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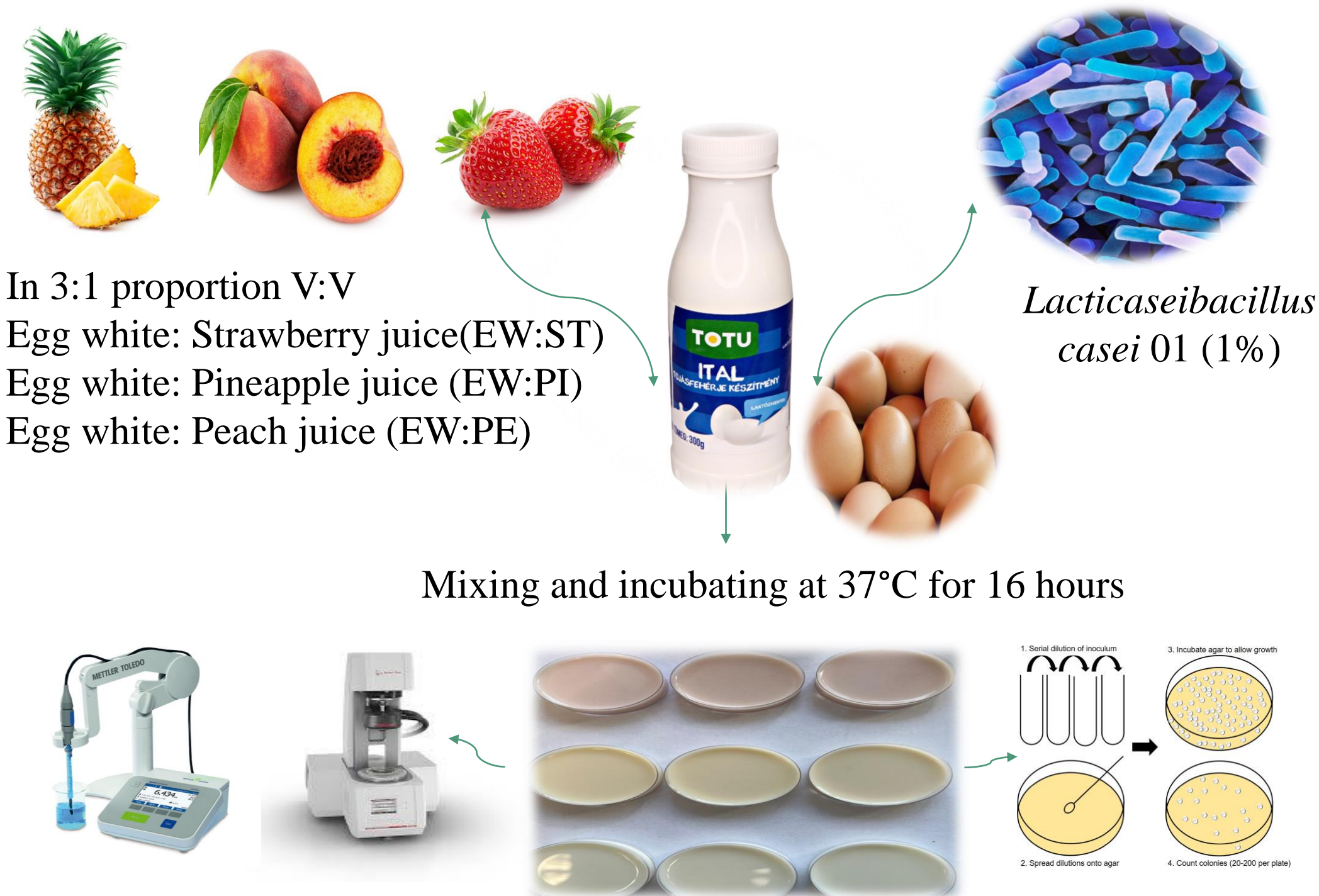
## INTRODUCTION

The use of probiotics for digestive and immune health has become increasingly popular, and they are being recommended more frequently as an effective therapeutic intervention (Sanders *et al.*, 2018). Most probiotics are found in dairy products, which are not suitable for individuals with lactose intolerance or milk protein allergies furthermore, its high cholesterol content (Luckow and Delahunty, 2004). Egg white drink is a rich source of protein and might be a suitable alternative to milk and a good probiotic substrate.

