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# "The origin of life is chemical synthesis" marine algae (green seaweed): Cellulose is a cell

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In today's earth ecology environment, various living things are active in hot water, dry environment, and acidic(microorganisms produced during the fermentation process of plants, bacteria that feed on sulfur) conditions with low concentration of hydrogen ions. The organic matter of green algae is structurally and chemically synthesized from C.H.O.N.S.P and minerals. Green algae are eukaryotes that are chemically synthesized of carbohydrates, proteins, lipids, nucleic acids and minerals.
The first organic substances were chemicals of water vapor, methane, oxygen, hydrogen, hydrogen sulfide, nitrogen, and halogens produced in the Earth's environment. Various minerals act as catalysts during the bonding process, enabling chemical synthesis of organic substances at high temperature and pressure. Because organic matter can be synthesized chemically, life on earth continued to evolve ecologically, biologically, physically and chemically, and the birth of primitive life started from organic matter and continued chemical evolution. It is well known from many studies that all organic substances (carbohydrates, proteins, lipids, nucleic acids, minerals) produce chemicals (methane, ammonia, volatile organic compounds, acetic acid, hydrogen sulfide) during hydrolysis and anaerobic degradation. In general, when all organic matter is decomposed, the final sludge is not decomposed and the cellulose is decomposed again in the soil. When the decomposition process of organic matter of green algae is completed, the final sludge becomes black cellulose. When cellulose, which was white due to the bleaching of green algae, was added to seawater, the green algae appeared green. When black cellulose is added to seawater, the photosynthetic activity causes the cellulose to appear from black to brown and green. Cellulose of green algae was white at pH 3.5 and slowly turned green by the change of pH: 3.5-5.0-6.0-7.0-7.6-8.5.The organic matter of green algae is created in the process of generating chemicals (methane, acetic acid, ammonia, hydrogen sulfide) during the decomposition of microorganisms. The organic matter of green algae finally turns black in the oxidation process of decomposition, and the chemical substance dimethyl sulfide (DMS) is produced. The final decomposition product of green algae organic sludge is cellulose. When cellulose is mixed with seawater, the cellulose slowly turns green through photosynthesis. Green algae are living organic matter, and cellulose of green algae is "chemically synthesized living cells".

**Keywords:** Origin of life, Organic matter, Green algae, Green seaweed, *Ulva prolifera, Ulva pertusa*, Cellulose, Cell, Protein, Carbohydrate, Lipid, Nucleic acid, Mineral, Methane, Acetic acid, Hydrogen sulfide, Ammonia, Temperature, Pressure, Hydrolysis, Anaerobic digestion, Synthesis of organic matter, Nine pigments, Nine genetics of mitochondria, Continue of life cycle, Chemical synthesis, Chemical evolution.

## Introduction

The scientific debate about the origin of life continues today. Hypotheses include relevant geological environments, Darwin's ponds, volcanic springs and hydrothermal vents, shallow or deep deep-sea hydrothermal vents, volcanic islands, fluctuating hydrothermal pools of primitive continents, deep hot biospheres, primordial soups, chemical evolution, rocks, dark catalysts, There are mica sheets, lava, and space planets (Venus). About 45 billion years ago, land and sea formed on Earth, the Earth was struck by pressure with meteorites, which caused earthquakes, and lava and volcanic eruptions produced gases. In Earth's atmosphere, water vapor, methane, carbon dioxide, hydrogen sulfide, nitrogen, hydrogen and halogen gases have transformed the atmosphere into an environment filled with dark matter. After that, the gas layer in the atmosphere fell with the rain and mixed with the sea water, and then the sea became acidic. Due to the warm temperature of seawater, various metals such as sodium and calcium of alkali metals are dissolved in water, and seawater slowly appears in an alkaline state by chemical bonding of chlorides and sulfides. (Law of constant seawater composition ratio) Green algae are organic substances synthesized from carbohydrates, proteins, fats, nucleic acids, and minerals, and are archaea and eukaryotes. There are nine structural colors of green algae, and there are nine pigments in cells. The mitochondria in the cell have the genetic information of nine pigments (Ahn.M.G.2021). The pigments of the nine cells of green algae are changing the color through photosynthesis. The chromaticity transformation of green algae changes frequently depending on the ecological environment and UV conditions. Green algae produce natural pink and blue pigments while chromaticity transformation. After the pigment separation of the green algae, the algae are alive. The cultivation temperature of green algae is 20℃-50℃ degrees or higher. Green algae do not grow in a high water temperature environment and remain dormant. Dry (green, red, brown) seaweed is alive. Green algae are still alive even if they melt depending on the temperature (30℃-50℃ degrees). Green algae are black and live in a rotten state. Cells and mitochondria of green algae are alive in both dry and dehydrated white. Green algae are affected by UV rays and seawater temperature, and the pigments of various colors transformation chromaticity through the cell's signaling system. (Ahn.M.G.2021).

## What are the features of green algae (green seaweed)?

Green seaweed (Chlorophyta) is a species of seaweed in the family Ulvaceae that can be found worldwide. Green seaweed has a main color of green and has eight colors. The nine colors of green algae have features that transformation chromaticity (Figure 1).

According to the nine genetic information of mitochondria, the color of the cell determines the color through the information transmission system (Ahn.M.G.2021).
The process chromaticity transformation of green seaweed.

1. Green-Blue-Yellow-White-Pink(Orange)-Red–red(Purple)-Brown-Black-Green
2. Green-white-pink-red-purple-brown-black-Green
3. Green-white-pink-red-purple-brown-Green
4. Green-white-pink–red(purple)-Green
5. Green-white-pink-red-Green
6. Green-white-pink-Green
7. Green-white-Green
8. Green seaweed is sometimes changing in chromatic depending on environmental conditions. (Green-brown-Green, Green-brown-white-Green, Green-blue-Green)
9. This is when green seaweed is in the upper layer of seawater. Green-yellow-white-Green. Green-yellow-Green
10. The various colors return to green even if the color is changed. (similar to a chameleon).

