UNIVERSITI SAINS MALAYSIA

Peperiksaan Semester Kedua
Sidang Akademik 2007/2008

April 2008

IMG 222 – Mikrobiologi Makanan II
[Food Microbiologi II]

Masa: 3 jam
[Duration: 3 hours]

Sila pastikan bahawa kertas peperiksaan ini mengandungi SEMBILAN muka surat yang bercetak sebelum anda memulakan peperiksaan ini.

Jawab EMPAT soalan. Semua soalan boleh dijawab dalam Bahasa Malaysia ATAU Bahasa Inggeris.

[Please check that the examination paper consists of NINE pages of printed material before you begin this examination.

Answer FOUR questions.. All questions can be answered either in Bahasa Malaysia OR English.]

...2/-

Bahagian B: Jawab 1 daripada 2 soalan. Setiap soalan membawa 25 markah.

6. Jawab semua bahagian soalan ini

(a) Sampel-sampel makanan A, B, C dan D (25 g masing-masing) diuji di dalam Makmal Kawalan Mutu Makanan untuk hitungan plat aerob. Hitungan dan pencairan adalah seperti berikut. Piring Petri piawai (59 cm^2) telah digunakan. Kira dan laporkan hitungan plat untuk sampel-sampel tersebut.

(12 markah)

Sampel	Pencairan	Bilangan koloni	APC
A	10^{-2}	100, 120	
	10^{-3}	11, 13	
B	10^{-1}	TNTC, TNTC	
	10^{-2}	700, 750	
C	10^{-2}	13, 18	
	10^{-3}	2, 5	
D	10^{-2}	0, 0	
	10^{-3}	0, 0	

(b) Untuk mendapat pencairan 10^{-1}, 50 g makanan disebarkan ke dalam 450 ml pencair. Sekiranya hanya 11 g didapati, apakah isipadu pencair yang diperlukan untuk mendapat pencairan 10^{-1}?

(3 markah)

(c) Satu sampel tepung gandum telah dianalisa untuk hitungan plat aerob. Sampel-sampel yang telah dicairkan bersiri telah i) diplat terus dan ii) diplatkan selepas diletak di dalam kukus air 80 °C selama 15 minit. Hitungan didapati adalah seperti berikut:

Diplatkan terus		Diplatkan selepas pemanasan	
Pencairan	Koloni/plat	Pencairan	Koloni/plat
10^{-2}	120, 130, 125	10^{-1}	18, 21, 16
10^{-3}	11, 14, 15	10^{-2}	2, 1, 2

(i) Kirakan hitungan plat aerob untuk kedua-dua set eksperimen
(ii) Terangkan signifikan keputusan yang didapati.

(10 markah)

TABLE 1/ JADUAL 1

Selected MPN and 95% confidence limit estimates for fermentation tube tests with 3 tubes of 0.1, 0.01 and 0.001 g (ml) portions[a]

Number of positive tubes			MPN/g (ml) [b]	95 % confidence limits	
0.1	0.01	0.001		Lower	Upper
0	0	0	<3	-	-
0	1	0	3+	<1	17
1	0	0	4	<1	21
1	0	1	7+	2	27
1	1	0	7	2	28
1	2	0	11+	4	35
2	0	0	9	2	38
2	0	1	14+	5	48
2	1	0	15	5	50
2	1	1	20+	7	60
2	2	0	21	8	62
3	0	0	23	9	130
3	0	1	39	10	180
3	1	0	43	10	210
3	1	1	75	20	280
3	2	0	93	30	380
3	2	1	150	50	500
3	2	2	210+	80	640
3	3	0	240	90	1400
3	3	1	460	100	2400
3	3	2	1100	300	4800
3	3	3	>1100	-	-

[a]Normal results, obtained in 95% of tests, are not followed by a plus (+). Less likely results, obtained in only 4% of tests, are followed by a plus (+). Combinations of positive tubes shown here occur in less than 1 % of tests, and their frequent occurrence indicates that techniques are faulty or that assumptions underlying the MPN estimate are not being fulfilled. MPN estimates for combinations not shown here may be obtained by extrapolation or by Thomas's formulae to the next highest combination shown; for example, a result of 2-0-2 would have an MPN of approximately 20, which is the MPN for a more likely result of 2-1-1.

