

Food Research Study Report

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Gut Microenvironment:

Gut microorganisms account for 78% of the total microbial load in the human body, with approximately 400–500 species of gut bacteria.

More than 1,000 species of bacteria reside in the human gut, most of which belong to two phyla: Bacteroidetes and Firmicutes.

The human gut microbiome can be classified into three enterotypes: Bacteroides, Prevotella, and Ruminococcus.

Effects of Different Components on the Gut:

A fiber-rich diet helps maintain a healthy gut microbiota. High fiber intake and short-chain fatty acids produced by gut bacteria can enhance the production of mucus and antimicrobial peptides, and increase the expression of tight junction proteins.

Dietary polyphenols can modulate the gut microbiota, such as increasing beneficial microbial species (e.g., *Bifidobacterium*, *Akkermansia*, *Akkermansia muciniphila*) and reducing harmful microbial populations.

Long-term protein and animal fat diets are associated with the *Bacteroides* enterotype, while long-term carbohydrate and simple sugar diets are associated with the *Prevotella* enterotype.

Classification of Flavor Substances:

Flavor substances are divided into aroma compounds (vanillin & menthol nitrile), fragrant flavor foods (cinnamaldehyde & eugenol), and spicy flavor foods (capsaicin & mustard oil).

According to their source, flavor substances are divided into two types: natural flavor substances and artificial flavor substances.

The functions of flavor substances are: improving taste, enhancing aroma, and meeting the needs of different customers.

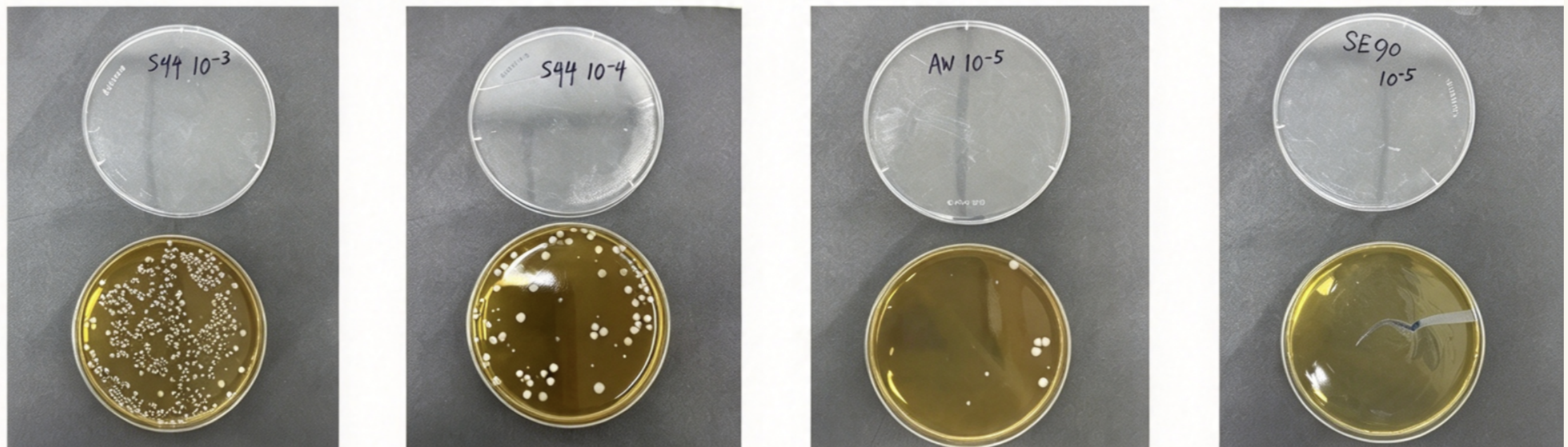
Applications of Flavor Substances:

Flavor substances can enhance the aroma and taste of food, improve food flavor, inhibit food spoilage, and improve food safety.

Current food processing technologies on the market include the extraction and concentration of flavor substances, as well as the embedding and microencapsulation of flavor substances.