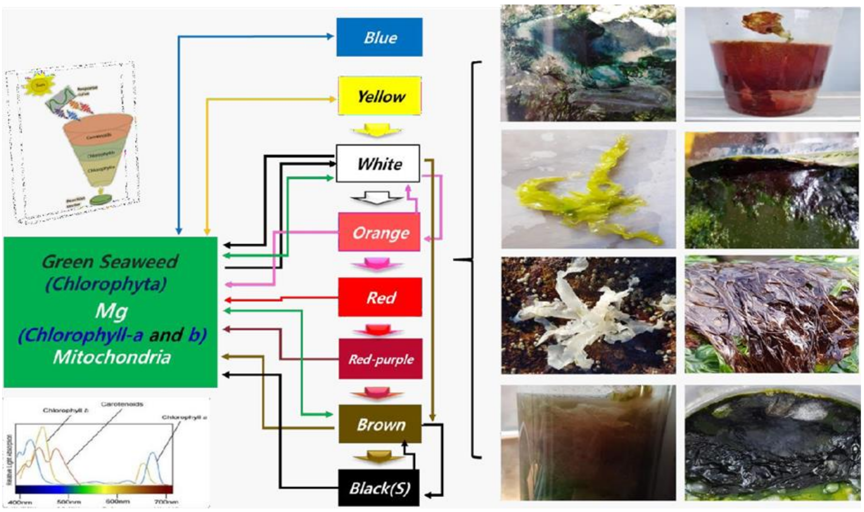


**Fig. 1.**The process of transformation chromaticity of the structural nine colors of photosynthetic green seaweed.

## Geographical location

Green algae are multicellular eukaryotes that inhabit coastal waters and are very widespread around the world. The geographically, South Korea is surrounded by the sea on three sides and has four seasons. Various green algae are distributed in coastal seas and brackish waters, and seasonally, the algae that live attached to rocks are affected by the sea temperature. As it melts, it disappears into the sea, and in the season when UV rays are weak, it attaches itself to rocks and lives. Through observation of green algae, we conducted a test on how they live in a seasonally polluted environment, including UV rays, atmospheric temperature, and water quality. (From July 2018 to July 2021) We observed green algae in four ways (1. Coastal seas 2. Land 3. River 4. Land: open type of testing bottles) (Dodd, et al. 2012).

## Life cycle in the coastal waters of green algae (*Ulva pertusa*)

A variety of green, brown, and red marine life inhabits the seas off the east and south coasts of Korea. Green algae in the sea seasonally from spring when the water temperature rises, the algae attached to the rocks are protected from UV rays and the rise in water temperature.to release the spores. And when the sea level is lowered on rocks or stones, the effect of UV rays. It is exposed and melts and mixes with seawater, leading to a life of floating in the sea. When the UV index decreases and the temperature of the seawater decreases, the spores mixed with the seawater attach to the rocks or stones again, preventing growth. The life of green algae in the sea isiterative through attachment and reproduction of thalli offspring. The chromaticity conversion of the cell pigment of green algae converts from green to white and back to green (Figure 2). Occasionally, the chromaticity conversion is irregularly green-yellow-green, green-white-pink, and green-brown- green under light-fluid conditions (Ahn.M.G.2020).

**Fig. 2.** Green algae (*Ulva pertusa*) Sea: 35°23’26.36"N 129°20’51.46"E

## Life cycle in the land of green algae (*Ulva prolifera* and spp)

The ecological environment of the sea was implemented by installing a module on land. A variety of creatures that live in the sea have come to land. (Green algae: prolifera, pertusa, spp, shrimp, lugworm, fish) It was tested by introducing very small particles of green algae mixed in seawater into the ground. Green algae mixed with seawater are attached to the porous ceramic at the bottom of the soil and turn brown in summer. appeared. They did not grow and grew in volume while converting to green in the fall when UV light was weak. In spring, green algae start to change chromaticity under the influence of ultraviolet rays, and the chromaticity change under light fluid conditions until summer appeared in various ways. Also, on the ground, the colors of green algae were regularly transformed in chromaticity. (green-yellow-white-pink-orange-red- red(purple)-brown-green). After the seawater was discharged from the land into the sea, the green seaweed was dried or rotted as it melted under the influence of ultraviolet rays and temperature. Produced chemicals of methane and hydrogen sulfide. Green algae buried in the ground was rotting black with sand (Figure 3). Green algae appeared brown when no nutrients were present and turned green again after re-supplying nutrients.(Ahn.M.G.2020)

The ecological environment of the sea was implemented by installing a module on land

Various marine creatures living in the sea came to land along with seawater.

(Green algae: *Ulva prolifera, pertusa*, spp, shrimp, midges, fish)

Tiny green algae particles mixed in seawater are attached to sand, wood and porous ceramics.

Green algae mixed with seawater adhere to the porous ceramic at the bottom of the soil and turn brown in hot summer.

Green algae did not grow in brown, and green algae grew in large volumes by appearing green in autumn when UV light was weak.

In spring, the structural colors of green algae begin to change chromaticity under the influence of UV rays, and until summer, green algae diversify the chromaticity change due to the earth's natural environment.

In addition, on the ground, the colors of green algae have undergone chromatic changes due to the effects of UV rays, temperature, and seasonal environment. (Green-yellow-white-pink-orange-red (purple)-brown-green).

After discharging seawater from the land to the sea, the green algae are dried or melted due to the evaporation of moisture under the influence of ultraviolet rays and temperature, generating odors.

Green algae produce chemicals of methane and hydrogen sulfide in their black rotting state.

The green algae buried in the ground were rotting black (Figure. 3).

