



Development of different functional variants of banana yogurt-like cassava starch beverage



F.V. Corte*¹; S. Tchakirian²; S.V. de Fabrizio¹

⁽¹⁾ Bromatología, Dto. de Química Orgánica, FCEN-UBA. Pab II, piso 3, Ciudad Universitaria (1428);
⁽²⁾ Centro Integral de Diagnóstico, Cabildo 491 (1426), Buenos Aires, Argentina. E-mail: sfabrizio@ciudad.com.ar

Introduction

Lactic fermented cassava starch products of different kinds has been successfully presented by our group since 1990. More recently, during CBN V Scientific Congress, we presented an example of a tropical fruit (banana) combined with cassava starch, as substrates to obtain a yoghurt-like fermented beverage. All these products, elaborated by a simple process, were intended to create new opportunities for farmers and processors as well as new markets for different regions. The global phenomena, has lead people to acquire unexpected knowledge and raising interest on healthy foods and their nutritional-biosafety aspects. Moreover, new functional foods are claimed by most Pharmaceutical Industries and Public Health Institutions of the world, including developing regions.



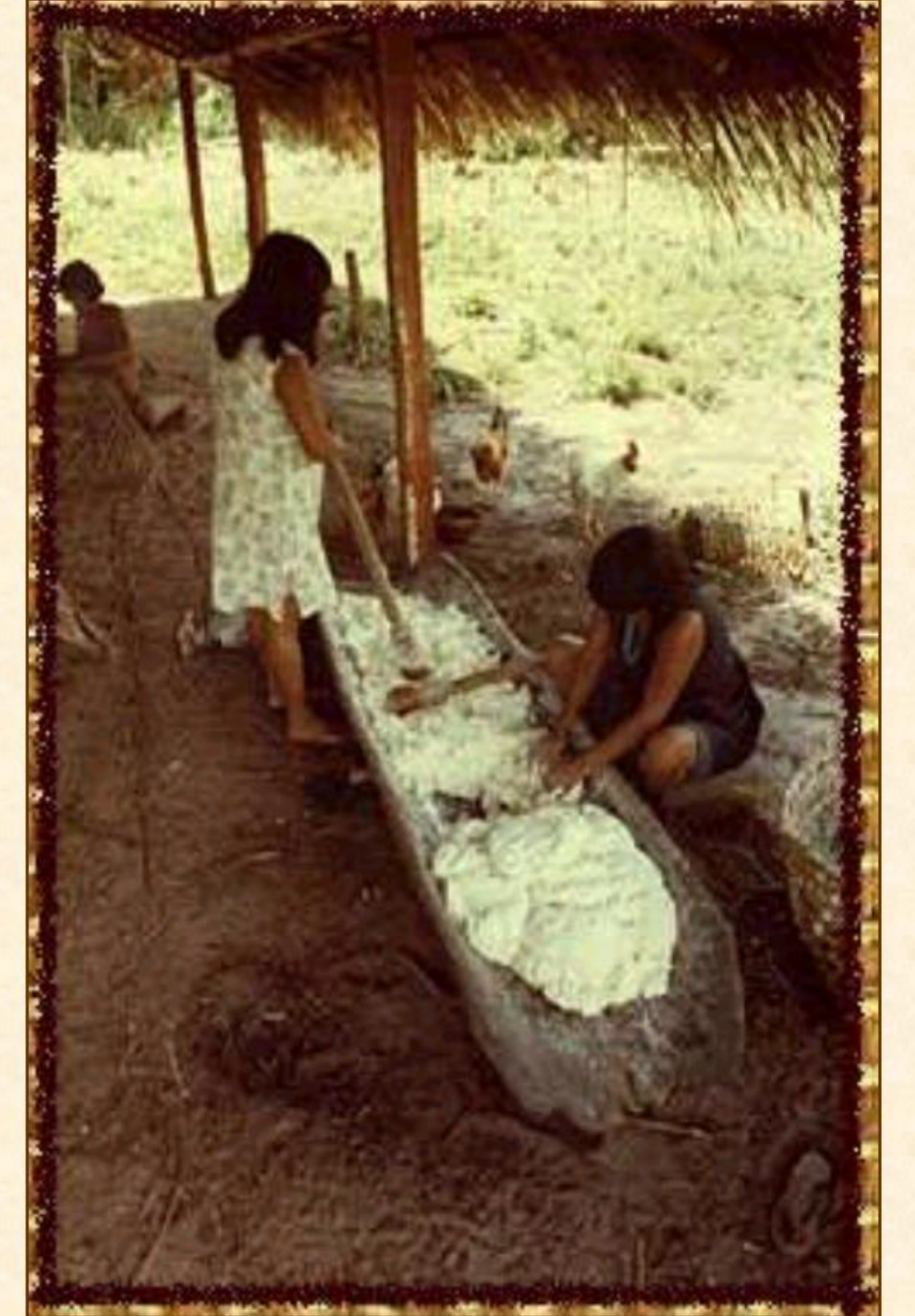
Fig. 1. Fermented products A and B final aspects.