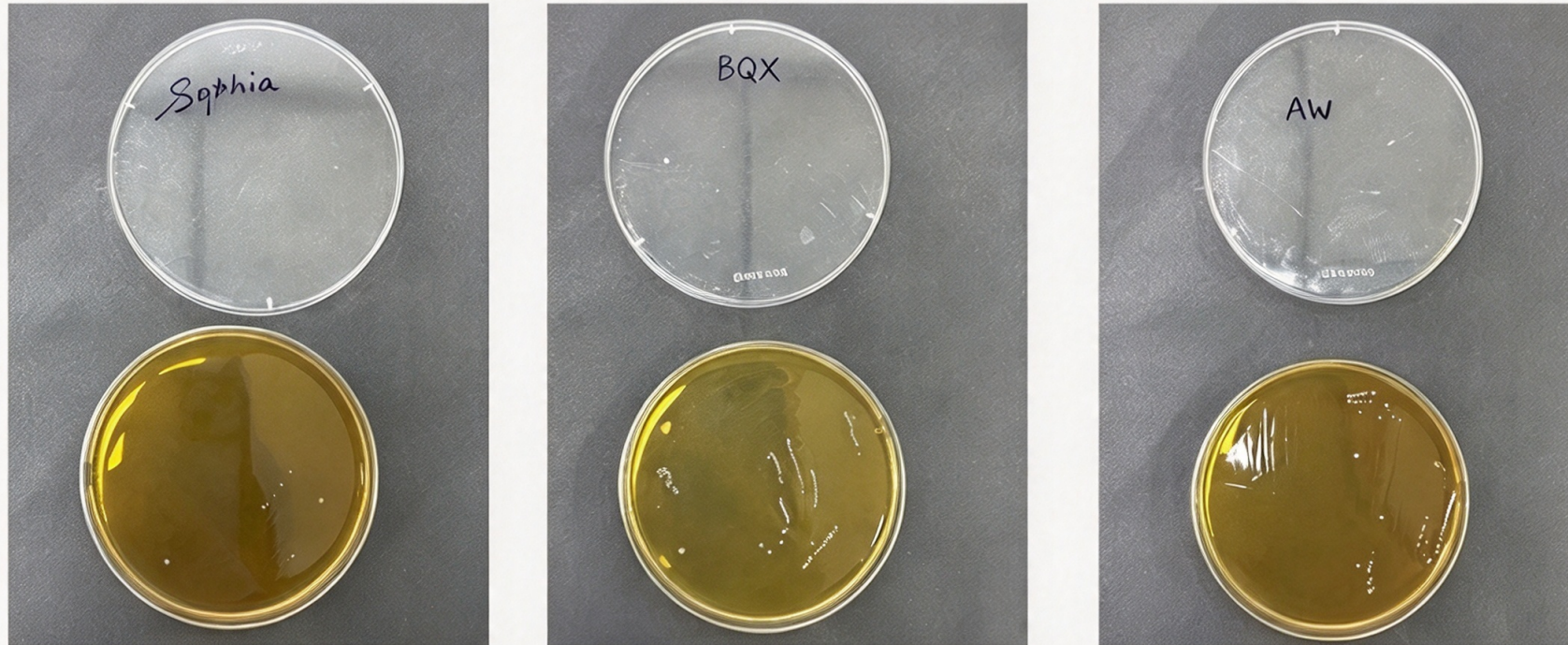
Isolation Experiment of Lactic Acid Bacteria from Mouse Feces

Experimental Results:



Dilution factor: 10 ⁻³	10 ⁻⁴	10 ⁻⁵	10 ⁻⁶
Colonies: 1087	95	10	3

Streaking



Experimental Summary and Reflection:

- There was a significant difference in the number of de1 colonies between the dilution factors 10^{-3} and 10^{-4}
- Uniformity of the diluted sample.
- Competition among lactic acid bacteria.
- When spreading the sample onto the agar, pay attention to the applied force.

Dissecting a Mouse

Objectives:

To understand the organs inside a mouse, learn dissection techniques, and understand the principles behind them.

Dissection allows for direct observation of the mouse's internal organ structure and makes it easier to collect tissue samples for subsequent analysis and research.