Green algae turned brown when they were not nutrient-dense, and then turned green when they were fed again. (Ahn.M.G.2020)


**Fig. 3.** Land IMTA with Seaweed farming (34°42'46.8"N 127°15'41.0" E.)

## Life cycle in the river of green algae (*Ulva pertusa*)

Green algae make a living by attaching to rocks in rivers. Green algae are exposed to ultraviolet light when the water level is low, and the algae that were attached to the rocks are mixed with water and disappear. The water level of green algae is lowered and when it dries, the algae attached to the rock appear as green-white-green, green-brown-green. Green algae are dormant in white or brown color after being dried on the rocks, and appear green again when the water level rises (Figure 4). The life of green algae is a life of repeated cycles throughout the four seasons (Carl, 2017).

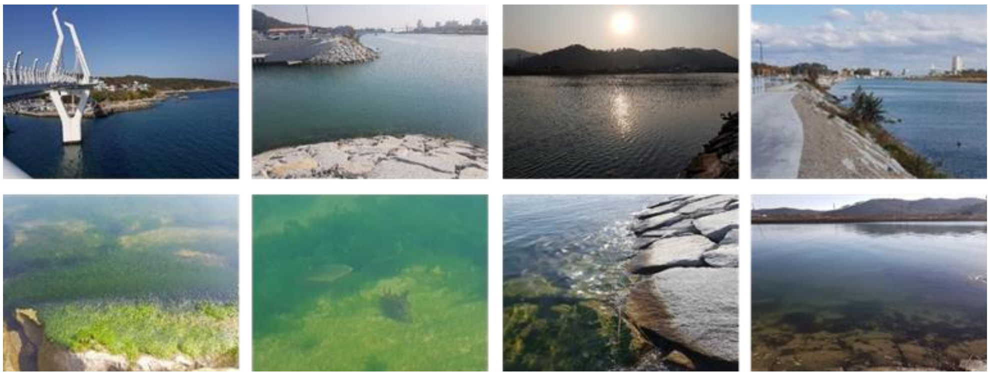

**Fig. 4.** Green algae (*Ulva pertusa*) River (35°23’37.50"N 129°20’12.33"E.)

## Life cycle in the bottle of green algae (*Ulva prolifera and pertusa*)

By putting green algae in a test bottle (glass, plastic) to test the change of the four seasons, green algae have the features of changing color in a very diverse and fluid way under the influence of ultraviolet rays and temperature. It is features by the transformation of nine colors and chromaticity of green algae. (Green-white-green) (Green-yellow-green) (Green-white-pink- green) (Green-yellow-white-pink-orange-red-red (purple)-reddish brown-brown-green) (Green-blue-green) (Green and structural colors-black-green) (Figure 5-Figure 18). The life of green algae and the reproduction of young green algae grow by releasing spores and gametes. They are homozygous for generations and reproduce offspring. They live a very complex life where parents become baby and baby become parents. Green algae melt in seawater with strong ultraviolet light or at temperatures above 30℃, forming tiny particles. Green algae grow as one body by attaching to the wall when the UV light is weak or the temperature is low. It is impossible to determine the age of green algae. (Ahn.M.G.2021).

**Fig. 5.** *Ulva prolifera* (at 30°: Green-white-green).

**Fig. 6.** *Ulva pertusa* (transformation and process of chromaticity from white to green).

**Fig. 7.** *Ulva pertusa* (white, pink, green-green, pink-green, pink-green).

**Fig. 8.** *Ulva pertusa* (yellow-green).

**Fig. 9.** *Ulva  pertusa* (whiee, pink-pink, orange-green, white-green-green, white, pink-yellow, green).

**Fig. 10.** *Ulva pertusa* (white, pink-pink, orange-red, orange-brown, pink, white-white, brown-brown, green-green, white).

**Fig. 11.** *Ulva pertusa* (pink, green)-(green, white, brown)-(green, brown)-(brown)-(green, brown, pink)-(pink, green)-(brown, pink, green)-(green, white, pink)-(green, white)-(green).