Objective

This work is intended to provide the basis for the development of such functional foods. In case of children or populations with deficit of protein, the desired nutritional balance is obtain by the addition of protein. Vegetarian requirements can be fulfilled by a strictly vegetable formulation, while diets with low fat and glucose contents could be also followed by a vegetable formulation, but sweetened by edulcorants.

Materials and Methods

Food safety, is accomplished by lactic fermentation and previous thermal treatment. Fermentation was followed by pH using Hanna pHmeter; acidity by titration with 0,1 N NaOH solution and lactic acid bacteria (LAB) enumeration by surface counts in SPC Agar. Also sensorial and rapid tests of consistency were conducted.



Results and Discussion

To cover all these expectation, we present two variants to the original banana yogurt-like beverage proposed before (cassava starch 4%, fresh blended banana 6%). The basic formula is nutritionally improved with 3% milk, obtaining the first variant: more rich in high quality proteins, calcium and vitamins.

For most diets, the desired effect is accomplished by using 6% starch, 1,5% soy protein plus sweetener and only banana flavour. Food safety, is accomplished by lactic fermentation and previous thermal treatment.

In all cases, pH and acidity reached safe levels. LAB population remained slightly higher at the end of the fermentation, while texture was significantly improved.



Fig. 2. Micrography of the fermented product.

