

Data Science Homework Semester 01

Lei Xian

February 2019

1 Section I

Ever wonder how yeast ferment barley malt into beer? Or how your muscles keep working when you're exercising so hard that they're very low on oxygen[1, 2].

2 Section II

Below are some definitions of fermentation. They range from informal, general usages to more scientific definitions.

Below are some definitions of fermentation. They range from informal, general usages to more scientific definitions.

Preservation methods for food via microorganisms (general use). Any process that produces alcoholic beverages or acidic dairy products (general use). Any large-scale microbial process occurring with or without air (common definition used in industry). Any energy-releasing metabolic process that takes place only under anaerobic conditions (becoming more scientific). Any metabolic process that releases energy from a sugar or other organic molecule, does not require oxygen or an electron transport system, and uses an organic molecule as the final electron acceptor (most scientific).



Figure 1: Cheese wheels

3 Section III

3.1 Subsection 1 - table

color	taste	smell
red	strong	stinky
yellow	mild	aroma

3.2 Subsection 2 - listing code

```
1 while True:
2     user_input = input("Type a sentence here\n>>> ").strip().lower()
3
4     user_input_to_array = user_input.split(" ")
5     print(user_input_to_array)
6
7     user_input_after_translate = []
8     user_input_after = ""
9
10    vowels = "aeiou"
11
12    for word in user_input_to_array:
13        word_index = user_input_to_array.index(word)
14        print("index" + str(word_index))
15
16        if word[0] in vowels:
17            word = word + "yay"
18        else:
19            # vowel_index = 0
20            # for letter in word:
21            #     if letter not in vowels:
22            #         vowel_index = vowel_index + 1
23            letter_index = 0
24            for letter in word:
25                if letter in vowels:
26                    letter_index = word.index(letter)
27                    print(letter_index)
28                    break
29
30            word = word[letter_index:] + word[:letter_index] + "ay"
31
32            user_input_after_translate.append(word)
33            user_input_after = " ".join(user_input_after_translate)
34
35    user_input_after = user_input_after.capitalize()
36    print(user_input_after)
```

3.3 Subsection 3 - external source file

```
1 # 2 types of number in python 3, int, and float
2
3 import random
```

```

4 health = 50
5
6
7 # difficulty: easy = 1, medium = 2, hard = 3
8 difficulty = 3
9
10 random_number = int(random.randint(25, 50))
11 print(random_number)
12
13 potion_health = (random_number / difficulty)
14
15 health = health + potion_health
16 print(potion_health)
17
18 print(health)

```

3.4 Subsection 4 - external text file

Homolactic fermentation (producing only lactic acid) is the simplest type of fermentation. The pyruvate from glycolysis[20] undergoes a simple redox reaction, forming lactic acid.[21][22] It is unique because it is one of the only respiration processes to not produce a gas as a byproduct. Overall, one molecule of glucose (or any six-carbon sugar) is converted to two molecules of lactic acid:

3.5 Subsection 5 - Multi-columns

Artiklen skal opgive kilder for størstedelen af dens indhold, og helst anvende referencer i løbende tekst for tydeligt at knytte specifikke oplysninger i artiklen til deres kilder. Visse undtagelser kan tænkes, specielt fra kravet om specifikke referencer: I indledningen er det ikke nødvendigt med kildehenvisninger, hvis teksten er en sammenfatning af kildebelagt tekst senere i artiklen. Indledningen bør være lettilgængelig for en bred skare, og kildehenvisninger kan forstyrre læseligheden for personer med læsevanskeligheder[3].

-
- | | | |
|---|--|--|
| <ul style="list-style-type: none"> • Af kildehenvisningen bør fremgå hvilken type kilde det drejer sig om, eksempelvis videnskabelig artikel, lærebog eller nyhedsartikel, for at læseren skal kunne vurdere kildens | troværdighed og neutralitet. Det er også en god ide at angive hvilken institution som står bag publikationen. Undertiden fremgår kildens karakter af navnet, men | det er ikke altid nok. Der er f.eks. stor forskel på om "Miljønyt" er udgivet af naturfredningsforeningen eller af en industribrancheforening. |
|---|--|--|

3.6 Subsection 6 - cheese pictures

Cheese proven health benefits includes supporting healthy bones, a great source of fats, supporting healthy heart[4], a great source of protein, may help prevent cancer, a great source of carbohydrates, management and prevention of osteoporosis, supporting health teeth and reducing stress. Other benefits includes promoting brain function, promoting immunity and supporting gut health.



When or how this process began is unknown, but there is certain evidence which shows the use of cheese around 8 to 10000 years ago. The cheese making process is mentioned in Greek Mythology, and several Egyptian murals are documenting the cheese-making process.

References

- [1] Peilin Yang, Ruihong Zhang, Jeffery A McGarvey, and John R Benemann. Biohydrogen production from cheese processing wastewater by anaerobic fermentation using mixed microbial communities. *International Journal of Hydrogen Energy*, 32(18):4761–4771, 2007.
- [2] Pedro M.R. Guimarães, José A Teixeira, and Lucília Domingues. Fermentation of lactose to bio-ethanol by yeasts as part of integrated solutions for the valorisation of cheese whey, 2010.
- [3] John Charles Tarver and T. D. Thomas. *Tiberius, the tyrant*;; volume 15. A. Constable and Co, 1902.
- [4] Kannan Krishnamoorthy, Anil Vijay Landge, Kannan Krishnamoorthy, and Anil Vijay Landge. Statistical Optimisation of Fermentation Media for Novel *Clostridium novyi* -NT Using Response Surface Methodology. *Brazilian Archives of Biology and Technology*, 61(0), 11 2018.

List of Figures

1	Cheese wheels	1
---	-------------------------	---