**Fig. 12.** *Ulva pertusa* (red-red purple-green).

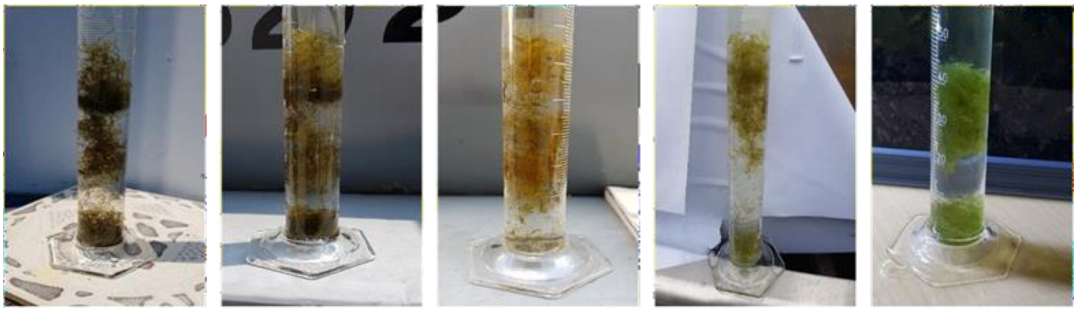

**Fig. 13.** *Ulva prolifera* (brown: Dark and light)-(green and brown)-(green).

**Fig. 14.** *Ulva prolifera* (black-black-black)-(black and brown, green).

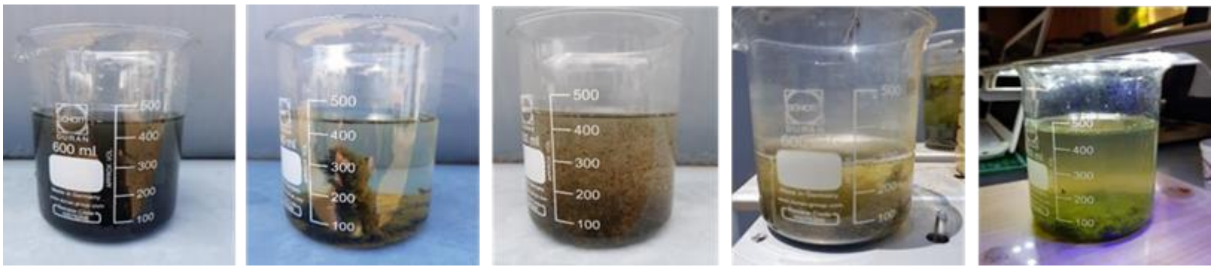

**Fig. 15.** *Ulva prolifera* (black)-(black and brown)-(brown)-(brown and green)-(green).

**Fig. 16.** *Ulva pertusa* (green-blue-green, blue-red purple-green).

**Fig. 17.** *Ulva prolifera* and *pertusa* (Open type testing).

## The natural pigment of green algae

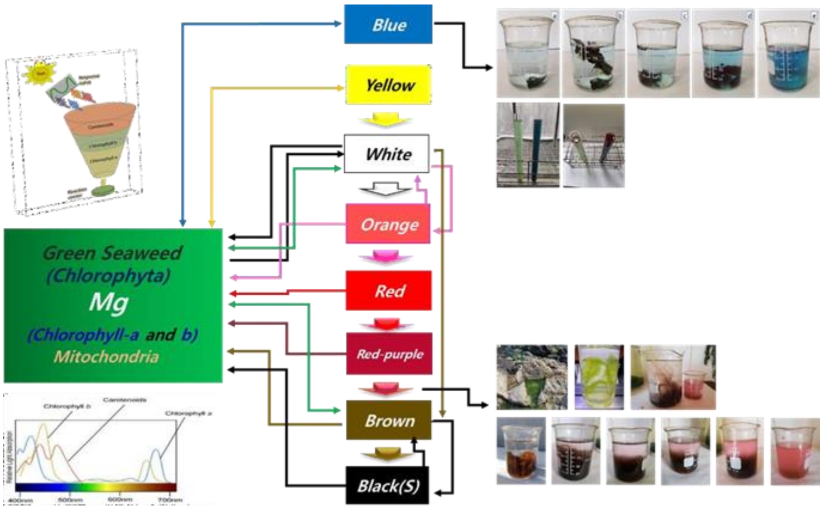


**Fig. 18.** Separation of natural pigments by chromaticity transformation. (pink and blue).

## Dried seaweed (green, brown, red) are alive

In coastal seas, the sea level is lowered due to the tilt of the earth, or the seaweed is exposed to UV rays due to high and low tides, and there are many seaweeds that have evaporated and dried (Figure 19). Cells are alive when dried seaweed of various colors is added to seawater (Ahn M.G, 2020).


**Fig. 19.** a) Dried red seaweed (nori) b) Dried red seaweed (nori) are alive c) Dried seaweed (green, brown, red) d) Dried seaweed (green, browen, red) are alive.

## Structural colors and features of green algae and comparison of existing education and new facts

There are no explanations or records in biology books, from basic biology education in existing elementary schools to professional education in universities (Figure 20).

| No | Marine algae: macroalgae and eukaryotes green, brown, red seaweed | Education: Biology Books Research paper: keywords | New facts |
|---|---|---|---|
| 1 | Dried algae are alive (green, brown, red) | Dead or Do not know. | Alive |
| 1-1 | Natural History Museum: The dried seaweed is alive | Dead or Do not know | Alive |
| 2 | Green algae | | |
| 2-1 | Green algae have nine colors | Do not know | Know |
| 2-2 | The nine colors of green algae undergo chromaticity transformation | Do not know | Know |
| 2-3 | Green algae have pink and blue pigments | Do not know | Know |
| 2-4 | The separated green algae are alive | Do not know | Know |
| 2-5 | Dried | Dead | Alive |
| 2-6 | Discoloration (whitening phenomenon) | Dead | Alive |
| 2-7 | Melted | Death by high temperature | Alive |
| 2-8 | Rotted | Rotted after death. | Alive |
| 2-9 | Genetic information of the nine pigments of mitochondria | Do not know | Know |
| 2-10 | Green algae: Cultivation temperature | 25 degrees and green | Free temperature: 20-50 degree |
| 2-11 | Seaweed culture place | Indoor | Natural environment |
| 3 | Fisheries Book: Seaweed can be farming in the land | Nets and ropes of storage tanks in the building | in land |

**Fig. 20.** Structural colors and features of green algae and comparison of existing education and new facts.

## Materials and Methods

Green algae are materials that inhabit the south and east coasts and river of Korea. *Ulva prolifera, pertusa (australis),* spp.

I tested the cellulose of green algae by observation under exposure to strong ultraviolet light, change in state by temperature, change in high temperature and rotting state, and alkalization in acidic conditions.

## Results

## Cellulose in green algae is a cell and is alive

Features of green algae in the dried and bleached state.

Dry and bleached green algae (*Ulva prolifera, Ulva pertusa*) are alive. Evaporation of seawater and drying and bleaching of green algae exposed to UV light green algae dries from green to white under light-fluid conditions. Exposure to ultraviolet light and the flow of light appear in various colors. In addition, the color changes from white to brown in the bleached state. When dried green algae are added to seawater, the white or brown color returns to green again (Figure 21 and Figure 22).

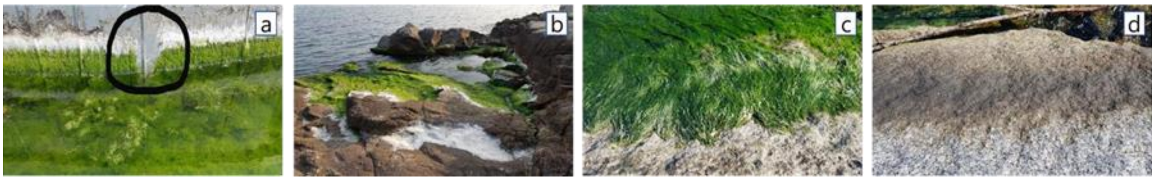


**Fig. 21.** a) Discoloration of green algae due to evaporation of seawater from the ground (Land: *Ulva prolifera*, UV exposure period: 120 days) b) When the sea level is lowered, green algae change color from green to white under the influence of UV rays. (Sea: *Ulva pertusa*) c.d) White and brown state of green algae dried on rock (River: *Ulva pertusa*).