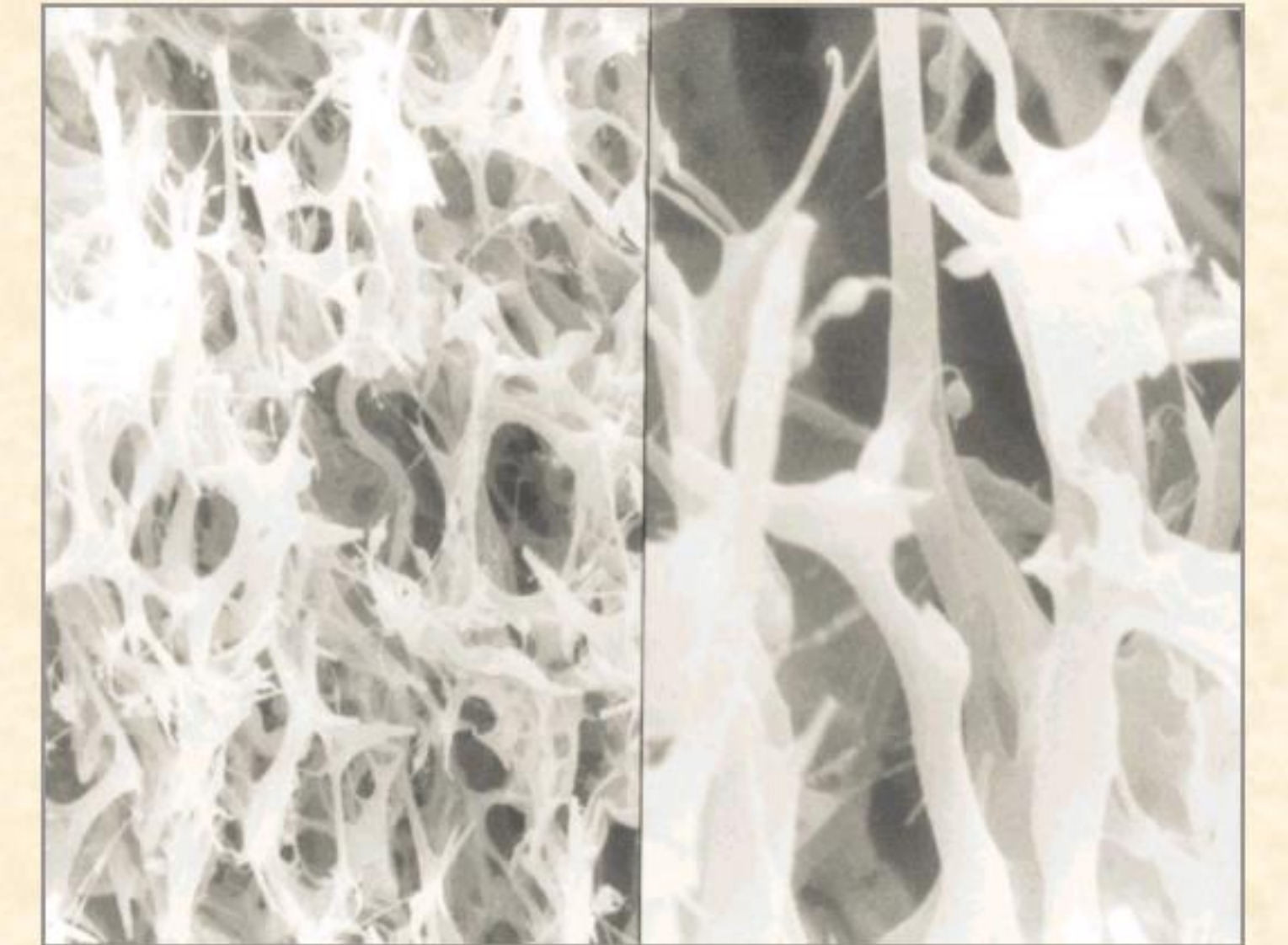
