

Survival Of *Lactobacillus* Strains When In Contact With Fruit Pulps

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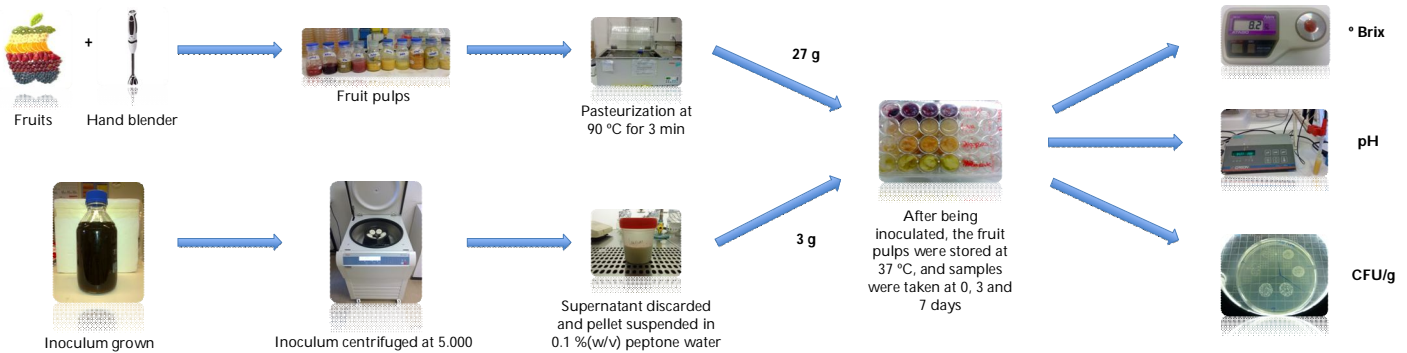
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Introduction

Probiotics have, in the past years, been incorporated in different food matrices, with a particular relevance for dairy products, since they have characteristics that provide the probiotics with a particularly good survival environment. These properties allow the dairy products to maintain high viability numbers, which enables them to have a good shelf-life. A further group of products that have a good market potential are those that utilize different fruits (such as fruit juices or pulps). However, fruit matrices, due to their composition, are often detrimental to the survival of probiotic strains. The aim of this research work was to study the survival of six *Lactobacillus* strains (*Lactobacillus paracasei* L26, *Lactobacillus casei* 01, *Lactobacillus plantarum* 229v, *Lactobacillus rhamnosus* R0011, *Lactobacillus acidophilus* K1, *Lactobacillus acidophilus* La-5), when in contact with eleven different fruit pulps.

Materials & Methods



Results & Discussion

Table 1. Survival percentage, and variation of CFU/g, pH and °Brix of the 10 fruits inoculated with the *Lactobacillus* strains (Skim-milk was utilized for comparison purposes), after 7 days storage at 37 °C.

