



Study on the Fermented Soybean Milk by Immobilized Lactic Acid Bacteria



Siou-Wen Ye and Jun-Hong Lin*
Department of Natural Biotechnology, Nanhua University, Chiayi, 62248, Taiwan
Email: jhlin@nhu.edu.tw

Fermented milk by Lactic Acid Bacteria (LAB) such yogurt is popular for daily diet. Some studies on the fermented soybean milk to get more functions in anti-oxidants, LAB and flavonoids. In this study, soybean milk fermented by immobilized LAB to get more anti-oxidants and to keep off the growth of LAB in the medium. The *Lactobacillus acidophilus*, *Bifidobacterium bifidum*, *Lactobacillus casei* were immobilized in sodium alginate and the diameter of each pellet is 3 mm. For getting the best savor in different fermented conditions, Taguchi method was adopted to get better flavor, anti-oxidants and flavonoids.

MATERIALS AND METHODS

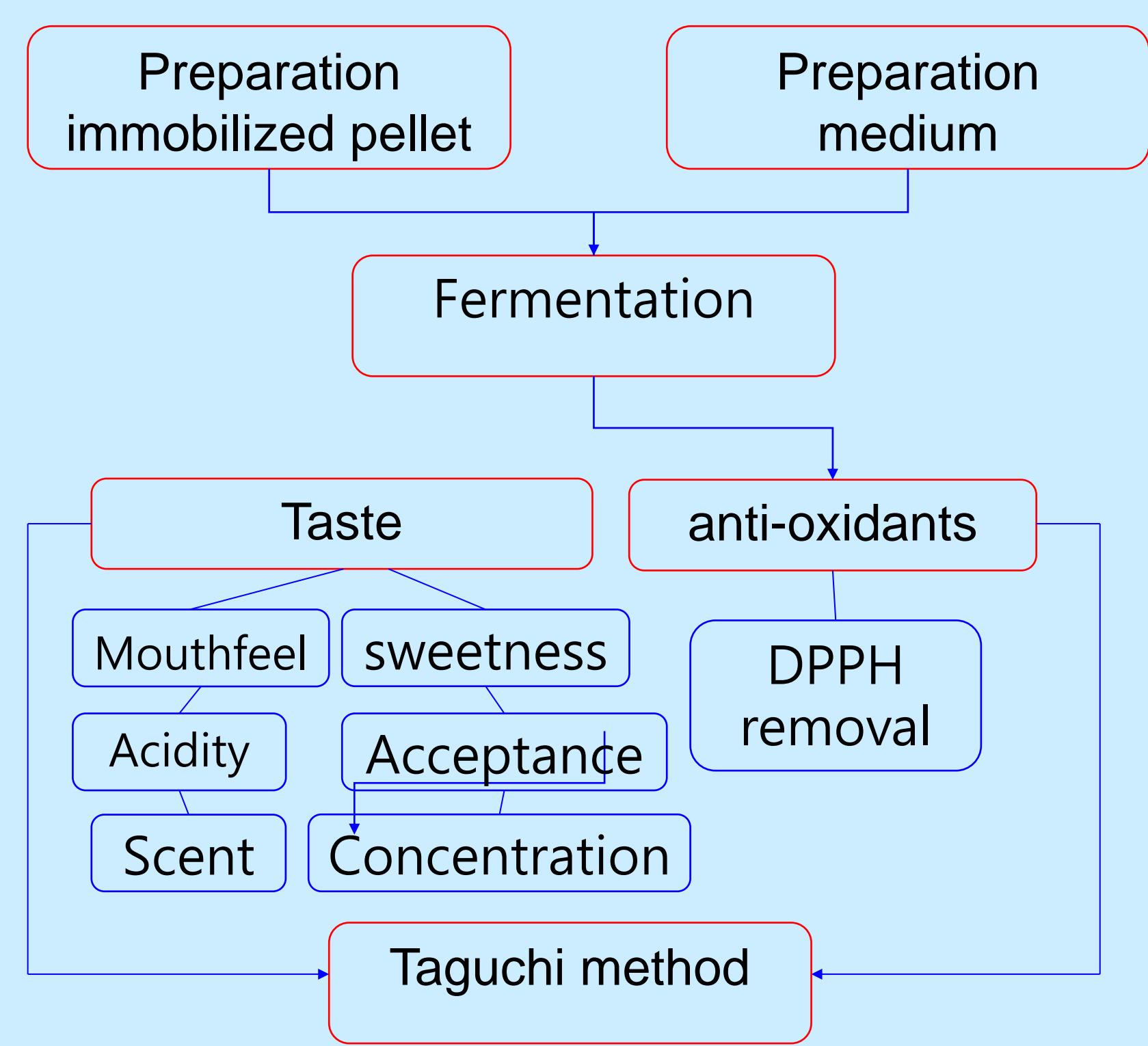
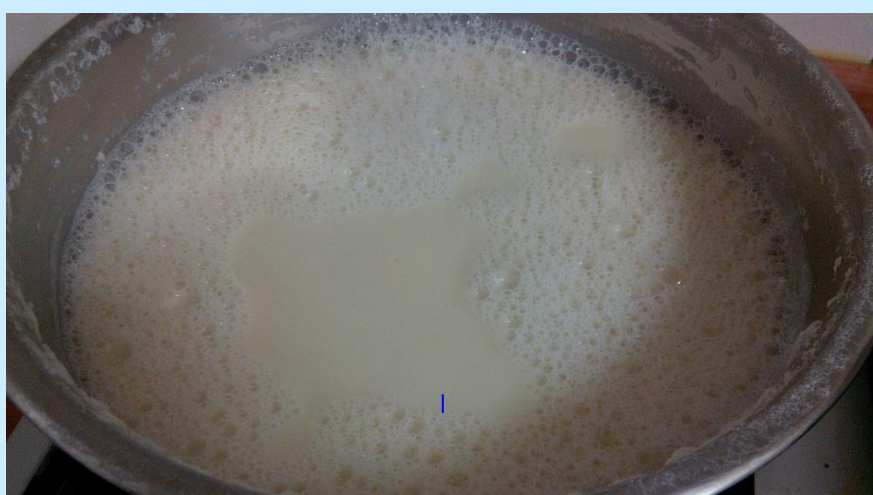