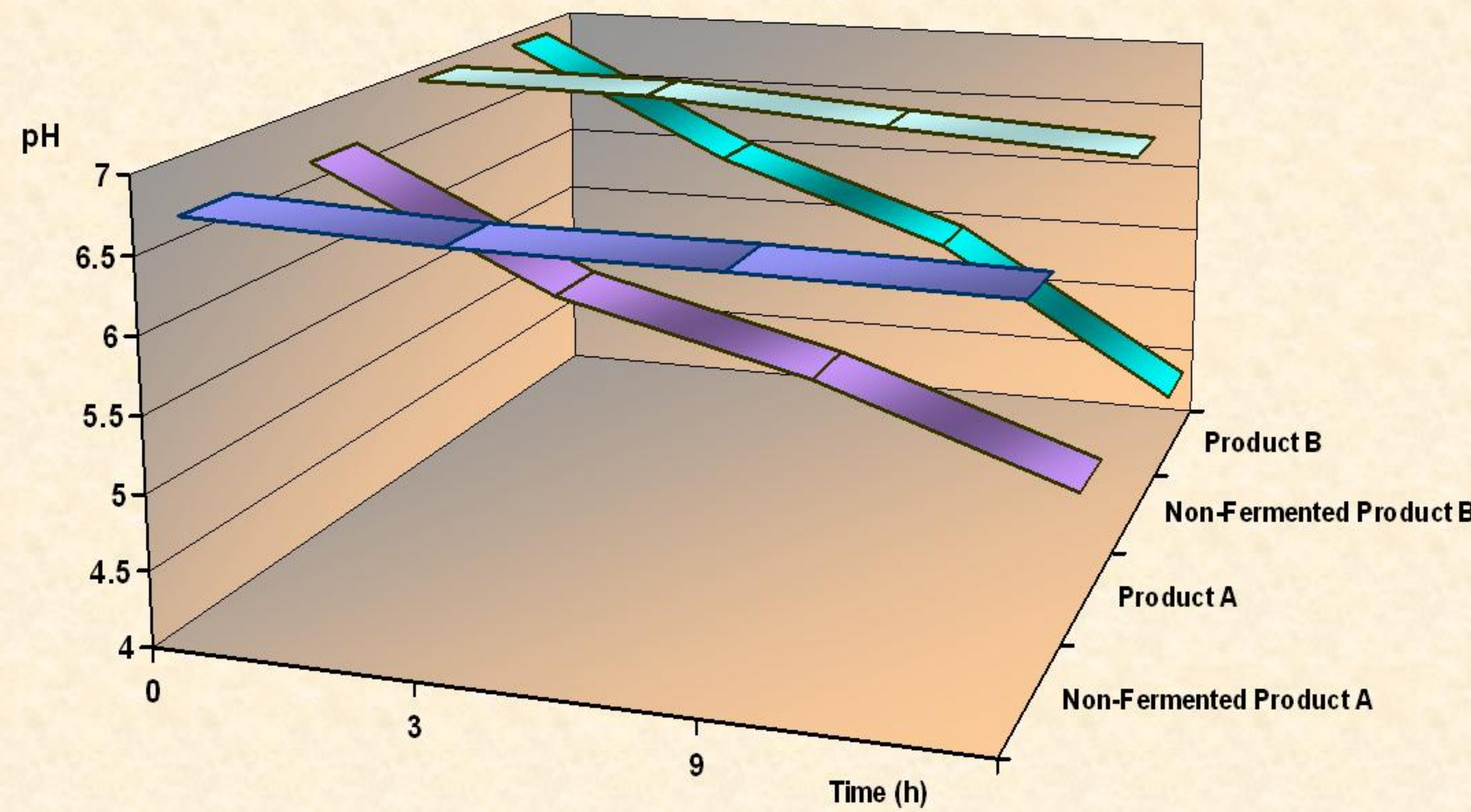