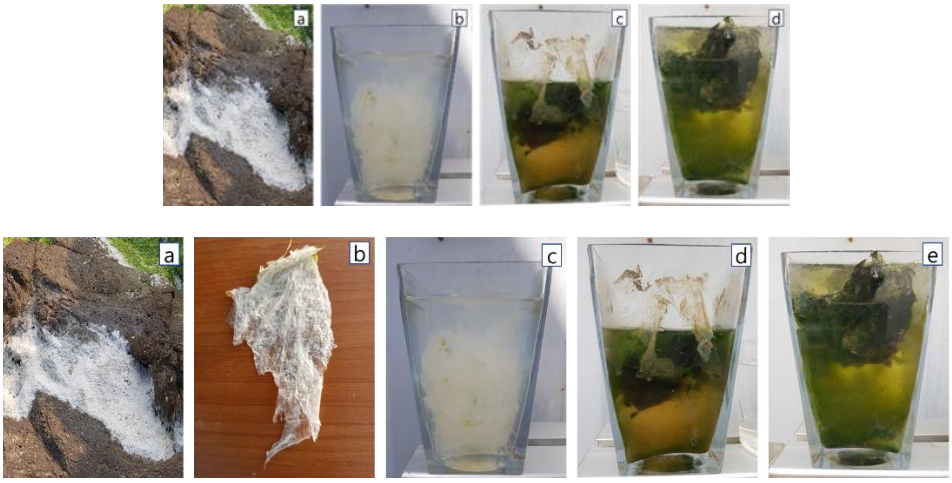


**Fig. 22.** a) The temperature of the white state of green algae is 45 degrees. b) State placed in seawater c.d) Colors are transformed by the fluid condition of light.

## Cellulose in green algae is a cell and is alive

Melting features of green algae (*Ulva pertusa*).

Green algae change color by strong UV rays and increase in water temperature, swell and create bubbles. When these are held by hand, they become a slurry and become small particles. Green algae are organic substances (proteins, carbohydrates, lipids, nucleic acids) that generate odors in the process of decomposition (Oparin, 1938). Green algae generate complex odors due to the decomposition of microorganisms, and the amount of pollution in seawater increases with chemicals (Figure 23).

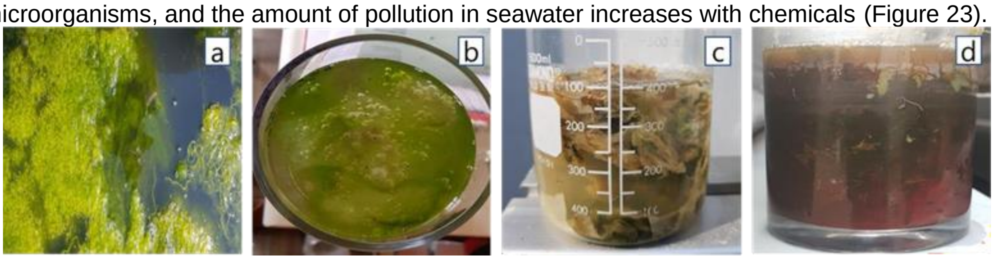


**Fig. 23.** a,b) *Ulva prolifera*: Yellow and white bubbles are generated due to strong UV rays and rising temperature. c.d) *Ulva pertusa*: As the temperature rises, seawater becomes cloudy and appears in green, pink, white, and yellow.

## Cellulose in green algae is a cell and is alive

Black rotten features of green algae (*Ulva pertusa*).

Green algae change from green to various colors under the influence of ultraviolet rays and temperature, and as organic matter is decomposed, methane, ammonia, and hydrogen sulfide are generated. is in a state of change. Green algae live in the black state in seawater in a slurry state or particle molecular state. Green algae attached to the soil or stones of the soil are alive in a black state. It is alive in a black state, generating odors and chemicals from the laboratory bottle. The organic slurry that turns black after decomposition by microorganisms is cellulose. (Peretó, 2005) When you put cellulose in seawater, it goes back from black to green.

(green-white or brown, pink)-(occurrence of pollution of seawater)- (decomposition of organic matter of green algae)- (occurrence of odor)-cellulose (black) (Figure 24).

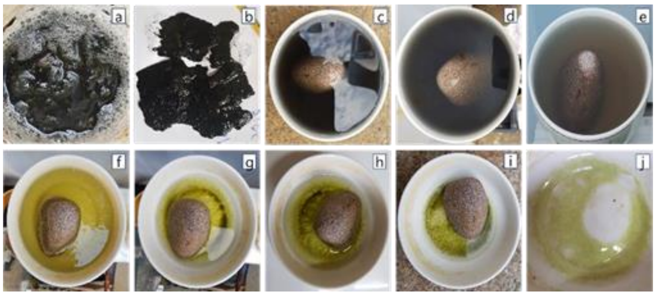


**Fig. 24.** a.b) The organic matter of green algae is a black slurry (cellulose). c.d.e) Changes from black to brown. f.g.h.i.j) Return from brown to green.

## A test of changes in cellulose with temperature of green algae (*Ulva pertusa*). Features of green algae at 55-60 degrees.

Test period: June 19, 2021-July 09, 2021 (20 days) Cellulose in green algae appears from white to green (Figure 25).

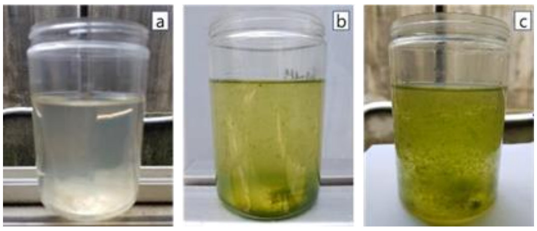


**Fig. 25.** a) White b) Green, brown, white c) Brown, green.

## Features at 70-75 degrees of green algae (*Ulva pertusa*)

The period from white to green is about 25 days. Features at 70°-75° of green algae (*Ulva pertusa*).
The period from white to green is about 25 days. Cellulose in green algae appears from white to green and brown (Figure 26).

