Indigenous Fermented Milks from some Regions of Cameroon and Chad: Production processes, Utilizations, and Challenges.

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INTRODUCTION

Fermentation is a biotechnological process used all over the world since ancient times to produce indigenous fermented foods and alcoholic beverages. The demand of traditional fermented foods by consumers is increased due to their numerous health benefits and important nutritional values. Lactic acid bacteria (LABs) have been reported as the main actors of the fermentation process of indigenous fermented milks. During fermentation, LABs including the genus Lactobacillus produce metabolites such as organic acids, bacteriocins, biosurfactants, etc., that have antimicrobial activity, thus prolonging the shelf life of foods (Mouaf et al., 2018a; 201b; 2020; Fookao et al., 2022). The “researched” properties of each fermented milk depend on the quality of raw materials, ingredients and the technological process used during its production. The aim of the present study is to establish after exploiting some published and experimental data: the technological processes, the utilizations, the potential properties and some related challenges of indigenous fermented milks produced in some regions of Cameroon and Chad.

METHODOLOGY

Screening of indigenous fermented milks and Sampling

- Cameroon
- Chad

Isolation and Identification of Lactic Acid Bacteria (LABs) strains producing bioemulsifiers/biosurfactants (BE/BS)

- MRS and M17 broths; MRS and M17 agars
- Gram staining; Biochemical test + API Gallery 50 CHL
- Oil spreading test (OST) + Production of BE/BS

Fermentation

Centrifugation

Oil spreading test (OST) on Cell free supernatant (CFS)

Ethanol precipitation (4°C overnight)

Centrifugation

BE/BS

Production yield

Emulsification Index (E24)

Stability tests: Extreme pH and T°C, variation of salinity (NaCl)

RESULTS AND DISCUSSION

The indigenous fermented milks in the localities investigated were represented by four types: Pendidam and Kindirimou in Cameroon; Rouaba and Raye in Chad. They are all produced by fermentation of raw fresh milk from cow origin and used mainly for feeding and therapeutic purposes.

The production yields of BE/BS range from 2.1 to 4.2 g/L. The main strains of BE/BS-producing and effective LABs (Oil spreading test (OST) on strain culture Cell free supernatants (CFS)) isolated from Pendidam belong to the genus Lactobacillus.

The BE/BS produced were stable at extreme pH (2 to 12), extreme temperatures (25 to 121°C) and varied salinity (0 to 50% NaCl (w/v)).

Results of chemical analysis and TLC showed that the chemical nature of the BE/BS produced could be a glycolipopeptide.

Some advantages of BE/BS

- Produced by lactobacilli and extracted with bio-ethanol (bio-solvent) => GRAS status
- Extracted BE/BS form stable emulsions (48 hours) at extreme pH and temperatures, and at varied salinity (NaCl) => multiple properties that can be used in multiple food substrates.

Biopreservatives

- Possess Antimicrobial, Antioxidant and Antiadhesive properties;
- Prevent the lipid oxidation and proteolysis;
- Stabilize the color, etc. (Ground Beef, Raw Ground Goat Meat)

Emulsifying properties

- Increase the shelf life (Pendidam, Yellow Achu Soup)
- Improve the sensory properties (Milk Bread, Sausages)
- Improve the texture (Bread Dough)
- Improve the stability of cold emulsion (Milk Chocolate Drink)

Figure 3. Stability of emulsions of refined palm oil + BE/BS after 48 hours.

Figure 4. Some advantages and potential applications in food industries of BE/BS produced by lactobacilli (Generally recognized as safe (GRAS) status) isolated from a Cameroon indigenous fermented milk (Pendidam) highly consumed because of its health benefits (Mouaf et al. 2018-2020; Fookao et al. 2022, etc.).

GREAT CHALLENGES ABOUT HEALTH CARE

Utilizations of GRAS BE/BS to fight against the:

- Covid-19, AIDS, Influenza, Hepatitis B and C viruses...
  via capsules (oral medication).

- Myocardial Infarction (MI), Cerebro-Vascular Accident (CVA) via coronary angiography techniques.

CONCLUSIONS

The BE/BS extracted from the CFS by bio-ethanol (bio-solvent) precipitation and produced by lactobacilli (GRAS status) isolated from Pendidam possess interesting bioemulsifying properties that improve the stability of emulsions with substrates showing their potential applications in food industries and in maintaining human health.

REFERENCES