Experimental Materials and Instruments:

Tools:

Syringe

Surgical forceps

Scissors

Tweezers

Gauze

15 mL centrifuge tube

Transparent tray

Chemical Reagents:

4% Paraformaldehyde

75% Alcohol

3.5% Chloral Hydrate

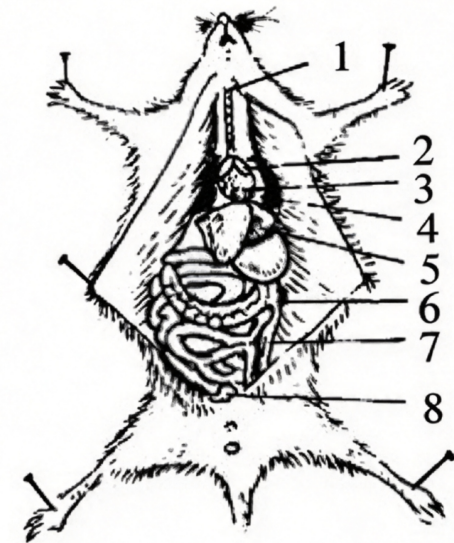


Figure 5 Internal Anatomy of a Mouse

1. Trachea 2. Atrium 3. Ventricle 4. Lung
5. Liver 6. Spleen 7. Intestine 8. Bladder

Conclusion

Learning Outcomes:

Through hands-on practice, we learned the basic dissection techniques and gained a thorough understanding of the internal organ structure of the mouse. By performing the procedure ourselves, we were able to directly observe how the organs are arranged within the body cavity, which deepened our understanding beyond what textbooks alone could provide.

Reflection:

However, the process also revealed several mistakes we made during the procedure:

Incorrect injection depth: The needle was not inserted to the correct depth, which may have affected the effectiveness of the anesthesia or caused unnecessary harm to the animal.

Failure to withdraw the needle in time: We did not remove the syringe promptly after injection, which could have caused additional injury or complications.

Incorrect needle angle: The angle of insertion was not appropriate, which made the injection less effective and increased the risk of error.

Detection of Protein Concentration in Guava Juice

Experimental Objective:

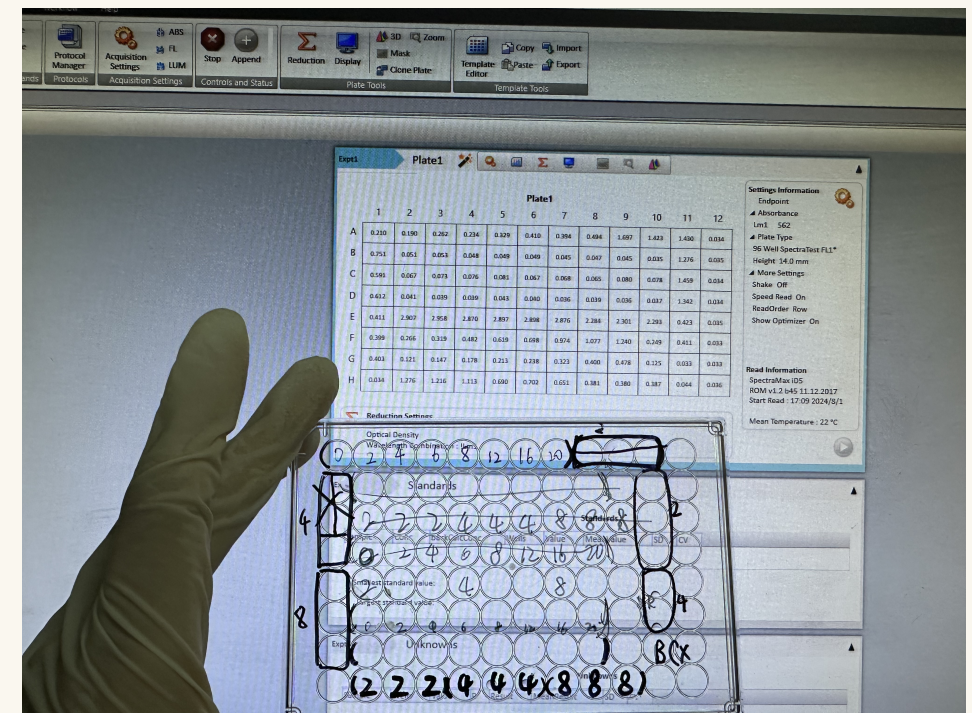
By comparing the preparation of standard protein samples with juice samples, we aimed to select the most suitable dilution ratio and calculate the protein concentration of guava juice.

