Consumer Acceptability of Yoghurt Produced from fresh Cow milk using Brevibacterium linens as Starter Culture.

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ABSTRACT

This study was investigated consumer acceptability of yoghurt produced from fresh cow milk using *Brevibacterium linens* as starter culture. The fresh cow milk was collected from Vom, Jos, and Plateau State, Nigeria. *Bervibacterium linens* was isolated from sample of cheese. The milk samples were clarified to remove foreign materials, pasteurized at 65°C for 30min to destroy pathogenic materials and later cool to temperature of 42°C and inoculated with Freeze- dried yoghurt starter as inoculums and allowed to ferment for 4hrs. The semi- solid curds were homogenized; package and cool at 4°C. Aroma, mouth- feel and taste were monitored for the sensory quality. The general acceptability of the products was evaluated using twenty (20) trained panelists. The result of the sensory evaluation of the yoghurts showed that the yoghurt produced from *B. linens* as starter culture was significantly different ($p<0.05$) than those produced from common starter culture.

Keywords: Consumer Acceptability, Yoghurt, Fresh Cow Milk, Brevibacterium linens, Starter Culture.

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1. INTRODUCTION

Milk is a complex biological fluid secreted in the mammary glands of mammals. Its function is to meet the nutritional needs of neonates of the species from which the milk is derived. However, milk and dairy products form a significant part of the human diet. They are rich sources of nutrients such as proteins, fats, vitamins and minerals; ironically, it is because of this that these products are susceptible to rapid microbial growth. In some instances, this microbial growth may be beneficial, while in others it is undesirable. Dairy products are vulnerable to spoilage or contamination with pathogens or microbial toxins; therefore, the microbiology of milk products is of key interest to milk handlers and those in the dairy industry. Nigeria, with a population of more than 170 million is grossly underprovided with essential food components - particularly the milk protein. Reports indicate that cow provides essentially all the fluid milk consumed (Igwegbe et al., 2014); and that milk production has been nose diving or at best has remained constant since 1994 in the country. To ameliorate this problem of low-level protein intake, especially from cheap dairy sources, there is the need for concerted effort to bring about the massive production and utilization of protein based food items from milk of other animal species such as goat, and at competitive costs so that they would be affordable to the general masses.

Yoghurt is one of the oldest fermented milk product consumed all over the world and it is produced by fermenting milk with lactic acid bacteria which responsible for development of typical yoghurt flavor. Fermentation is one of the oldest methods practiced by human beings for the transformation of milk into products with an extended shelf life Tammie and Robinson (1999). The conversion of lactose to lactic acid in fermented products has preservative effect on as the pH of cultured milk inhibits the growth putrefactive bacteria and other determined organisms, thereby prolonging the shelf life of products Esharaga, *et al*., (2011). Yoghurt is nutritionally rich in protein, minerals and vitamins and the values differ due to a number of reasons such as sources of milk, processing methods and ingredients used. Worldwide, cow's milk is most commonly used to make yogurt but milk from water buffalo, goats, sheep, camels and yake is also use various different part of the Castro, (2007).

Brevibacterium linens is non pathogenic and has long usage in food industries (Collins and Matthew, 2006). It has antimicrobial properties which can reduce the effect of pathogenic *Listeriamonocytogenes* by1-2 log units .This property makes it safer for human consumption (Motta and Brandelli, 2008). This antimicrobial property is known as bacteriocins. These are a kind of ribosomal synthesized antimicrobial peptides produced by bacteria, which can kill or inhibit bacterial strains closely-related or non-related to produced bacteria, but will not harm the bacteria themselves by specific immunity proteins. Bacteriocins become one of the weapons against microorganisms due to the specific characteristics of large diversity of structure and function, natural resource, and being stable to heat. Many recent studies have purified and identified bacteriocins for application in food technology, which aims to extend food preservation time, treat pathogen disease and cancer therapy, and maintain human health. Therefore, bacteriocins may become a potential drug candidate for replacing antibiotics in order to treat multiple drugs resistance pathogens in the future. Microbial communities from rinds of surface-ripened cheeses are composed of various bacteria, yeasts and molds, which contribute to the flavor, texture and appearance of the final products.

These microorganisms may come from the milk, the ripening environment or from ripening cultures that are widely used in the cheese industry. The function of the ripening cultures is to provide specific organoleptic properties, to ensure a better regularity of manufacturing, and to out compete pathogens or spoilage microorganisms (Motta and Brandlis, 2008). However, strains from ripening cultures frequently do not establish themselves in cheeses (Onranedt *et al*., 2003). Even if they are massively inoculated, these strains are sometimes out competed by the resident "house flora" due to insufficient fitness in the cheese surface habitat. The ability to grow on the cheese surface depends on various properties such as efficient salt tolerance and iron acquisition systems, or on the ability to use the energy compounds present in the cheese (Gavish, *et al*., 2004). In addition, growth is influenced by the other microorganisms present at the cheese surface, with which they may have positive or negative interactions. This study investigated the consumer acceptability of yoghurt produced from *B. linens* as starter culture

2. MATERIAL AND METHODS

2.1 Source of milk and cheese

The fresh cow milk used was obtained from National Veterinary Research Institute (Vom), Jos Plateau State, Nigeria. The cheese and standard starter culture (freeze-dried yoghurt starter) were obtained from food chemical shop in Jos.