[b] Multiply all values under MPN/g (ml) by 100 for reporting MPN/100g

...6/-

Section B: Answer 1 question. Each question carries 15 marks.

6. *Answer all parts of this question*

(a) *Food samples A, B, C and D (25 g each) were tested in the Food Quality Control Laboratory for aerobic plate counts. The colony counts and respective dilutions are as follows. Standard Petri Plates (59 cm^2) were used. Calculate and report the plate counts for the samples.*

(12 marks)

Sample	Dilution	No. of colonies	APC
A	10^{-2}	100, 120	
	10^{-3}	11, 13	
B	10^{-1}	TNTC, TNTC	
	10^{-2}	700, 750	
C	10^{-2}	13, 18	
	10^{-3}	2, 5	
D	10^{-2}	0, 0	
	10^{-3}	0, 0	

(b) *To obtain a dilution of 10^{-1}, 50 g of food was distributed into 450 ml diluent. If only 11 g of sample was available, what is the volume of diluent required to obtain a dilution of 10^{-1}?*

(3 marks)

(c) *A sample of wheat flour was analyzed for aerobic plate count. The samples that have been serially diluted were i) directly plated and ii) plated after being subjected to 80 °C for 15 minutes in a water bath. The counts obtained were as follows:*

Directly plated		Plated after heating	
Dilution	Colony/plate	Dilution	Colony/plate
10^{-2}	120, 130, 125	10^{-1}	18, 21, 16
10^{-3}	11, 14, 15	10^{-2}	2, 1, 2

(i) *Calculate the aerobic plate count for both sets of experiments.*
(ii) *Explain the significance of the results obtained.*

(10 marks)

TABLE 1/ JADUAL 1

Selected MPN and 95% confidence limit estimates for fermentation tube tests with 3 tubes of 0.1, 0.01 and 0.001 g (ml) portions[a]

Number of positive tubes			*MPN/g (ml)* [b]	*95 % confidence limits*	
0.1	*0.01*	*0.001*		*Lower*	*Upper*
0	*0*	*0*	*<3*	-	-
0	*1*	*0*	*3+*	*<1*	*17*
1	*0*	*0*	*4*	*<1*	*21*
1	*0*	*1*	*7+*	*2*	*27*
1	*1*	*0*	*7*	*2*	*28*
1	*2*	*0*	*11+*	*4*	*35*
2	*0*	*0*	*9*	*2*	*38*
2	*0*	*1*	*14+*	*5*	*48*
2	*1*	*0*	*15*	*5*	*50*
2	*1*	*1*	*20+*	*7*	*60*
2	*2*	*0*	*21*	*8*	*62*
3	*0*	*0*	*23*	*9*	*130*
3	*0*	*1*	*39*	*10*	*180*
3	*1*	*0*	*43*	*10*	*210*
3	*1*	*1*	*75*	*20*	*280*
3	*2*	*0*	*93*	*30*	*380*
3	*2*	*1*	*150*	*50*	*500*
3	*2*	*2*	*210+*	*80*	*640*
3	*3*	*0*	*240*	*90*	*1400*
3	*3*	*1*	*460*	*100*	*2400*
3	*3*	*2*	*1100*	*300*	*4800*
3	*3*	*3*	*>1100*	-	-

[a] *Normal results, obtained in 95% of tests, are not followed by a plus (+). Less likely results, obtained in only 4% of tests, are followed by a plus (+). Combinations of positive tubes shown here occur in less than 1 % of tests, and their frequent occurrence indicates that techniques are faulty or that assumptions underlying the MPN estimate are not being fulfilled. MPN estimates for combinations not shown here may be obtained by extrapolation or by Thomas's formulae to the next highest combination shown; for example, a result of 2-0-2 would have an MPN of approximately 20, which is the MPN for a more likely result of 2-1-1.*

[b] *Multiply all values under MPN/g (ml) by 100 for reporting MPN/100g*

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