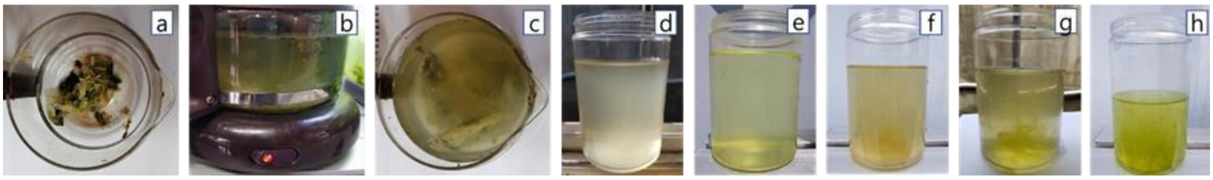


**Fig. 26.** a) White and green. b) Heating of the temperature. b.c) Heating and state after heating d) White. e) White and brown. f) Many brown, mixed with white and green. g) Green and brown. h) Green.

## Features at 100 degrees of green algae (*Ulva pertusa*)

The period from white to green is about 26 days. Cellulose in green algae appears from white to green and brown, white (Figure 27 and Figure 28).

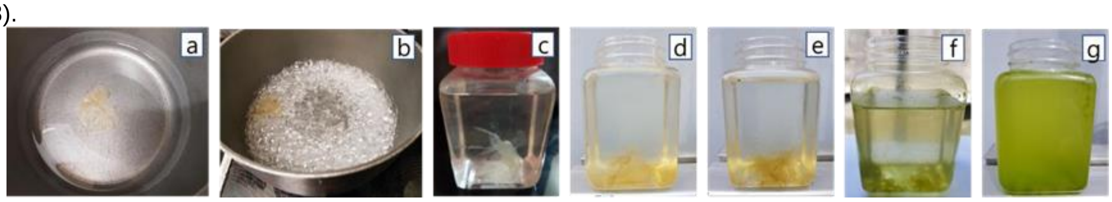


**Fig. 27.** a) Green algae and fresh water. b) Heating at 100 degrees c) White and seawater d.e) White and brown. f) Lots of green, brown and white. g) Green.

## Changes in cellulose in green algae(*Ulva pertusa*)

| Material | Water | Heat(℃) | Heat time | Methods | Result |
|---|---|---|---|---|---|
| Green seaweed | sea water | 50 | summer | natural | green |
| Green seaweed | fresh water | 55-60 | 5hr | natural | green |
| Green seaweed | fresh water | 70-75 | 24hr | natural | green |
| Green seaweed | fresh water | 100 | 5minutes | natural | green |

**Fig. 28.** Changes in cellulose by heating green algae and temperature and time.

## Cellulose features at the hydrogen ion concentration of green algae

1. Green algae appear white in the area where the concentration of hydrogen ions is low, and appear green when it changes to the area where the hydrogen ion concentration is high.
   i. Green algae cellulose changes from green to white when the hydrogen ion concentration is (pH:4.8-5.0).
   ii. Green algae appear from white to brown and green when the concentration of hydrogen ions (pH:5.5-6.0-8.5) is gradually changed.
2. Green algae appear white in the area with low hydrogen ion concentration, and appear white even when changing to the high area.
   i. 2-1. Cellulose of green algae changes from green to white when the concentration of hydrogen ions (Ph 3.5-4.0) is green.
   ii. 2-2. Cellulose of green algae changes from white to white when the concentration of hydrogen ions (pH 7.5-8.5) is white.

## Changes in hydrogen ion concentration in seawater and changes in green algae

Seawater, freshwater, and stones and green algae from the sea were placed in the aquarium. A solution of urea, phosphoric acid, iron sulfate, calcium sulfate, and magnesium sulfate was added to seawater and mixed.
The hydrogen ion concentration of seawater is pH 4.8-5.0. Green algae were placed in aquarium seawater.
Green algae are green to white in slurry (Figure 29 and Figure 30).
Calcium attached to the stone is being ionized as it dissolve (Scharf, 2015).
The white color of green algae slowly turns green as hydrogen ions change. Change in hydrogen ion concentration: pH 4.8-5.5-6.0-8.5

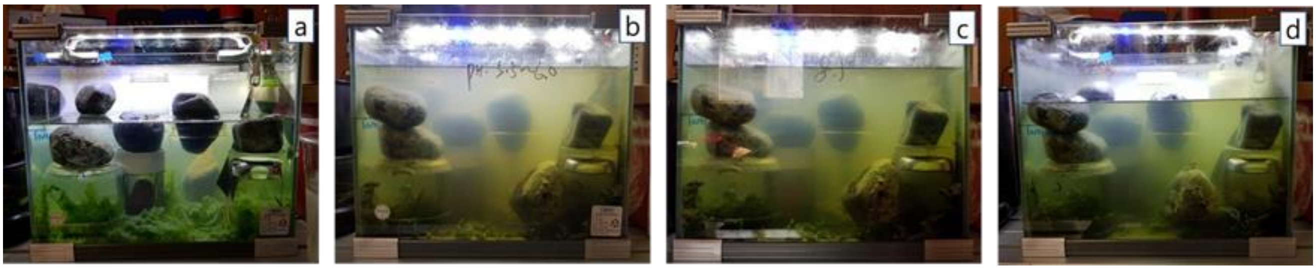

**Fig. 29.** a) Green to white b) White and brown c) White, brown, green d) Brown, green.

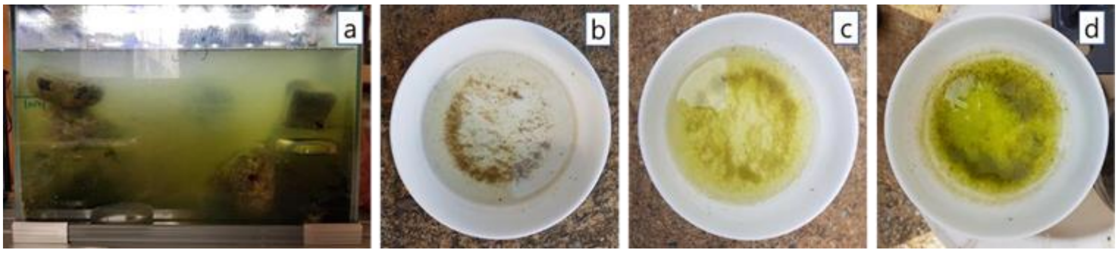

**Fig. 30.** a) The slurry state of green algae in the aquarium is a mixture of green, white, and brown colors. b.) Green algae are green, white and brown. c.d) Appear green and brown.