There has been a suggestion that fruit juices could serve as suitable media for cultivating probiotic as they do not contain dairy allergens that could discourage certain segments of the population from using them (Pakbin *et al.*, 2004), such as peach (*Prunus persica*), strawberry (*Fragaria x ananassa Duch*), and pineapple are high in minerals, vitamins, and polyphenols which makes them healthy to consume (Pakbin *et al.*, 2004).

In this context, the feasibility of egg white drinks fermentation with different fruit juices (peach, strawberry, pineapple) separately in a ratio of 3:1 egg white drink to fruit juice by *Lactocaseibacillus casei* 01 was evaluated. During 24 hours of fermentation the growth of *L. casei* 01, and the changes in the pH value were monitored, additionally the rheological parameters of the final product were determined.

## MATERIALS AND METHODS



## RESULTS AND DISCUSSION

### The viability of *L. casei* 01 during 24 hours of fermentation

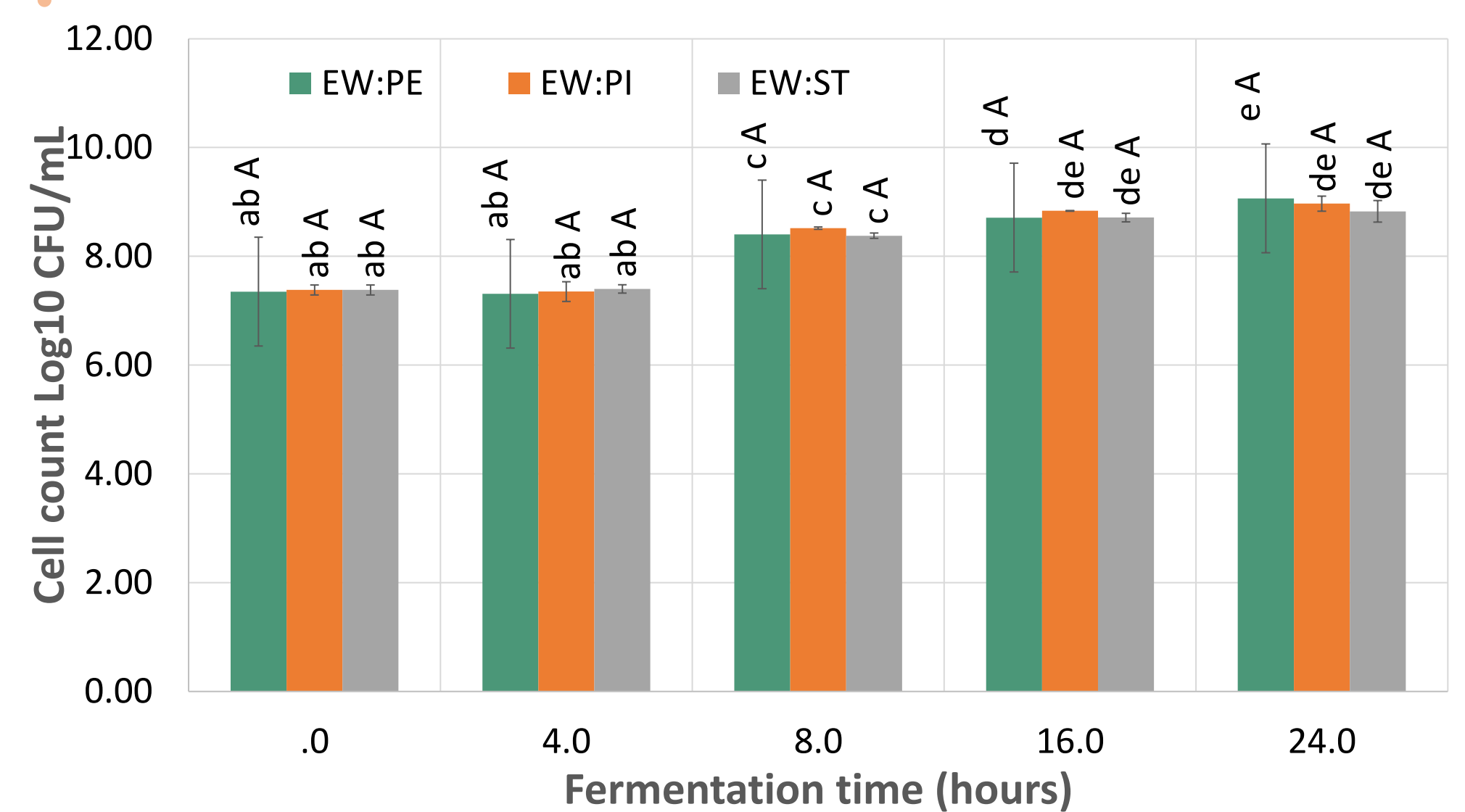


Figure (1): The viability of *L. casei* 01 in a mixed of egg white drink with fruit juices during 24 hours of fermentation

EW: PE :fermented egg white drink with peach juice, EW: PI :fermented egg white drink with pineapple juice, EW: ST :fermented egg white drink with strawberry juice. Lower case letters indicate the difference throughout fermentation when the same fruit juices were added, higher case letters indicate the differences between juices in the same period.

A slightly dropped in the microbial population was noticed after 4 hours of fermentation (Fig1), as a result of the difference between the pre-culture and the fermentation medium (Mousavi *et al.*, 2011). After wards, *L. casei* 01 tried to adapt to the new conditions as the growth rate relatively increased after 8 hours of fermentation reaching a value of 8 Log10 CFU/mL among all samples.

The cell count in 16 hours and 24 hours of fermentation did not significantly change in EW:PI and EW:ST samples, however, it reached its highest level after 24 hours in EW:PE samples.