Fruit	<i>L. paracasei</i> L26			<i>L. casei</i> 01			<i>L. plantarum</i> 229v			<i>L. rhamnosus</i> R0011			<i>L. acidophilus</i> K1			<i>L. acidophilus</i> La-5				
	Survival (%)	Δ Log ₁₀ CFU/g	Δ pH	Survival (%)	Δ Log ₁₀ CFU/g	Δ pH	Survival (%)	Δ Log ₁₀ CFU/g	Δ pH	Survival (%)	Δ Log ₁₀ CFU/g	Δ pH	Survival (%)	Δ Log ₁₀ CFU/g	Δ pH	Survival (%)	Δ Log ₁₀ CFU/g	Δ pH		
Skim-milk	71	2.92	-2.30	57	-4.01	1.84	39	-2.25	0.95	-1.45	36	-4.26	2.05	-2.01	36	-4.87	2.10	-3.88		
Strawberry	<26	7.81	0.37	-0.75	<27	7.10	0.21	-1.18	<25	7.07	0.22	-1.05	<29	6.14	0.07	-2.53	<27	7.19	0.30	0.12
Orange	<26	7.69	0.43	-1.70	<27	7.17	0.22	-2.40	<26	7.86	0.10	-1.50	30	6.33	0.25	-4.20	<28	7.07	0.30	-3.90
Apple	<26	7.71	0.50	-1.80	<27	7.25	0.30	-1.18	<25	7.60	0.40	-0.48	<28	7.08	0.38	-0.57	<28	7.07	0.41	-0.30
Pineapple	<26	7.73	0.30	-0.60	<27	7.18	0.20	-0.71	<25	7.68	0.21	-0.40	<29	6.62	0.20	0.00	<28	7.09	0.38	-1.30
Blueberry	<26	7.49	0.52	-1.10	<27	7.28	0.27	-1.80	<26	7.71	0.23	-1.58	<29	6.40	0.38	-3.10	<28	7.05	0.37	-1.45
Avocado	<26	7.53	0.24	0.80	<27	7.19	0.14	-2.30	<25	7.05	0.02	-1.90	<30	6.38	0.00	-0.90	<27	7.19	0.15	-2.63
Grape	71	2.96	0.05	-1.75	86	1.40	1.10	-1.90	85	1.53	0.98	-0.13	78	2.00	-0.11	-0.85	90	0.97	0.24	-0.05
Peach	<26	7.62	0.51	0.00	31	4.80	0.40	-1.03	<25	7.02	0.27	-0.20	69	3.20	0.24	-4.10	29	6.85	0.33	-0.60
Kiwi	<26	7.78	0.03	-0.40	<27	7.13	0.18	-0.31	<25	7.52	0.19	-0.20	<29	6.51	0.21	-0.73	<27	7.13	0.44	-0.72
Apple	<26	7.64	0.27	-0.45	<27	7.30	0.27	-0.73	<26	7.87	0.27	-0.50	<30	6.40	0.03	-1.03	<27	7.29	0.30	-0.28
Apple	<26	7.70	0.21	-0.40	<26	7.53	0.38	-2.08	<27	7.48	0.47	-2.10	<29	6.77	0.50	-3.28	<27	7.26	0.55	-1.98

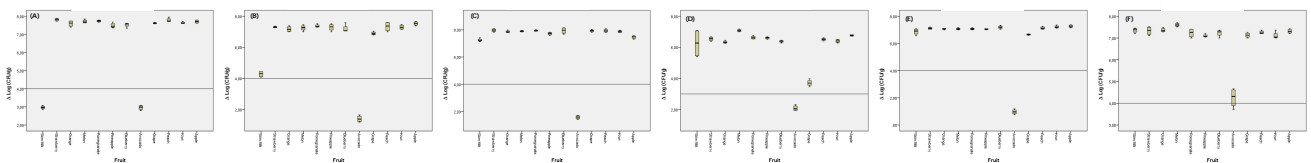


Figure 1. *Lactobacillus paracasei* L26 (A), *L. casei* 01 (B), *L. plantarum* 229v (C), *L. rhamnosus* R0011 (D), *L. acidophilus* K1 (E) and *L. acidophilus* La-5 (F) CFU/g variation after 7 days storage at 37 °C. The values above the line are the ones in which the variation lowers the CFU/g values to below 10⁶ CFU/g.

- Among the tested fruits, after 7 days and for all six strains, only avocado was able to maintain viability numbers above the minimum threshold (10⁶ CFU/g) that would enable the production of a functional food product (a product with enough viable cell numbers to allow the ingestion of probiotics in sufficient numbers to provide positive health effects).
- Grape pulp was the only other fruit pulp registering survival of lactobacilli, in particular, *L. rhamnosus* strain, although final viable cell numbers were below the required minimum threshold.

Conclusion

Initial concentration of probiotics must be considerably higher in order to achieve the desired concentration at the time of consumption otherwise treatments (or protective components) must be used, in order to obtain a fruit product containing viable and stable *Lactobacillus*.

Acknowledgements

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