Figure 1 Experimental schema

$$S/N = -10 \cdot \log_{10} \left(\frac{1}{n} \sum_{i=1}^n \frac{1}{y_i^2} \right)$$

Large-the-better
Signal to noise ratio



Preparation of medium

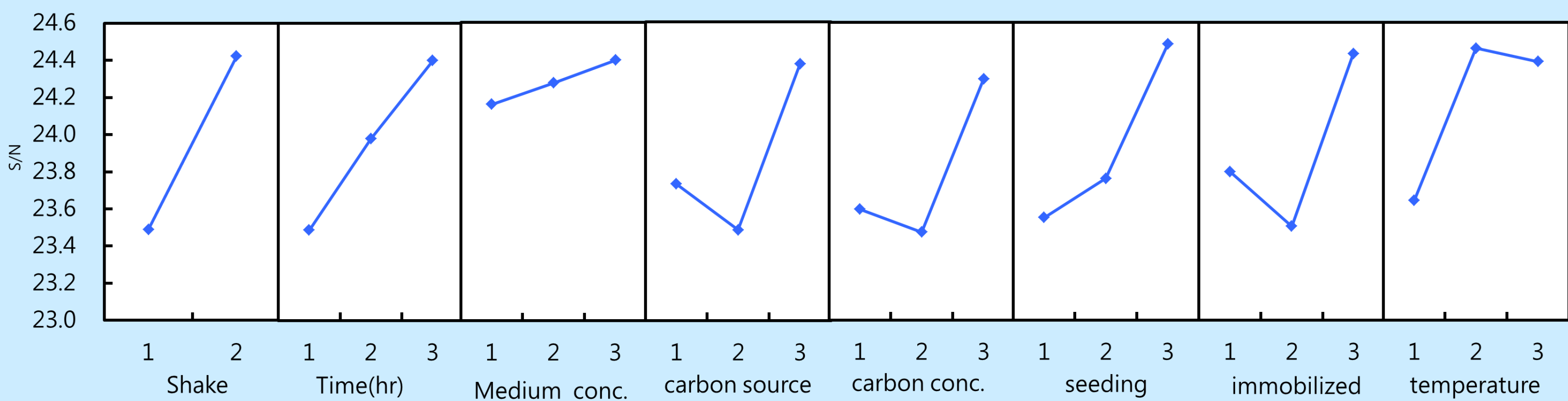


Preparation of immobilized pellet

Table 1		
L ₁₈ (2 ¹ × 3 ⁴) orthogonal array		
	Level	Conditions
Shake	1	Yes
	2	No
Fermented time(hr)	1	3
	2	6
	3	9
Medium concentration (v/v)	1	1/10
	2	1/2
	3	1
Carbon source	1	Glucose
	2	Fructose
	3	Sucrose
Carbon conc. (g/mL)	1	0
	2	2.5/100
	3	5/100
Seeding (v/v)	1	0.05/100
	2	0.1/100
	3	0.15/100
Concentration of immobilized pellet(g/mL)	1	No
	2	2/100
	3	3/100
Fermented temperature(°C)	1	25
	2	37
	3	50

RESULTS

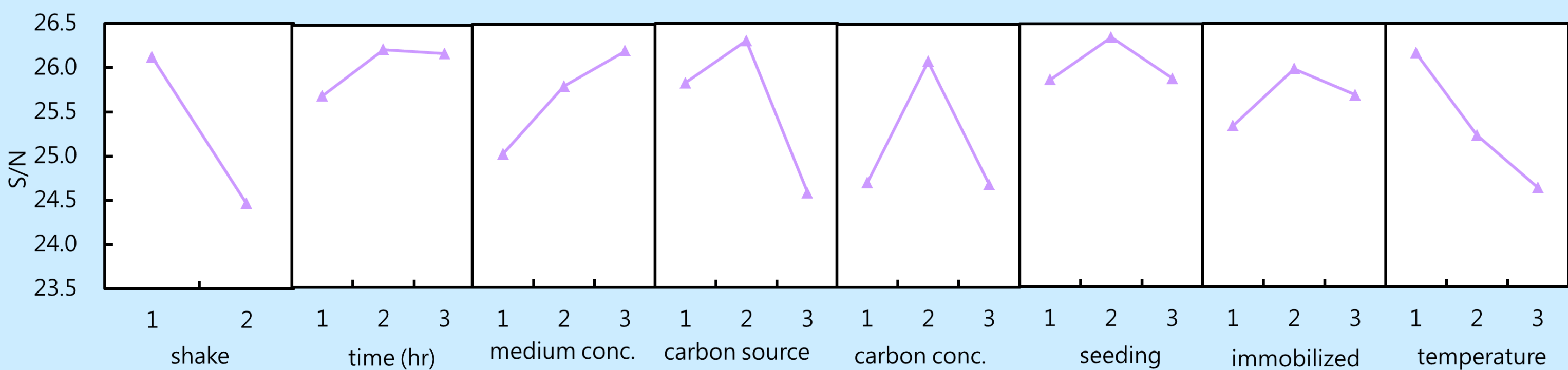
1. Taste Results



Taste: signal to noise ratio (S/N) and rank of responses

	1	2	3	4	5	6	7	8