### The pH value of egg white drink during 24 hours of fermentation

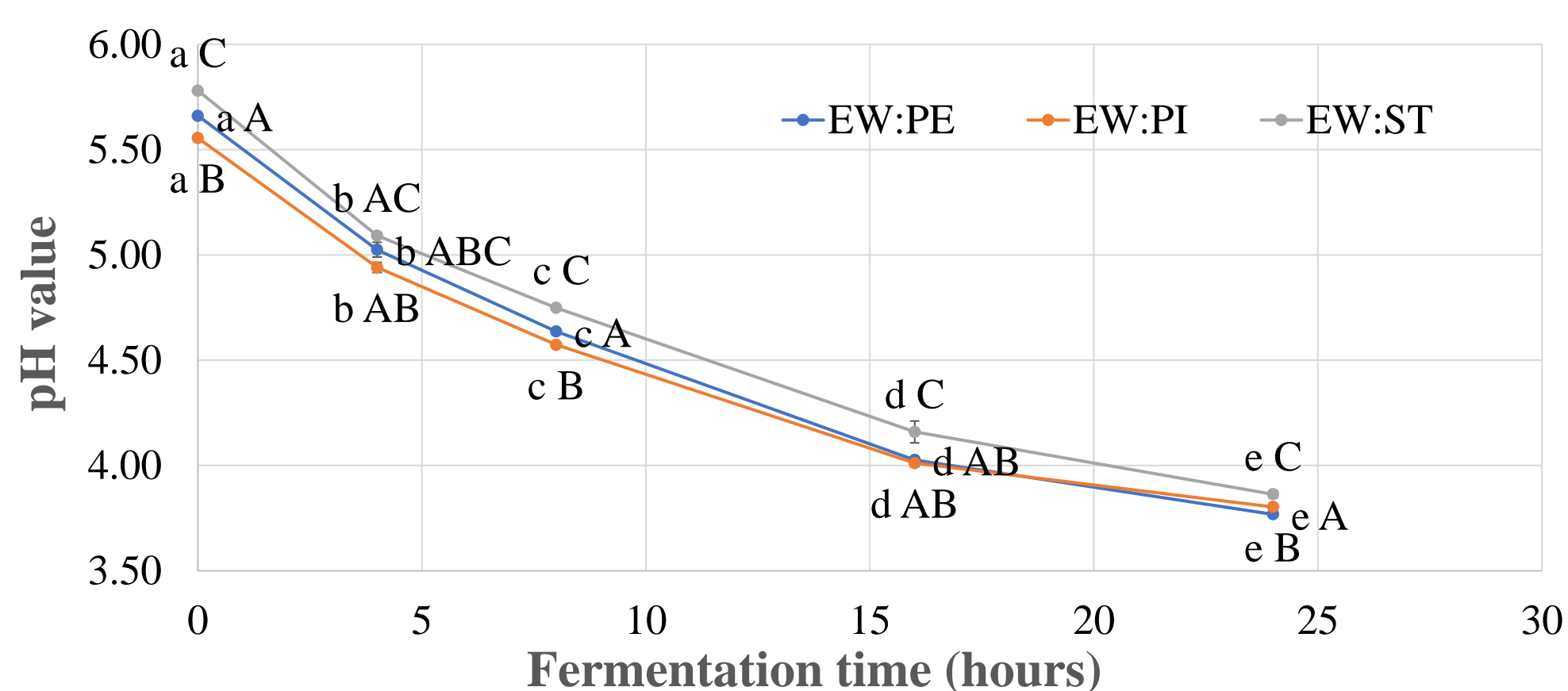


Figure (2): The viability of *L. casei* 01 in a mixed of egg white drink with fruit juices during 24 hours of fermentation

EW: PE :fermented egg white drink with peach juice, EW: PI :fermented egg white drink with pineapple juice, EW: ST :fermented egg white drink with strawberry juice. Lower case letters indicate the difference throughout fermentation when the same fruit juices were added, higher case letters indicate the differences between juices in the same period.

There was a significant drop in pH in all samples during fermentation Fig 2. Initially, the pH value of EW:ST was significantly higher than others, but after 16 hours, it significantly dropped on the other hand, there were no remarkable differences between EW:PE, and EW:PI. Additionally, after 24 hours of fermentation EW:ST had a significantly higher pH value followed by EW:PI.

## CONCLUSION

Adding fruit juices to egg white resulted in *L. casei* 01 growing at its highest after 16 hours when pineapple and strawberry juices were added, while samples with peaches took 24 hours. The pH of final products reached around (4). Furthermore, samples with peach and strawberry showed shear thickening behaviour, while pineapple had a shear thinning behaviour.

## REFERENCES

- Luckow T, Delahunty C. (2004) Which juice is 'healthier'? A consumer study of probiotic non-dairy juice drinks. *Food Quality and Preference*;15(7):751-759.
