



NIGERIAN SOCIETY FOR ANIMAL PRODUCTION



Proceedings of

33rd
Annual



Conference

(NSAP - OGUN 2008)

THEME:

**ANIMAL AGRICULTURE
TOWARDS MILLENNIUM
DEVELOPMENT IN NIGERIA**

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PROCEEDING 33RD ANNUAL CONFERENCE

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ISBN 1596-5570

The proceeding of the annual conference of the Nigerian Society for Animal Production presents papers on research works relevant to animal production Views expressed in the Proceedings are not necessarily those of the NSAP or the host institution.

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Proceedings Produced by: Department of Animal Production Olabisi Onabanjo University, Ogun State

Compugraphy and Layout by: Dare Adenuga Production (08062451858)

Printed by Unique Concept (08033928540)

Cover Design by: Olajide A. Adeyemi, Ph.D

Copies of the Proceedings may be purchased or ordered from the National Secretariat, Nigerian Society for Animal Production (NSAP), National Animal Production Research Institute (NAPRI), Ahmadu Bello University, Shika - Zaria, Kaduna State, Nigeria.

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EFFECTS OF VARYING LEVEL OF LEMON JUICE ON THE PALATABILITY AND SHELF STABILITY OF QUESO BLANCO CHEESE

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Summary

The effects of varying concentration of Lemon juice on the preparation of Queso Blanco Cheese (QBC) and on its palatability and microbiological composition was investigated. The QBC was manufactured from raw and morning milk adjusted to 3.0% fat. Completely randomized design was used for the study. Varying levels of lemon juice (2.5%, 3.0% and 3.5%) were used per treatment. Organoleptic evaluation of prepared cheese was carried out using a five point hedonic scale for quality traits for the colour, taste, smell, texture and overall acceptability of the cheese revealed that QBC made with 2.5% lemon juice was rated highest (4.9 ± 0.32) for overall acceptability and for all parameters tested for on day one. Cheese prepared with 3.5% lemon juice recorded the lowest plate count for all the days. In conclusion Cheese prepared with 2.5% lemon juice was more acceptable, however, the plate count was highest for all the days for this treatment.

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Introduction

Milk is a food of outstanding interest which is designed by nature to be a complete food for every young mammal (Allan 1991). Its interesting and complex colloidal nutritive properties has been converted into cheese primarily to preserve its qualities using natural acidifying action of undefined lactic bacteria (Kemeni, Mbanya and Mendi 1994). The average annual consumption of dairy products in sub-saharan Africa is about 27kg ranging from 58kg in the eastern sub region to around 1kg in the central sub region. However, in sub-sahara Africa where surplus milk is sometimes available for processing into cheese, highly efficient techniques for cheese making have been timidly applied (IDRC 1984). Attempts to develop or introduce cheese making in this part of the continent had been initiated with encouraging results (Ogundiwin and Oke 1983; Boor et al 1987; Faist et al 1987). Demand for dairy products in this area continues to increase with the overall growth rate in the consumption of milk and milk products being estimated at about 2.1% per annum (O'Connor 1993). Queso Blanco (white) cheese is a form of technology transfer in Africa, though not common but presently common in Ethiopia and Sudan (O'Mahony and Peters 1987). It is produced from raw milk containing about 3% fat and is precipitated by an organic acid usually in the form of lemon juice and pressed. Queso Blanco is a pressed cheese (it contains less moisture than unpressed cheese) and therefore has a longer stability than soft curd cheese. This can be kept for at least 3 to 4 weeks at room temperature (17 to 22°C). The addition of some selected micro-organisms for their ability to serve as starter cultures for the production of Wara, a West African soft cheese (Sanni et al 1999) proved useful in improving cheese quality. This really called for varying quantity of lemon juice used for preservation of shelf life of this type of cheese so as to improve the possible means of standardizing the properties of these cheeses. This work evaluates the effects of varying level of lemon juice on the

palatability and stability of QBC.

Materials and methods

Fresh whole milk from a herd of white Fulani dairy cows was obtained from Gaa Apará (Oyo) following the sanitary procedures to reduce the initial microbial load and prevention of faecal contamination is the milk. An average of 15 litres of milk was collected from 24 animals at each time of milking. Milk was filtered through mucilin cheese cloth to remove the extraneous materials like hairs and other contaminants and transported with ice cubes in a sealed container to the microbiology laboratory of the Department of Animal Science in the University of Ibadan.

The milk was allowed to stand for one hour and the top layer was skimmed off so as to reduce the fat content of the milk to about three percent. The milk was heated to 85°C to further destroy the bacteria present and also to increase yield through precipitation of the whey proteins. The boiled milk was thoroughly stirred and 100ml of diluted lemon juice (equal mixture of lemon juice and water) was carefully portioned into 2.5%, 3.0% and 3.5% and added to the heated milk (5 litres per treatment) in the experiment respectively.