## Changes and tests of cellulose in the acidic state of green algae

Green algae were added to fresh water as (pH 3.5-4.0). The green algae gradually bleached and turned white.
Green algae that have turned white remain white for 20 days.
The white color of green algae appeared green when the concentration of hydrogen ions was high (Figure 31 and Figure 32)
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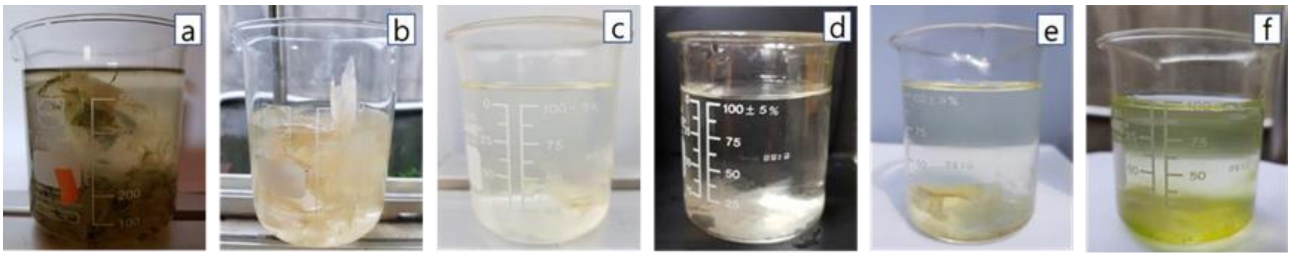

**Fig. 31.** a) Green, brown, white b) White, pink c, d) White e) White and green f) Green.

| Material | Water | pH | Day | Cellulose | pH | Cellulose |
|---|---|---|---|---|---|---|
| green seaweed | sea water | 4.8-5.0 | 10 | white | 8.5 | green |
| green seaweed | fresh water | 3.5-4.0 | 5 | white | 7.5-8.5 | green, white |

**Fig. 32.** Changes in cellulose in acidic conditions and the state and color of cellulose in seawater.

## The origin of life chemical evolution
## Oparin's coacervate

Researchers Tony Jia and Kuhan Chandru have proposed that membraneless polyesters droplets could have been significant in the Origins of Life. Given the "messy" nature of prebiotic chemistry, the spontaneous generation of these combinatorial droplets may have played a role in early cellularization before the innovation of lipid vesicles. Protein function within and RNA function in the presence of certain polyester droplets was shown to be preserved within the droplets. Additionally, the droplets have scaffolding ability, by allowing lipids to assemble around them that may have prevented leakage of genetic materials (Warmflash, 2005).

## Miller–Urey experiment

One of the most important pieces of experimental support for the "soup" theory came in 1952. Stanley Miller and Harold Urey performed an experiment that demonstrated how organic molecules could have spontaneously formed from inorganic precursors under conditions like those posited by the Oparin-Haldane hypothesis. The now-famous Miller–Urey experiment used a highly reducing mixture of gases—methane, ammonia, and hydrogen, as well as water vapor— to form simple organic monomers such as amino acids. The mixture of gases was cycled through an apparatus that delivered electrical sparks to the mixture. After one week, it was found that about 10% to 15% of the carbon in the system was then in the form of a racemic mixture of organic compounds, including amino acids, which are the building blocks of proteins. This provided direct experimental support for the second point of the "soup" theory, and it is around the remaining two points of the theory that much of the debate now centers. A 2011 reanalysis of the saved vials containing the original extracts that resulted from the Miller and Urey experiments, using current and more advanced analytical equipment and technology, has uncovered more biochemicals than originally discovered in the 1950s. One of the more important findings was 23 amino acids, far more than the five originally found (Miller, 1953). In November 2020, a team of international scientists reported studies which suggest that the primeval atmosphere of the Earth was much different than the conditions used in the Miller-Urey studies.Indicated are results with gas discharge for the origin of life in the primary atmosphere and hydrosphere (Figure 33).

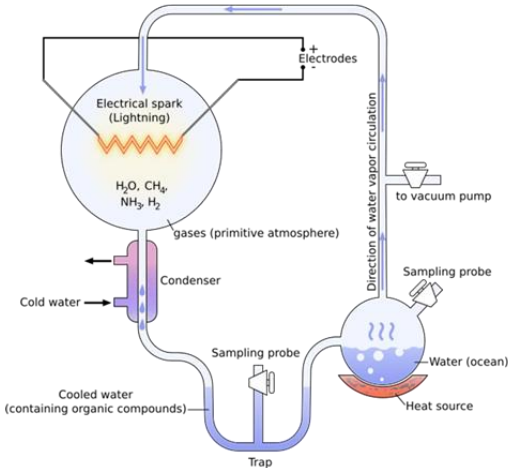


**Fig. 33.** Miller–Urey experiment Synthesis of small organic molecules in a mixture of simple gases that is placed in a thermal gradient by heating (right) and cooling (left) the mixture at the same time, a mixture that is also subject to electrical discharges Wikipedie.

