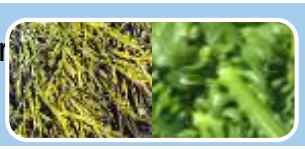
TOYO HAKKO

For immuno-stimulation

SOLWEED®

SOLWEED ® has far stronger antitumor effect than other seaweed extr
which was confirmed with tumor cells from various organs.



Characteristics

Material obtained by mixing and extracting two types of seaweed

●A functional food material extracted from the mixture of Sporophyll of Undaria pinnatifida (Mekabu) and Canadian kelp, Ascophyllum nodosum and spray-dried.

●We chose a mixed seaweed extract for better results.

Anti-tumor effect / immunity improvement

●It is known that ingredients such as fucoidan have immune balance regulation and antitumor effects.

●It selectively eliminates cancer cells by its powerful apoptosis-inducing action.

Infection protection / Helicobacter pylori removal effect

●It suppresses the binding of Salmonella to macrophages and may prevent food poisoning and other infectious diseases.

●It suppresses the growth of Helicobacter pylori and reduces the risk of diseases such as chronic gastritis, gastric ulcer, duodenal ulcer, and gastric cancer.

About seaweed

Undaria pinnatifida

●The thick, fold-shaped spore sac at the base of wakame seaweed is called "mekabu". Mekabu contains a relatively large amount of highly unsaturated fatty acids that are necessary for our health. The main components of Mekabu's slime are acidic polysaccharides called alginic acid and fucoidan, and fucoidan is a component that is attracting attention as an immune component.

Ascophyllum nodosum

● It also called Algit, is a brown seaweed which grows in north Europe and north America and is close species to Hibamata (Fucus) harvested in Japan.

● Dried alga is served for tea in Norway and is used for raw material of alginic acid (food additive as stabilizer), feed and fertilizer.

Product name	SOLWEED®	TEST	SPECIFICATION	TEST METHOD
Name	Seaweed (Ascophyllum nodsum and Mekabu) Extract	Appearance	Light brown to brown powder with the unique odor	Visual
Example of description of raw materials	Functional food extracted from the mixture of sporophyll			
Standard amount to be used	100mg/day			
Package	1kg in aluminum bag×6/ carton box			
Storage	Store it away from direct sunlight and high temperature/humidity	Fucoidan content	More than 25% (corresponding value from fucose)	HPLC Method
Expiration date	Three years after manufacturing (No bag opening)			

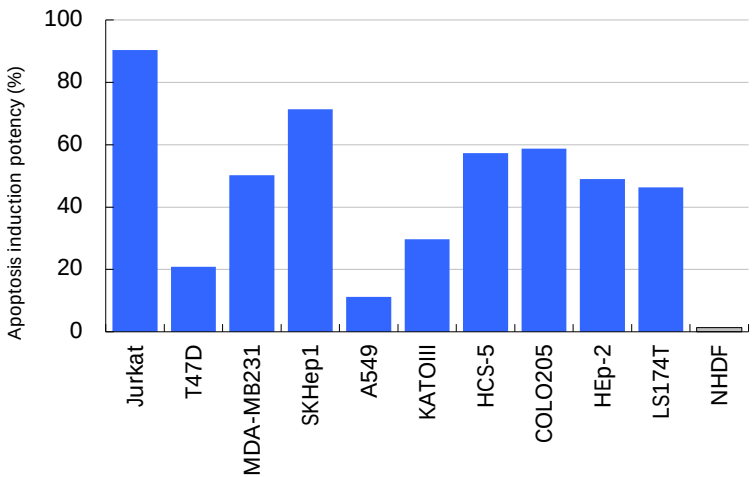
Apoptosis induction for cancer/ carcinoma cells

＜Method＞

SORWEED dissolved in phosphate buffer (PBS) was added to the medium to a final concentration of 1 mg / ml, and each cell was cultured for 24 hours. Then, the cells were stained with the Annexin V-FITC kit, and those with high fluorescence intensity of FITC were detected as apoptosis-induced cells by the flow cytometer. The proportion of apoptosis-induced cells in the whole cell was defined as the apoptosis-inducing activity.

＜Results＞

SOLWEED® is recognized to induce apoptosis as shown on the right graph for various cancer cells: Jurkat (leukemia T lymphoma), T47D(ER positive breast cancer), MDA-MB231(ER negative breast cancer), SKHep1(liver cancer), A549 (lung epithelium carcinoma), KATO III (stomach signet ring cell cancer), HSC-5 (skin squamous cell carcinoma), COLO205 (large bowel cancer), HEp-2 (laryngeal cancer), LS174T (rectal cancer).On the other hand, no such induction was recognized for NHDF (normal human fibroblast).

