Electronic supplementary information (ESI)

1. Trade names and manufacturers of food products used in the culture medium (Table 1, Table 2)

Table S1. Details of foods used in the culture medium (Table 1)

"Sample" in Table 1	Product name	Manufacturer
Grape	Red grape	Nagoya Seiraku Co.,Ltd.
Pineapple	Tropicana 100% Pineapple	Kirin Holdings Co.,Ltd.
Apple	Del monte APPLE JUICE	Kikkoman Corporation.
Amazake	Morinaga's mild rice malt amazake	MORINAGA & CO., LTD.
Carrot	Rich Furano Carrot Story	Maruha Nichiro Kitanippon,Inc.
Tomato	Ideal tomato	ITOEN, LTD.
Orange	Tropicana 100% Orange	Kirin Holdings Co.,Ltd.
Grapefruit	Tropicana 100% Grapefluit	Kirin Holdings Co.,Ltd.
Prune	Prune 100	KAGOME CO,. Ltd.
Coconut water	Malee 100% COCONUT WATER	OVERSEAS CO.,LTD.
Maple water	WAHTA PURE MAPLE WATER	OVERSEAS CO.,LTD.

Table S2. Details of foods used in the culture medium (Table 2)

"Sample" in Table 2	Product name	Manufacturer
Grape	Red grape	Nagoya Seiraku Co.,Ltd.
Pineapple	Tropicana 100% Pineapple	Kirin Holdings Co.,Ltd.
Apple	Tropicana 100% Apple	Kirin Holdings Co., Ltd.
Amazake	Plus Koji Koji Amazake	Marukome Co.,Ltd.
Carrot	Rich Furano Carrot Story	Maruha Nichiro Kitanippon,Inc.
Tomato	Ideal tomato	ITOEN, LTD.
Orange	Tropicana 100% Orange	Kirin Holdings Co.,Ltd.
Grapefruit	Tropicana 100% Grapefluit	Kirin Holdings Co.,Ltd.
Prune	Prune 100	KAGOME CO,. Ltd.
Coconut water	Malee 100% COCONUT WATER	OVERSEAS CO.,LTD.
Maple water	WAHTA PURE MAPLE WATER	OVERSEAS CO.,LTD.

2. Effect of glutamic acid on the growth of *E. gracilis*

In Figure 11, the culture medium in which Tomato juice was diluted with water and essential vitamins were added showed good growth equivalent to KH medium, a heterotrophic medium, while the culture medium in which glutamic acid, a nutrient characteristic of tomato, was added instead of tomato juice reached a lower cell density than CM medium.

Therefore, the following experiment was performed to measure cell density in the steady phase in a culture medium with Ajinomoto® and also glutamic acid added to CM in an independent nutrient medium. In laboranscrew tube bottles (No. 5), various culture media were autoclaved after being adjusted to the composition of Table S3. "Sterile water" was not included in the sample and was added together with "Cell suspension (CM)" after autoclaving, along with CM medium to bring the total volume to 3 mL. For "Tomato (Filtered)", "Sample" and "Sterile water" were mixed to make a total volume of 3 mL, and then 30 µL of "Cell suspension (CM)" was added.

Table S3. Composition of the culture medium

Sample	Sample amount	$V.B_1$ [µg]	$V.B_{12}$ [µg]	Sterile water [µL]	CM [µL]	Cell suspension (CM) [µL]	Total [µL]	Culture Period [day]
CM (Control)	-	-	-	-	2800	200 (16 days)	3000	12
Ajinomoto®	0.01 [g]	7.5	0.015	0	2800	200 (16 days)	3000	12
Glutamic acid	0.1 [g]	7.5	0.015	0	2800	200 (16 days)	3000	12
Tomato (Filtered)＊	1500 [µL]	7.5	0.015	1500	0	30 (9 days)	3030	43

$V.B_1$ and $V.B_{12}$ were added in equal amounts to KH medium (except for "CM(Control)").