Reflection:

Liquid adhering to the tube wall: When dispensing liquid, some of it stuck to the inner wall of the pipette tip or tube, which may have caused the final ratio to be inaccurate and affected the results.

Using the wrong pipette: Selecting the incorrect pipette may have led to an inaccurate final ratio, reducing the reliability of the data.

Misreading the wells or recording incorrect data: Failing to clearly identify the correct wells or making errors when recording measurements caused subsequent data from individual wells to be incorrect.



Flavor Development Experiment of Fruit and Vegetable Fat-Loss Food

Experimental Raw Materials

- Fruit and vegetable meal replacement powder: grapefruit fruit and vegetable powder, lemon fruit and vegetable powder, blum
- Fruit and vegetable salad: grape juice, prune juice, pectin

Experimental Records

- Fruit and vegetable pressed tablets: grapefruit powder (15g), lemon powder (5g), blueberry powder (10g), sorbitol (15g),
- Fruit and vegetable salad: prune juice (28g), pectin (0.05g)

Ingredients

- Fruit and vegetable pressed tablets: grapefruit fruit and vegetable powder, blueberry fruit and vegetable powder, sorbitol
- Fruit and vegetable salad: prune juice, grape juice, pectin

豆包AI生成

Nutritional information of [various/yycx.yybq.net/article/searchIndex.html](http://yycx.yybq.net/article/searchIndex.html)

Fruit and Vegetable Pressed Tablets (Sun Yutong)

Ingredients (sorted by added amount): Grapefruit powder 15g, sorbitol 15g, blueberry powder 10g, lemon powder 5g, magnesi.

Nutrition Facts Table

Item	Per 100g	NRV%
Energy	108 cal	5.43%
Protein	0.85 g	1.42%
Fat	1.14 g	1.90%
Carbohydrates	32.5 g	10.83%
Sodium	2.05 mg	0.10%

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<http://yycx.yybq.net/article/searchIndex.html>

Pressed Candy (Tablet Candy)

Ingredient Record:

Coconut powder: 20 g

Mango powder: 10 g

Grapefruit powder: 10 g

Dragon fruit powder: 5 g

Sorbitol: 10 g

Magnesium stearate: 0.5 g

Reflection: Too little magnesium stearate was added, which caused the pressed candy to fail to form properly.

Fruit and Vegetable Salad

Ingredient Record:

Citrus juice: 25 mL

Grape juice: 10 mL

Kiwi juice: 5 mL

Carrot juice: 5 mL

Passion fruit juice: 5 mL

Product Name: Fruit and Vegetable Tablet (Wang Jingyi)

Ingredients (sorted from highest to lowest addition amount): Coconut powder 20g, mango powder 10g, grapefruit powder 10g, sorbitol 10g, pitaya powder 5g, magnesium stearate 0.5g

Nutrition Facts Table

项目	Per 100 g	NRV%
Energy	198.5 cal	9.93%
Protein	1.775 g	2.96%
Fat	23.68 g	39.47%
Carbohydrates	21.3 g	7.10%
Sodium	8.65 mg	0.43%

Development of Fat-Reducing (Low-Calorie/Weight-Loss) Food Products

Experimental Record

Fruit and Vegetable Pressed Candy
(Tablet Candy):

20 g bayberry powder

15 g mulberry powder

15 g sorbitol

0.1–0.5 g magnesium stearate

Fruit and Vegetable Salad:

25 g citrus juice

25 g grape juice

0.005 g pectin

Nutrition Facts Table

Product Name: Fruit and Vegetable Pressed Tablets (Bai Chunxiao)

(Ingredients: (ngredients llisted by descending addition amount): 20 g strawberry
berry powder, 15 g mulberry powder, 15 g sorbitol, 0.5 g Magneium

营养成分表

Nutrient	Per 100g	NRV%
Energy	129.5 cal	6.48%
Protein	0.615g	1.03%
Fat	0.655g	1.09%
Carbohydrates	37.9g	12.63%
Sodiune	4.8 mg	0.24

Thank you