- Mousavi, Z., Mousavi, M., Razavi, S., Emam-Djomeh, Z. & Kiani, H. (2011) Fermentation of pomegranate juice by probiotic lactic acid bacteria. *World Journal of Microbiology and Biotechnology* 27, 123-128.
- Pakbin B, Razavi S, Mahmoudi R, Gajarbeygi P. (2014) Producing Probiotic Peach Juice. *Biotech. Health. Sci.*;1:1-5.
- Sanders M, Merenstein D, Merrifield C, Hutkins R. (2018) Probiotics for human use. *Nutrition Bulletin*,43:212-225.

### The rheological parameters of egg white drink mixed with fruit juice

Table(1): The viability of *L. casei* 01 in a mixed of egg white drink with fruit juices during 24 hours of fermentation

	Yield stress ( $\sigma_0$ ) Pa	Consistency Index (K) Pa.s <sup>n</sup>	Flow behaviour index (n)
EW: PE	0.04643 ± 0.008 <sup>ac</sup>	0.00460 ± 0.0002 <sup>ac</sup>	1.02931 ± 0.003 <sup>ac</sup>
EW: PI	0.11060 ± 0.03 <sup>bc</sup>	0.00650 ± 0.001 <sup>b</sup>	0.96329 ± 0.02 <sup>b</sup>
EW: ST	0.09367 ± 0.01 <sup>abc</sup>	0.00500 ± 0.00001 <sup>ac</sup>	1.03333 ± 0.004 <sup>ac</sup>

EW: PE :fermented egg white drink with peach juice, EW: PI :fermented egg white drink with pineapple juice, EW: ST :fermented egg white drink with strawberry juice. Lower case letters indicate the difference throughout fermentation when the same fruit juices were added, higher case letters indicate the differences between juices in the same period.

- ❖ In accordance with Table 1, EW: ST produced similar stress yields as EW: PE and EW: PI samples.
- ❖ In comparison with other samples, EW: PI samples had considerably a higher consistency index.
- ❖ A shear thickening behaviour was observed in EW: ST and EW: PE whereas EW: PI had a shear thinning behaviour.