Ajinomoto® (AJINOMOTO CO.,INC.) : Sodium glutamate 97.5%, sodium inosinate 1.25%, sodium guanylate 1.25

Glutamic acid: L-Glutamic Acid (FUJIFILM Wako Pure Chemical Corporation)

＊Tomato (Filtered): Tomato juice (Ideal tomato, ITOEN, LTD.) filtered through filter paper (FILTER PAPER No.2, TOYO ROSHI KAISHA, Ltd.)

Cell suspension (CM): Cell suspension grown in CM medium.

□ The same cell suspension was used except for "Tomato (Filtered)".

Each sample was incubated for a given period of time under the following conditions (Table S3) and the cells were counted. The results are shown in Figure S1.

- The sample tubes were lightly uncovered and incubated under aerobic conditions.
- Light: White fluorescent light (90 ~ 95 µmol/m^2/sec), temperature: 23.7 ~ 26.5 °C
- Initial cell density: 4.8 × 10^3 cells/mL("CM", "Ajinomoto®", "Glutamic acid"), "Tomato(Filtered) " not measured

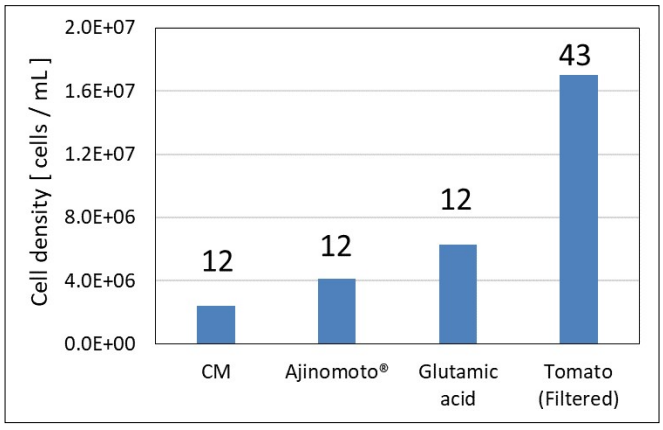

Figure S1. *E. gracilis* cell density in each culture

Numbers above each bar indicate the number of days of incubation

($V.B_1$ and $V.B_{12}$ were added.)

Figure S1 shows that the addition of Ajinomoto® or glutamic acid to CM medium increased the cell density of *E. gracilis* 2 to 3 times that of CM medium. However, since Tomato juice reaches a cell density (equivalent to KH medium culture) that is eight times higher than that grown in CM medium, it is thought that components in tomato juice other than glutamic acid (or monosodium glutamate) also contribute to the good growth of the cells. The concentration of food in the tomato juice (filtered) in Figure 11 is 30% and that in Figure S1 is 50%, each with approximately the same cell density. Tomato juice (Filtered) in Figure S1 maintained high cell density for as long as 43 days from the start of culture.