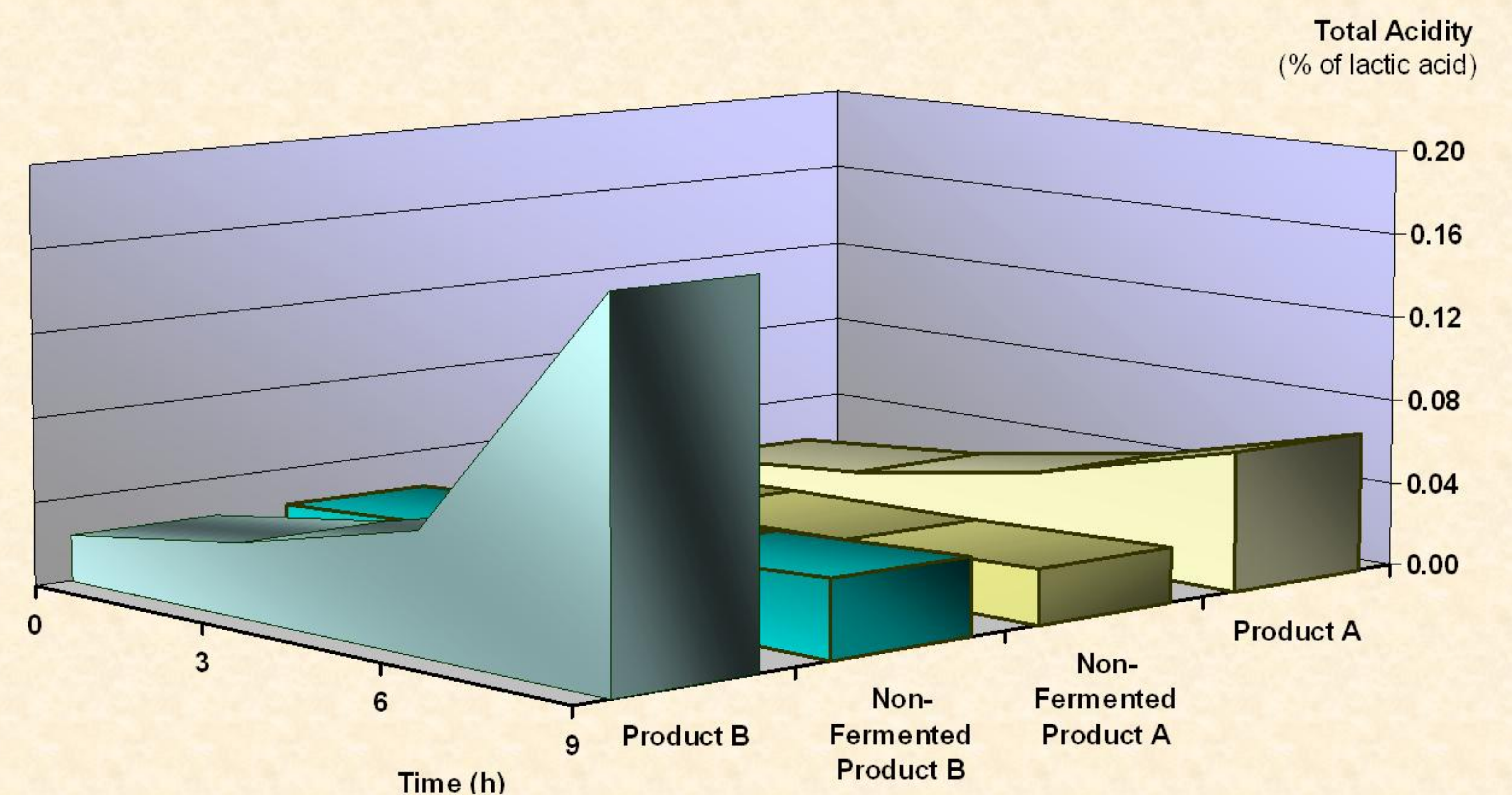
Fig. 3. Microstructure of the products.

