THE PULSIFIER™

COMPARISON OF MICROBE SUSPENDING EFFICIENCIES: PULSIFIER™ vs STOMACHER®

Description

Pulsifier™ uses a novel proprietary principle to prepare microbial suspensions from foods. Instead of the familiar paddle action in traditional lab blenders which repeatedly crush the samples, the Pulsifier™ beats the outside of the bag at high frequency. This beating action produces a combination of shock waves and intense mixing which rapidly releases the microbes into suspension.

Protocol 1

The unwashed food samples (10g of carrots or celery) were precut to ~1cm^3 and mixed to improve uniformity. The samples were then placed in either a Pulsifier™ or Stomacher® bag with 90mLs peptone water (1% peptone, 0.5% NaCl, pH 7.2) and blended for 1 min using Pulsifier™ or Stomacher® respectively.

Protocol 2

The suspensions were plated on TSA and incubated for 24 hours at 35°C. Plates of 20-300 colonies were counted.

Results

The food samples processed by the Stomacher® were crushed into small pieces so the suspensions were filled with debris and difficult to pipette. With the samples that were processed by Pulsifier™, the food pieces remained intact and the suspensions stayed clear. Whilst the samples were visually different, the recovery of microbes using Pulsifier™ was as efficient as Stomacher® (*Tables 1 & 2*)

	Log10 cfu/g	
Sample No	**Pulsifier™**	**Stomacher®**
1	5.89	5.87
2	5.72	6.16
3	6.21	6.45
4	6.16	6.44
5	5.69	6.16
6	6.74	5.56
7	6.28	6.25
8	6.24	6.25

Table 1: Comparison of Aerobic Plate Counts on Food Samples - Carrots

	Log10 cfu/g	
Sample No	**Pulsifier™**	**Stomacher®**
1	6.16	5.93
2	5.10	5.13
3	5.06	5.23
4	4.95	5.36
5	4.35	4.95
6	4.21	4.25
7	5.18	5.18
8	4.88	4.20

Table 2: Comparison of aerobic Plate Counts on Food Samples – Celery

Comparison of Aerobic Plate Counts on Samples Prepared by Pulsifier™ and Stomacher®

All samples precut (1cm^3) and mixed to improve uniformity. Samples blended 1min in 90mLs 0.1% peptone, plated on TSA and incubated 24hrs at 35°C. Plates of 20-300 colonies counted

	Log10 cfu/g		
	Pulsifier™	**Stomacher®**	**Puls/Stom**
Ground Beef (reg) frozen	6.20	6.23	0.995
Ground Beef (reg) frozen	6.32	6.30	1.003
Ground Beef (reg) frozen	6.11	6.20	0.985
Ground Beef (lean) frozen	5.48	5.36	1.022
Veal cutlet, fresh	2.51	1.93	1.301
Fish, haddock, fresh	4.52	4.23	1.069
Pate, herb	2.93	2.52	1.163
Cheese, Camembert, cream	5.71	5.75	0.993
Cheese, Camembert, skin	3.54	3.28	1.079
Peas, frozen	2.34	2.28	1.026
Sprouts, alfalfa	8.30	7.85	1.057
Celery	3.17	2.92	1.086
Carrot	2.51	2.46	1.020
Basil, dry	5.92	5.98	0.990
Chilli, Mexican	2.80	2.78	1.007
Oats, rolled	1.78	1.30	1.369
Rice, white	1.58	1.83	0.863*
Rice, brown	1.23	1.38	0.891**
Raisins	3.33	3.57	0.933***
Dishcloth, used	7.84	7.66	1.023

* presoaked 20mins but Stomacher® bag leaked = false high concentration
** presoaked 30mins but Stomacher® bag leaked = false high concentration
*** raisins opened up by Stomacher® but not by Pulsifier™

Conclusion

The comparison data clearly shows that this new method of “pulsifying” food samples is as efficient in releasing microbial contamination as the Stomacher® method but produces a cleaner sample and minimises sampling difficulties due to particulates blocking pipettes.
Bag leakage, especially when hard or gritty foods are processed, has always been a problem but the Pulsifier™ minimises the probability of this occurring because no shearing forces are used.

In conclusion this new method of processing food samples for microbiological analysis is as microbiologically efficient as the existing methods and offers additional practical benefits.

Acknowledgements

The Pulsifier – A New Instrument for Preparing Food Suspensions for Microbiological Analysis. Fung, Sharpe, Hart and Liu; Journal of Rapid Methods and Automation in Micro 6 (1998) 43-49.