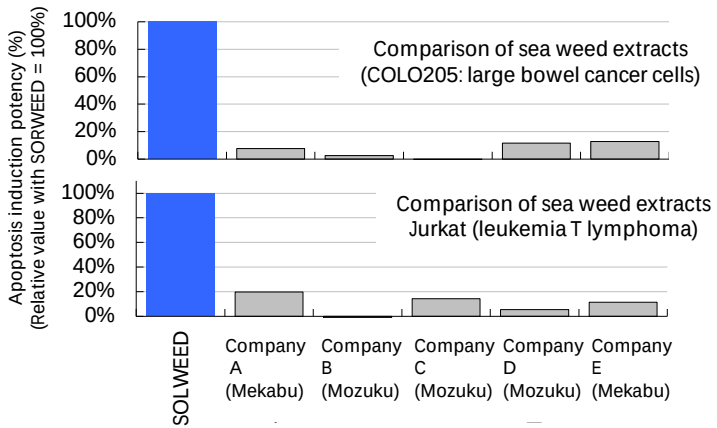


Comparison with other seaweed extracts

Apoptosis induction potency of SOLWEED® was confirmed to be far higher than that of other companies' single sea weed extract such as Mekabu and Mozuku.

＜Method＞
Each sample dissolved in PBS was added to the medium so that the final concentration became 1mg/ml and cells of COLO205 and Jurkat were incubated for 24 hours.
Then, after dying with Annexin V-FITC kit, cells which have higher fluorescence strength in FITC was considered to be the ones induced by apoptosis and detected. The ratio of such cells against total ones was defined as apoptosis induction potency (100% =the ratio in case of SOLWEED®).

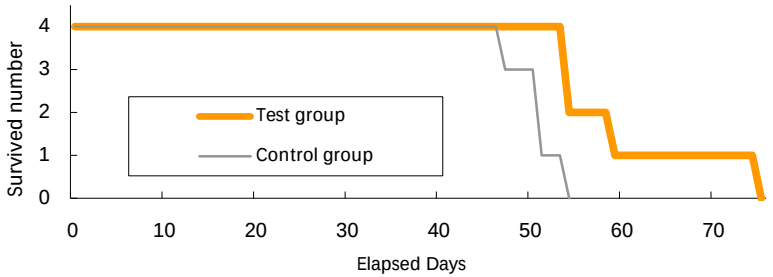
<Results>
The apoptosis-inducing activity was compared with other commercially available seaweed extract materials derived from seaweed. Other seaweed extracts showed about 0 to 20% apoptosis-inducing activity as compared with SORWEED, but it was revealed that SORWEED has sufficiently high inducing activity for both cancer cells..



Life-prolonging action for mice

<Method>
Eight mouse BDF1 (7 weeks old) were subcutaneously injected with 5 × 106 mouse leukemia cells FBL-3, and then divided into two groups. The test group (4 animals) was allowed to freely ingest a 0.6% SOLWEED aqueous solution, and the control group (4 animals) was allowed to freely ingest water.

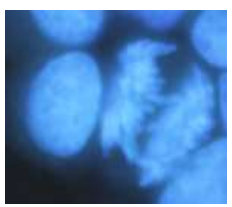
<Results>
Compared with the control group, the average survival time after transplantation increased by 19.2% in the test group, and it was confirmed that the intake of SORWEED tended to increase the survival time ($p < 0.1$). It was suggested that SORWEED prolongs the life of the cancer by suppressing the progression of the cancer.



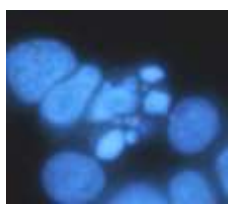
	Test group	Control group
Survival days after transplantation	60.5±9.9	50.8±2.9
Life prolonging rate	19.2%	—

Cell shape change by apoptosis

The cell nuclei were Hoechst-stained and the morphology of apoptotic cells and living cells was observed.
In normal cells, the nucleus is large and some chromosomes are observed during cell division, but in cells that have undergone apoptosis, the nucleus is small and it can be observed that the nucleus is divided into multiple parts, which is apoptosis-specific. It was confirmed that the form was various.



Living cancer cells
Mid cell shows the actively dividing on where chromosome division is underway.



Apoptotic cancer cells
Mid cell shows the change of cell nucleus.