Fig. 1. Evolution of pH during fermentation of banana yoghurt-like functional products



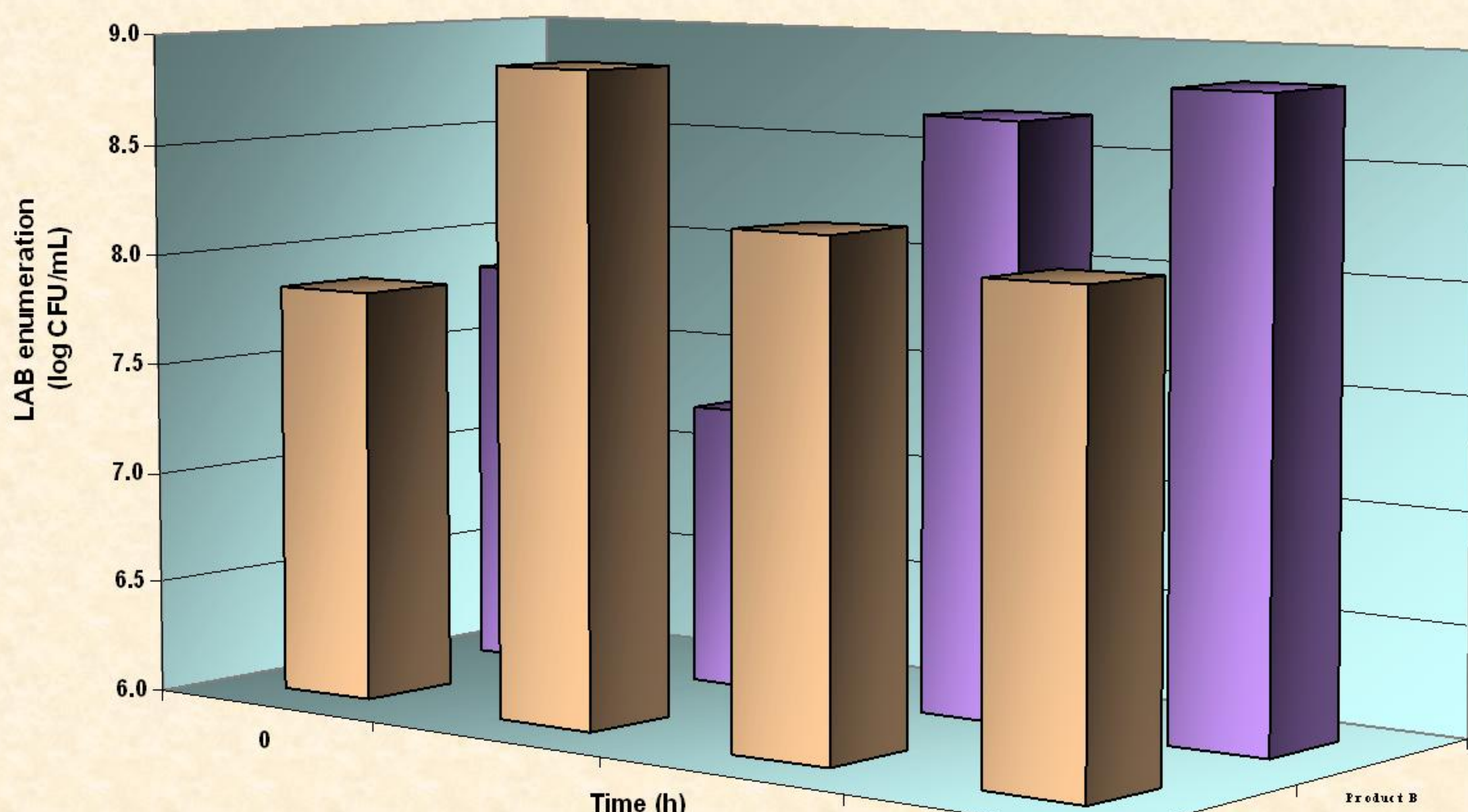
- Product A elaborated with cassava starch, soy protein, banana flavoring and edulcorant.
- Product B formulated with cassava starch, milk (fat 1,5 %) and banana fruit blended.
- Both formulations were fermented by 1:1 mixed culture of *S. thermophilus* and *L. bulgaricus* at 40°C

Fig. 2. Evolution of acidity during fermentation of the proposed formulations for banana yoghurt-like functional products



- Product A elaborated with cassava starch, soy protein, banana flavoring and edulcorant.
- Product B formulated with cassava starch, milk (fat 1,5 %) and banana fruit blended.
- Both formulations were fermented by 1:1 mixed culture of *S. thermophilus* and *L. bulgaricus* at 40°C

Fig. 3. Lactic acid bacterial growth during fermentation of the banana yoghurt-like formulation based on cassava starch using different-nature protein substrates



- Product A elaborated with cassava starch, soy protein, banana flavoring and edulcorant.
- Product B formulated with cassava starch, milk (fat 1,5 %) and banana fruit blended.
- Both formulations were fermented by 1:1 mixed culture of *S. thermophilus* and *L. bulgaricus* at 40°C

Conclusions

In this manner, we developed three different purpose functional yogurt-like drink with the probiotic properties of a real yogurt, being an alternative for the diet of different cases including those people with casein intolerance and celiacs

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