3. Photos of cells and culture vessels grown in culture media of various beverages (Table 2, Figure 3)

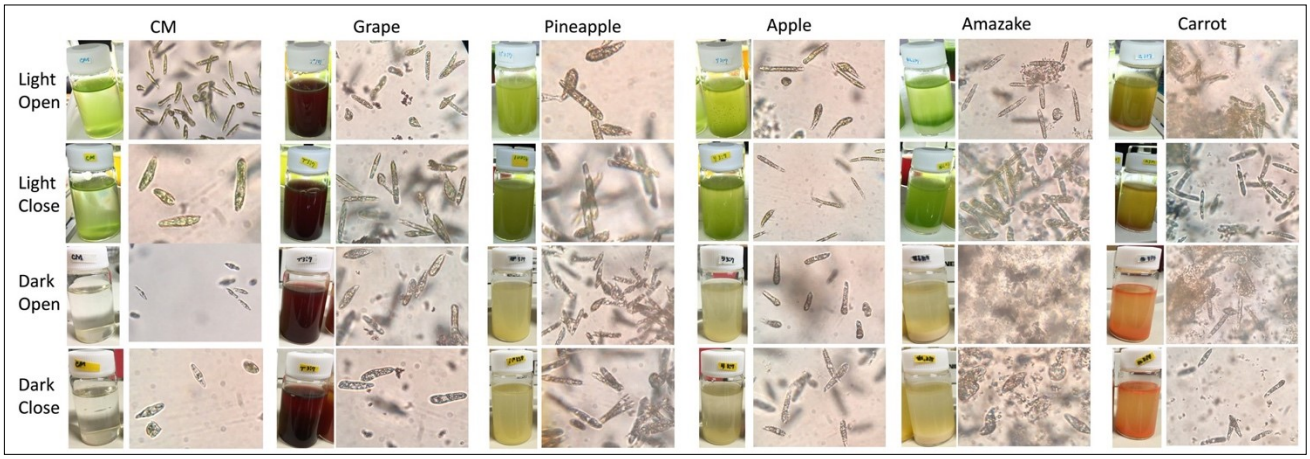

Figure S2. Photos of cells and culture vessels grown in culture media of various beverages (Table 2, Figure 3)

Different scales for each photomicrograph (scale bars could not be shown)

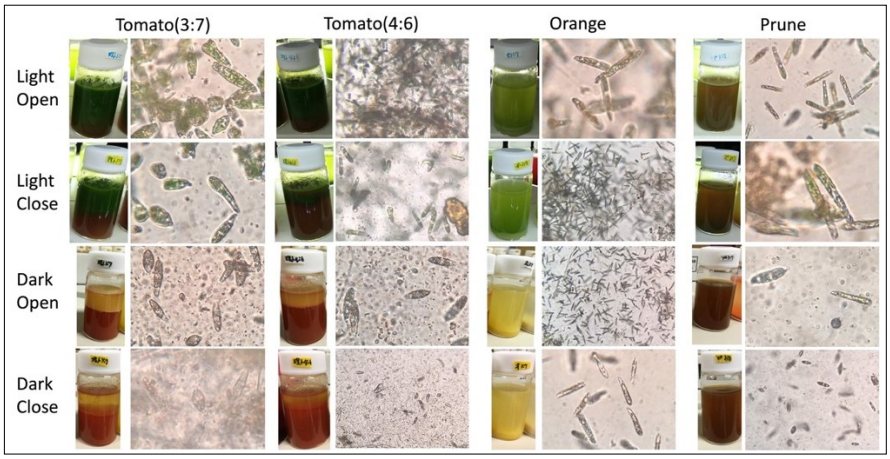

Figure S3. Photos of cells and culture vessels grown in culture media of various beverages (Table 2, Figure 3)

Different scales for each photomicrograph (scale bars could not be shown)

4. Ingredients of each beverage in STANDARD TABLES OF FOOD COMPOSITION IN JAPAN

Among the beverages used in this study, those published in STANDARD TABLES OF FOOD COMPOSITION IN JAPAN - 2020 - (8th Revised Version) are shown below. It can be seen that tomato juice contains various vitamins compared to other beverages.

Table S4. Ingredients of various beverages (per 100 g edible portion)

Food and Description	Energy	Water	Protein	Fat	Carbohydrate	Sodium	Potassium	Calcium	Magnesium	Phosphorus	Iron	Zinc	Copper	Manganese	Iodine	Selenium	Chromium	Molybdenum	Vitamin K	Thiamin	Riboflavin	Niacin	Vitamin B- 6	Vitamin B- 12	Folate	Pantothenic acid	Biotin	Ascorbic acid	Salt equivalents
Unit	kcal	(..... g .....)				(..... mg .....)									(..... µg.....)					(..... mg .....)				(... µg...)		mg	µg	mg	
Grapefruit, reconstituted fruit juice	46	87.2	0.3	0.3	12.0	2	24	5	9	7	0.3	Tr	0.02	0.07	Tr	0	1	1	-	0.02	Tr	0.2	0.06	(0)	1	0.04	1.7	Tr	0
Pineapple, reconstituted fruit juice	45	88.3	0.1	0.1	11.1	1	190	9	10	12	0.3	0.1	0.03	1.16	-	-	-	-	0	0.05	0.02	0.2	0.05	(0)	7	0.17	-	5	0
Apples, reconstituted fruit juice	47	88.1	0.1	0.2	11.4	6	110	3	4	9	0.1	Tr	0.02	0.04	-	-	-	-	-	Tr	Tr	0.1	0.02	(0)	2	0.11	-	1	0
Ama-zake	76	79.7	1.7	0.1	18.3	60	14	3	5	21	0.1	0.3	0.05	0.17	-	-	-	-	0	0.01	0.03	0.2	0.02	-	8	0	-	(0)	0.2
Carrot, regular (European type), juice, canned	29	92.0	0.6	0.1	6.7	19	280	10	7	20	0.2	0.1	0.04	0.07	-	-	-	-	2	0.03	0.04	0.6	0.08	(0)	13	0.27	-	1	0
Tomatoes, canned products, juice, without salt	18	94.1	0.7	0.1	4.0	8	260	6	9	18	0.3	0.1	0.06	0.05	4	Tr	1	4	2	0.04	0.04	0.7	0.09	(0)	17	0.18	4.2	6	0
Oranges, Valencia, reconstituted fruit juice	46	88.1	0.7	0.1	10.7	1	190	9	10	18	0.1	0.1	0.03	0.03	1	0	Tr	Tr	-	0.07	0.02	0.3	0.06	(0)	27	0.23	0.3	42	0
Grapefruit, reconstituted fruit juice	38	90.1	0.7	0.1	8.8	1	160	9	9	12	0.1	Tr	0.04	0.01	-	-	-	-	(0)	0.06	0.02	0.3	0.03	(0)	10	0.25	-	53	0

