

October 10, 2023

**Developing the world's first Automatic Wheat Germ Extractor  
for cultivated meat production without genetically modified organisms.  
~ Contributing to carbon neutral society through life science-related technologies ~**

Hitachi Zosen Corporation, in collaboration with the biotech start-up company, NUProtein Co., Ltd. (Tokushima City, Founder & CEO : Masataka Minami, hereinafter “NUProtein”), has developed the world’s first an automatic manufacturing equipment for the wheat germ extract, a raw material for cell-growth-factor<sup>※</sup> that produces cultivated meat without genetically modified **organisms**.

**【Demonstration equipment】**



Currently, greenhouse gas (GHG) emissions from livestock production, such as cattle and poultry for meat, account for about 15% of the world's total emissions, and there are concerns that the increase in meat supply due to population growth will lead to an increase in the number of livestock animals kept, which may further increase GHG generation. In Singapore, which has a high level of environmental awareness but low food self-sufficiency, cultivated meat is already served in some restaurants. And, it is also attracting attention in the U.S. and other countries.

For cultivating cells, which are the raw material for cultured meat, cell-growth-factors are necessary. Cell-growth-factors used to be produced by genetic recombination technology using animal cells, but in recent years, NUProtein and other companies have established a cell-free protein-synthesis method, which does not use genetic recombination technology but uses components extracted from wheat germ, which is derived from plants, to produce cell growth factors.

While cell-free protein-synthesis has the advantage of eliminating the risk of endogenous viruses because it does not use animal cells, it has been difficult to mechanize the process because manual work by skilled workers is required to extract the necessary components from wheat germ. However, in collaboration with NUProtein, we were the first in the world to develop an automatic wheat germ extractor. Since cell growth factor accounts for a large portion of the production cost of cultivated meat, automating the production of wheat germ extract, which is the raw material for cell growth factor, will lead to significant cost reductions.

In the development, Hitachi Zosen was in charge of robot control and equipment manufacturing to reproduce manual operations, while NUProtein was in charge of optimizing the raw materials and extraction process.

This equipment can produce cell-growth-factors to be added to 2,000 liters of culture medium from wheat germ in one day, and can produce enough cell-growth-factors to produce approximately 3 tons of cultivated fish meat in one month of operation.

※Cell-growth-factor: A group of proteins required to promote the differentiation and growth of pluripotent stem cells, such as ES cells and iPS cells, and tissue stem cells.

In the life science field, we have delivered a prototype sterilizer for culture medium bottles to the Kyoto University iPS Cell Research Foundation, and developed a new type of ion injector for cancer therapy in collaboration with the Japan Quantum Science and Technology Agency, among others. In our medium-term management plan "Forward 25" starting from FY2023, we have designated life science-related businesses as a priority investment target under the priority measures "Promoting investment strategies (Business Investment and Development Investment)".

Life science technology is important for people to live healthier and safer lives and is expected to grow for a long period of time.

The outline of this equipment is as follows.

1. Equipment name : Automatic wheat germ extractor
2. Dimension : W1,500 × D1,600 × H2,500mm
3. Weight: : 1,100kg
4. Manufacturing capacity : about 3 tons/month

About NUProtein

Company name : NUProtein Co., Ltd.

Headquarters : a 3-20-1 Showa Town, Tokushima City, Tokushima Prefecture

Founder & CEO : Masataka Minami

Establishment : in August 2016

URL : <http://nuprotein.jp/ja/>