2.2 Isolation of *Brevibacterium linens* from cheese

Brevibactrium linens were isolated and characterized from cheese. Prior to isolation of *Brevibacteriumlinens*, cheese was thawed in the dark at 4°C. The smear was collected from cheese, by scraping the surface of the cheese and weighed. The culture was grown in 250ml Erlenmeyer flask containing 50ml of a medium composed of 20g/L D-glucose (Carloerba, London), 5g/L casamino acids (Difco), 1g/L yeast extracts (Biokar), 5g/L NaCl and 1g/L KH_2PO4. The pH was adjusted to 6.9 and the medium was sterilized at 121°C for 15minutes and incubated at 25°C for 48hours with stirring (150rpm) to oxygenate the medium (Galaup *et al.*, 2005).

2.3 Yoghurt production

Yoghurt was manufactured using the method outlined by Tammine and Robinson (1999), with some modifications. The milk was filtered and clarified. The clarified cow milk was pasteurized at 65°C for 30 min. Pasteurized milk samples were cooled to inoculation temperature of 42 ºC ± 1 ºC and then cooled samples were divided into two (2) portions; A and B. Sample A was inoculated with 2%v/v of *B. linens* starter the samples was fermented for 4 -6h.The plain yoghurt was then packaged and stored. The same procedure was repeated for yoghurt inoculated with standard starter culture (freeze-dried yoghurt starter) consisting of *Lactobacillus bulgaricus* and *Streptococcus thermophillus*.

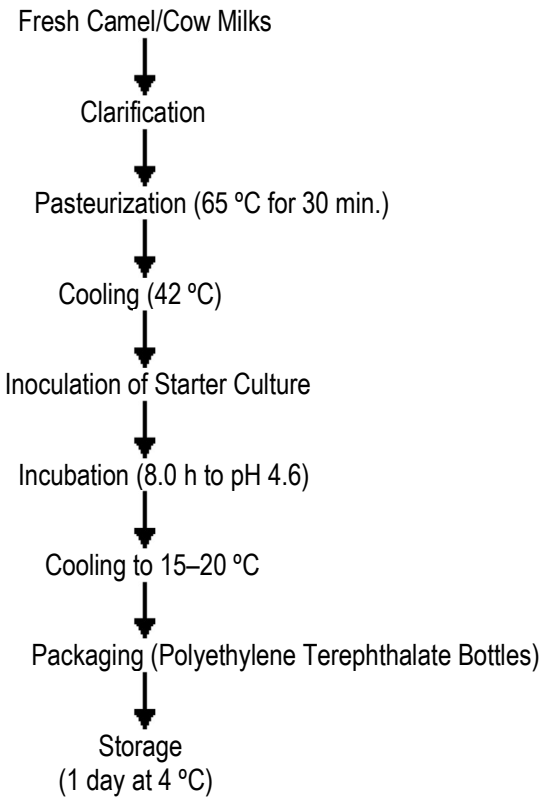

Figure1: Flow Chart for Modifying Method Yoghurts Production (Tamime and Robinson, 1999)

2.4 Sensory Quality Evaluation and Acceptability Test.

Acceptance testing method described by Ihekoronye and Ngoddy, (1995) was used to investigate the acceptability of the yoghurt produced from *Brevibacterium linens* as starter culture against the common starter culture yoghurt. Determination of acceptability was done using 20 trained panelists who were familiar with yoghurt and were willing to participate, the panelist were recruited at Federal Polytechnic Bauchi. Briefing regarding the evaluation was given at the beginning of the session. Each panelist was assigned a number for identification purposes and he/she was responsible to evaluate two different samples. Samples were coded using a 3-digit random number and served successively. Panelists were asked to fill out a score sheet for each yoghurt sample they evaluated in term of taste, mouth feel, aroma and overall acceptability. Each sample attribute was rated using a nine-point Hedonic Scale. The nine points on the Hedonic Scale were: dislike extremely = 1, dislike very much = 2, dislike moderately = 3, dislike slightly = 4, neither like nor dislike = 5, like slightly = 6, like moderately = 7, like very much = 8 and like extremely = 9. The average and mean values of scores for each of attributes was computed and analyzed statistically.

2.5 Statistical Analysis

The sensory analysis of the yoghurt samples was statistically evaluated using paired t-test.

3. RESULT AND DISCUSSIONS

The sensory assessment has judged by twenty (20) panelists was presented in table 3. The sensory attribute of the yoghurt is a combination of the flavor, colour (appearance), taste and texture (the mouth feel).The scores for flavour, texture, colour, taste, and overall acceptability of yogurt produce from *B.linens* as starter culture was significantly ($P < 0.05$) lower than those produced from common starter culture. The low organoleptic properties of *B.linens* yogurt was attributed to many factors such as; high quantity of whey and fat hydrolysis during fermentation Gran *et al*., (1990). These made it to play a key role in cheese ripening and development of color pigment Arif *et al*.; (2006). This observation was in agreements with finding of Igwegbe *et al*., (2015). The appearance of the yoghurt is a combination of the colour and visual separation of the whey.

Table 3: Organoleptic properties of Yoghurt produced from *B. linens* and common Starter culture

Parameter	BLY	CSCY
Taste	5.06± 0.01	7.00 0.02
Flavor	6.30±0.02	7.14±0.01
Color	6.50± 0.04	7.50± 0.01
Texture	6.20 ± 0.01	7.66 ±0.04
Overall acceptability	6.01 ± 0.02	7.50 ±0.02

Means obtained from triplicate determinations ($p<0.05$)

Key:
BLY: *Bevibacteriumlinens* yoghurt
CSCY: Common starter culture yoghurt

4. CONCLUSION

The result of this work revealed that the yoghurt produced from standard starter culture ingredient (*L. bulgaricus and S.thermophilus*) generally accepted by panelists than yoghurt produced *B. linens*

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