"-" means unmeasured.

"0" is less than 1/10 (3/10 for iodine, selenium, chromium, molybdenum and biotin) or not detected.

"Tr (trace, trace)" indicates that the amount is 1/10 or more of the minimum stated amount, but less than 5/10.

5. Cell density of *E. gracilis* grown in each beverage in this study (with error bars)

Although some samples had different incubation periods and different brands of juice used as culture medium, a graph of cell density with error bars for each of the juices conducted in this study is shown below (Figure S4).

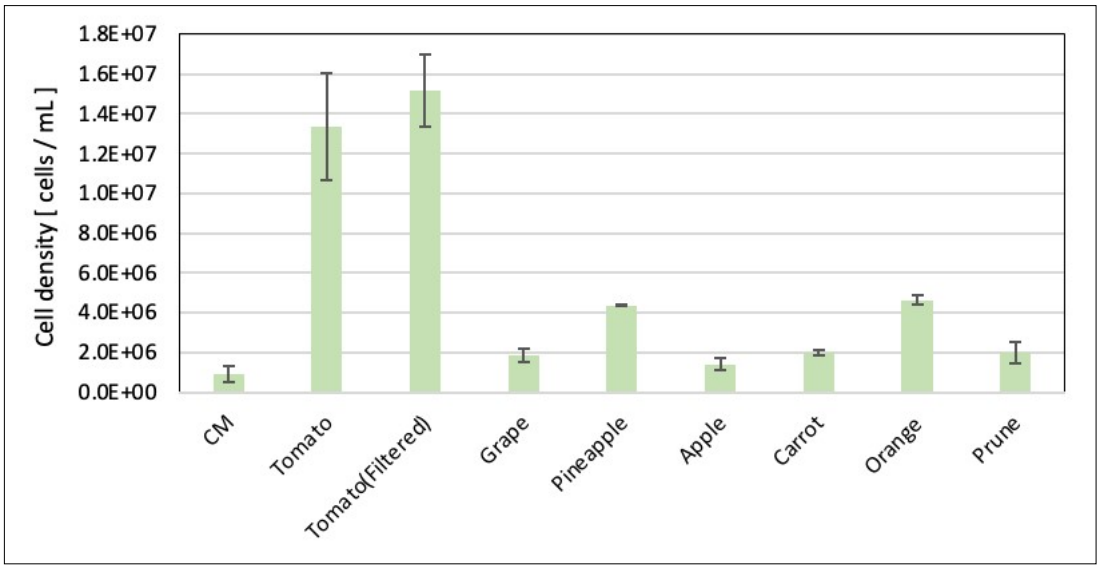

Figure S4. Cell density of *E. gracilis* grown in the medium of each beverage (with error bars)

Error bars in the figure indicates standard deviation (n = 2, n = 20 only for “Tomato”)