Level	Shake	Fermented time(hr)	Medium conc. (v/v)	Carbon source	Carbon conc. (g/mL)	Seeding (v/v)	Conc. of immobilized pellet (g/mL)	Fermented temp. (°C)
Effect	0.93	0.91	4.44	0.78	3.09	1.46	0.46	1.02
Rank	5	6	1	7	2	3	8	4

2. Anti-oxidants



DPPH removal: signal to noise ratio (S/N) and rank of responses

	1	2	3	4	5	6	7	8
Level	Shake	Fermented time(hr)	Medium conc. (v/v)	Carbon source	Carbon conc. (g/mL)	Seeding (v/v)	Conc. of immobilized pellet (g/mL)	Fermented temp. (°C)
Effect	1.65	5.29	13.72	3.17	2.82	4.86	7.58	3.58
Rank	8	3	1	6	7	4	2	5

CONCLUSION

- The results indicated the concentration of soybean milk is the critical condition for flavor and anti-oxidant..

REFERENCE

Abd El-Gawad IA, El-Sayed EM, El- Zeini HM, Hafez SA and Saleh FA (2014), Antibacterial Activity of Probiotic Yoghurt and Soy-Yoghurt against Escherichia coli and Staphylococcus aureus, Nutrition and Food Sciences, 4, 303-308.