Organic matter of plants and organic matter of green algae

1. Organic substances: carbohydrates, proteins, lipids, nucleic acids, minerals
   - 1-1. Chemical properties generated during the decomposition of organic matter in methane- fermented anaerobic digested sludge.
   - 1-2. Chemical properties.Methane, hydrogen sulfide, ammonia, nitrate nitrogen, acetic acid and other volatile organic compounds.
2. Green algae (*Ulva prolifera, pertusa*)
   - 1-2. Organic substances: carbohydrates, proteins, lipids, nucleic acids, minerals
   - 1-3. Chemical properties that occur during the decomposition of organic matter due to natural influences and the environment.Carbohydrates (methane), proteins (amines and hydrogen sulfide), lipids (acetic acid)—chemical properties of green algae in a black rotten state. The smell of methane and hydrogen sulfide is very high.
   - 1-4. 2-3.Chemical properties. Methane, hydrogen sulfide, ammonia, nitrate nitrogen, acetic acid, other volatile organic compounds
   - 1-5.

## Anaerobic digestion (anaerobic digestion of organic matter)

Anaerobic digestion occurs naturally in some soils and in lake and oceanic basin sediments, where it is usually referred to as "anaerobic activity". This is the source of marsh gas methane as discovered by Alessandro Volta in 1776.The digestion process begins with bacterial hydrolysis of the input materials.

Insoluble organic polymers, such as carbohydrates, are broken down to soluble derivatives that become available for other bacteria. Acidogenic bacteria then convert the sugars and amino acids into carbondioxide, hydrogen, ammonia, and organic acids. In Acetogenesis, bacteria convert these resulting organic acids into acetic acid, along with additional ammonia, hydrogen, and carbon dioxide amongst other compounds (Zurich, 2020).

Finally, methanogens convert these products to methane and carbon dioxide. The methanogenicarchaea populations play an indispensable role in anaerobic wastewater treatments. Anaerobic digestion is used as part of the process to treat biodegradable waste and sewage sludge. As part of an integrated waste management system, anaerobic digestion reduces the emission of landfill gas into the atmosphere. Anaerobic digesters can also be fed with purpose-grown energy crops, such as maize. Anaerobic digestion is widely used as a source of renewable energy. The process produces a biogas, consistingof methane, carbon dioxide, and traces of other 'contaminant' gases. This biogas can be used directly as fuel, in combined heat and power gas engines ((Florian et al., 2013; Hagos et al., 2016) or upgraded to natural gas-quality biomethane. The nutrient-rich digestate also produced can be used as fertilizer (Figure 34 and Figure 35).

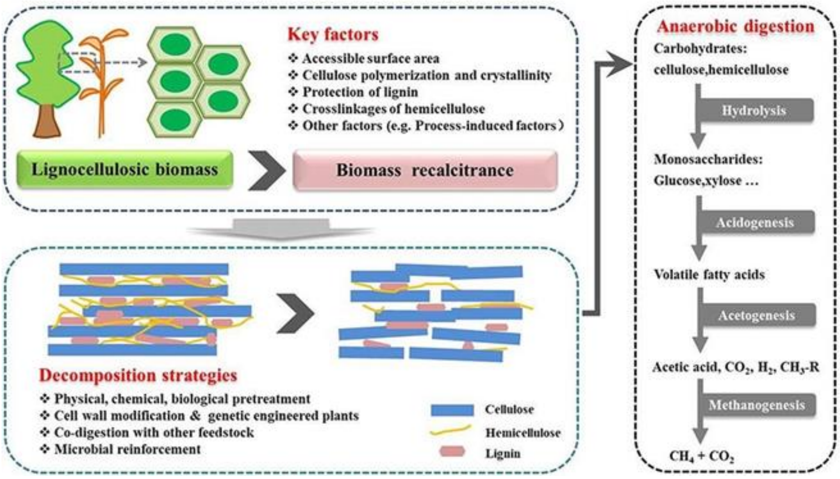


**Fig. 34.** Process stages of the conversion of lignocellulosic biomass to biomethane. Biomethane production is a naturally occurring biological process, which can be divided into four stages. Recalcitrance of lignocellulose restricts the hydrolysis during the first stage. Pretreatment is necessary step for biomethane production. The positive effects of pretreatment strategies can help to facilitate the hydrolysis of lignocellulosic in the first stage.

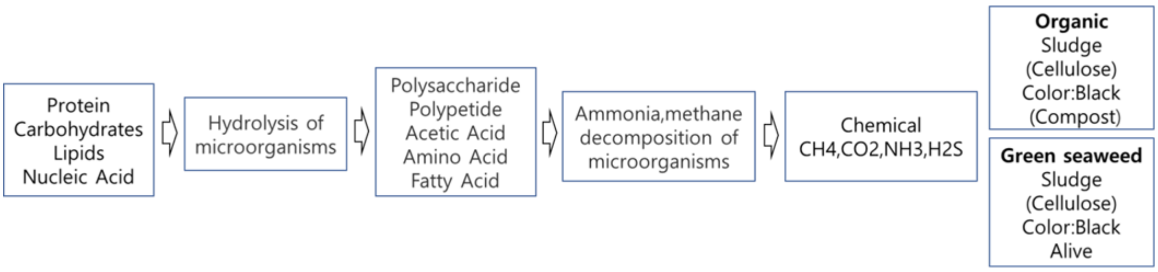


**Fig. 35.** Methane recovery chemical properties generated during anaerobic digestion of organic sludge.

## Genetic information of cell pigments and mitochondrial colors of green algae

Information on the nine genetic pigments of mitochondria possessed by green algae.
The mitochondria of photosynthetic marine algae and plants and terrestrial plants are identical. The mitochondrial melanin pigment in humans, marine animals and terrestrial animals is the same.

## Conclusion

Cellulose in green algae is a cell, a mass of cells. A very small particle (genetic: nine colors) of cellulose that is mixed with seawater returns to green. Cellulose in the white or crystalline state of green algae returns to green. The origin of life evolved by being chemically synthesized by strong lightning, methane ($CH_4$), hot water ($H_2O$), nitrogen (N), hydrogen sulfide ($H_2S$), phosphate (P), chloride and sulfide.

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