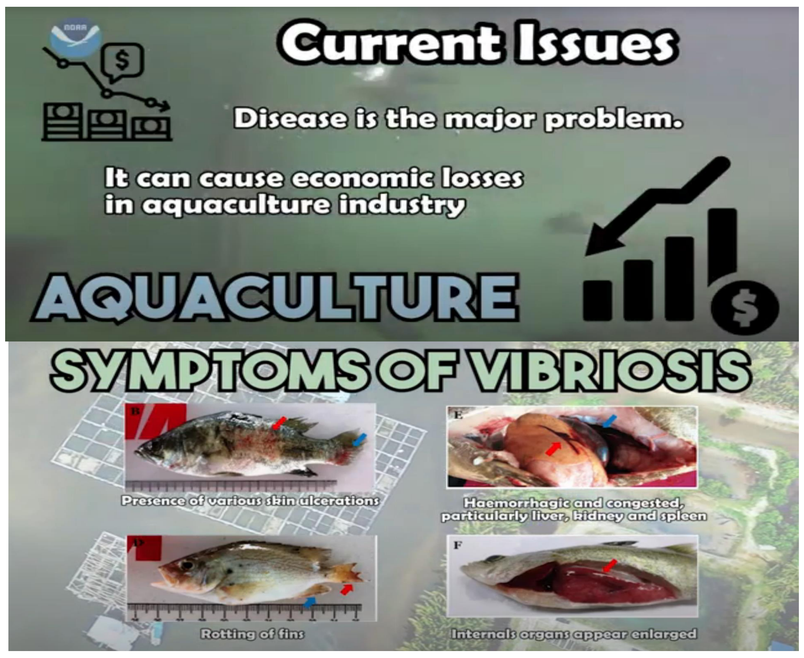

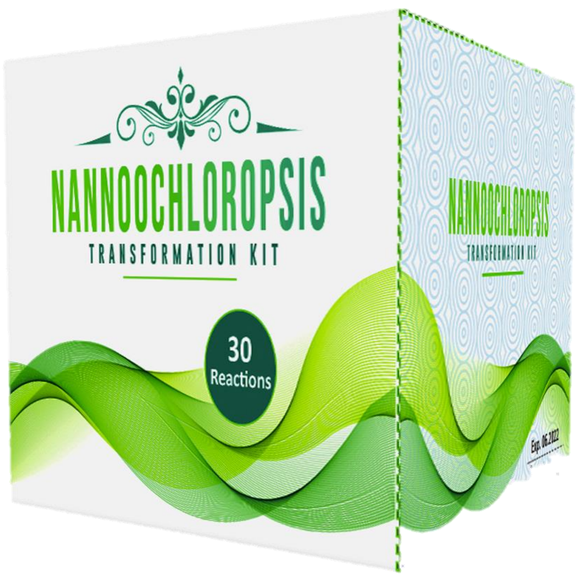

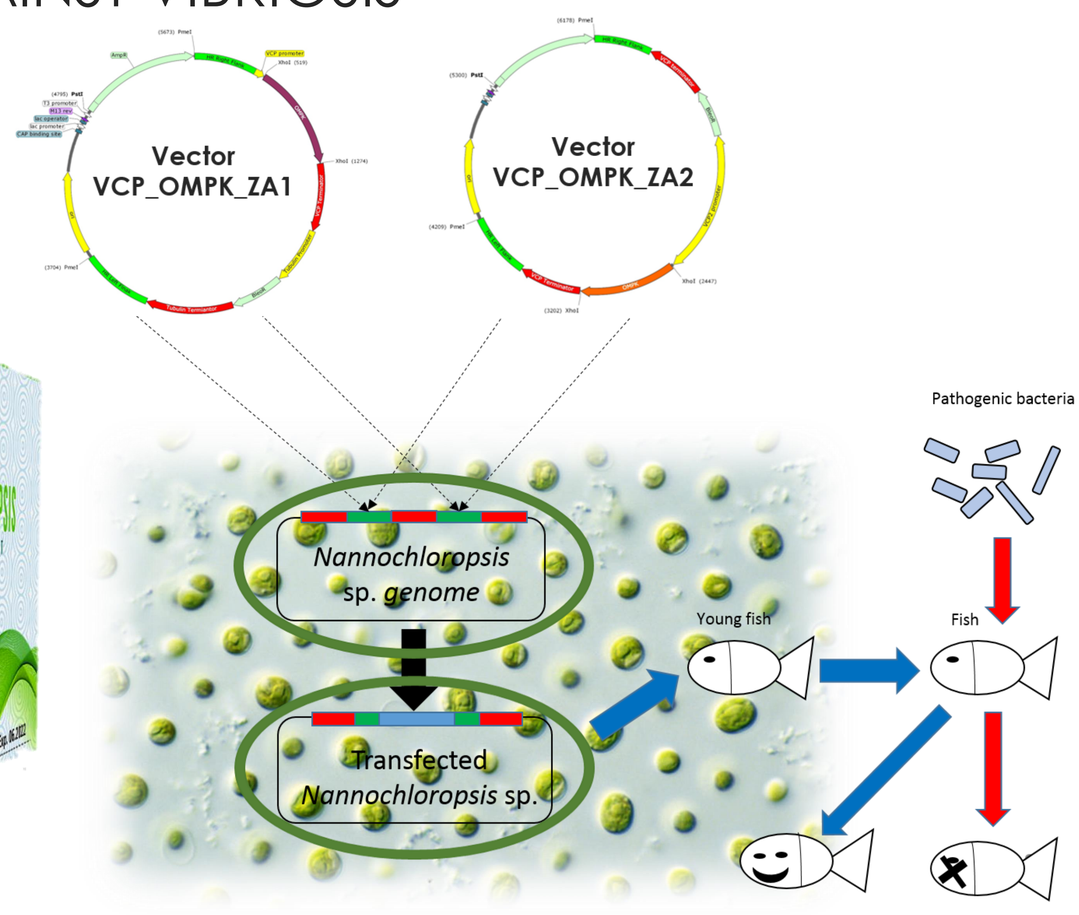

BRIEF TECHNOLOGY

- Two type of vectors to transform *Nannochloropsis* sp. – a common green microalga used as fish feed in the aquaculture industry
- Target **specific site** in the genome (nitrate reductase) via **homologous recombination**
- Will **knock-out a (non-vital) gene** and **replacing** it with the **expression cassette** harbouring the gene of interest
- Gene of interest = Antigenic protein

PROBLEM STATEMENT & CURRENT ISSUES

- **Most vectors** used to modify *Nannochloropsis* often involve **random insertion**
- Gene expression cassette is inserted randomly and this may cause **unstable expression** and difficulties in maintenance

INVENTIVENESS & NOVELTY

- Specific target site sequence for expression cassette to be integrated into the host genome
- Current application of the vector – *Nannochloropsis* sp. expressing antigens for vaccines against Vibriosis disease in fish
- The vector is modifiable to produce not only vaccines but other useful properties

USEFULNESS & APPLICATION

- Transforming *Nannochloropsis* sp. into a **green recombinant protein factory**
- The application could be **endless** such as:
  - Vaccines delivery through oral vaccination (current study)
  - High biomolecules production for pharmaceutical, nutraceutical and many more
  - High lipid production for biodiesel, PUFAs and many more
- Apart from the recombinant protein produced, other side biomolecules from the biomass could be utilized for **zero waste management**

IMPACT OF THE PRODUCT

- A green cell factory for recombinant protein production – comparable to other recombinant protein cell factories such as *Escherichia coli* and yeast
- The vector is modifiable to develop *Nannochloropsis* sp. into producing varieties of recombinant proteins

MARKET POTENTIAL

- Algae biotechnology industry
- Aquaculture industry
- Molecular biology company

TRL : 5 - Validation in real environment

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