The milk curdled almost immediately and the stirring continued for about three minutes (3mins) the resulting curdled mixture was allowed to settle for 15 minutes followed by separating it from whey by draining through a sieve or mucillin cheese cloth. As the draining of the whey continued, the curdled mixture was carefully stirred to prevent it from matting. The prepared white cheese was portioned into two equal replicates for observation. The curd was then transferred to the curd mould (container) lined with cheese cloth and covered by folding over the cheese cloth. A 15kg weight was placed on each to exert pressure and was left overnight to remove

whatever moisture was left for the final product to be observed. An organoleptic evaluation of the cheese prepared was carried out using a 5 point hedonic scale for quality traits such as: Colour, Taste, Smell, Texture and Overall acceptability. To achieve this, a group of students were asked to evaluate the cheese.

Microbiology

Pour plate technique was used for the microbiological examination of the various samples as described by (Adegoke 2000). 1g of each sample of cheese was blended in 1ml of 2% sterile sodium citrate solution in order to prepare a suspension and then used for serial dilution of between 10^{-1} to 10^{-6} . 1.0ml of diluted sample was placed in sterile disposable petri dishes (sterilin) in duplicates. At 45°C the various media were poured into samples in petri dishes and allowed to set invertedly and incubated. Matured cheese were cultured and analysed after three days with respect to analysis of total colony counts (TCC), Streptococci counts, Staphylococci counts, Lactobacillus count (Masth 1978) on poured plates and general identification of these organism on different ajar media such as pour plate agar, Nutrient agar and Mac Conkey agar.

Experimental design

Completely randomised block design was used in the experiment of which three treatments were considered at varying levels lemon juice in the cheese (cheese 2.5%, 3.0% and 3.5%). Each treatment was replicated three times and five parameters were observed; Colour, Taste, Smell, Texture and Overall acceptability. The panelist consisted of Male and female students from the department conversant with cheese consumption. The cheese was manufactured according to the procedure of the Traditional Cheese Making (O'Connor 1993). (15litres) milk was used in each experiment.

Taste panel analysis

A taste panel of 10 (male and female students) selected for their past habit of consuming cheese were used to assess the organoleptic quality of the cheese. A vocabulary to evaluate the features of the product was developed using the continuous marking scheme of (Power 1984). A total of 30 numbers of observation were collated from them followed by scoring according to the panel rating test which state:

Dislike a lot 1, Dislike a little 2, Neither like nor dislike 3, Like a little 4, Like a lot 5

The panelist were presented with the experimental samples identified by coded letters. They were asked to mark the position of a sample on each boxes which corresponded to its score. The feature under assessment were Colour, Taste, Smell, Texture and overall acceptability. The controls were also presented.

Statistical analysis

For statistical analysis the procedure of the SAS (Statistical Analysis System of the SAS Institute of North Carolina, U.S.A., (2001) was used. Means separation was done by the Duncan Multiple Range Test method to separate means for significant differences and finally correlation of the treatments and days.

Results and Discussions

Table 1 gives the means or standard deviation values of all parameters. Cheese with the brightest colour when compared with the other two treatments at day 1, this did not significantly differ from cheese from 3.5% lemon juice.

Table 1

Effects of varying levels of lemon juice on the organoleptic properties of queso blanco cheeses

Parameters Evaluated	Days	Cheese/ 2.5%	Cheese/ 3.0%	Cheese/ 3.5%
Colour	1	4.90±0.32 ^a	4.20±0.42 ^b	4.80±0.63 ^a
	2	4.50±0.53 ^a	3.90±0.32 ^b	4.60±0.52 ^a
	3	4.10±0.57 ^a	4.20±0.63 ^{ab}	4.70±0.48 ^a
Taste	1	4.90±0.32 ^a	4.20±0.32 ^b	4.80±0.63 ^b
	2	4.40±0.52 ^a	4.10±0.32 ^{ab}	3.90±0.57 ^b
	3	4.10±0.57 ^a	3.70±0.48 ^a	3.60±0.52 ^a
Smell	1	4.90±0.32 ^a	3.80±0.42 ^b	3.70±0.67 ^b
	2	4.40±0.52 ^a	3.60±0.52 ^b	3.60±0.52 ^b
	3	4.10±0.57 ^a	3.10±0.57 ^b	3.70±0.48 ^a
Texture	1	4.90±0.32 ^a	3.60±0.52 ^c	3.20±0.42 ^b
	2	4.40±0.52 ^a	3.80±0.42	3.60±0.52 ^b
	3	4.10±0.57 ^a	3.20±0.42 ^a	4.00±0.00 ^a
O. Accept.	1	4.90±0.32 ^a	3.60±0.52 ^c	4.00±0.00 ^b
	2	4.40±0.52 ^a	3.80±0.42 ^b	4.00±0.00 ^b
	3	4.10±0.57 ^a	3.30±0.48 ^a	4.10±0.32 ^b

Means on the same row with different superscripts are significantly ($P<0.05$) different.

Means of replicate determination with standard deviation.

The table above shows the means and standard deviation values of each parameters and the cheese treated with 2.5% Lemon juice produced cheese with relatively brighter colour, taste, smell, texture and overall acceptability for day 1 and day 3 observation than similar cheese produced from 3.0% lemon juice for the corresponding days. So also the day 2 observations were significantly higher ($P<0.05$) in 2.5% lemon juice cheese in taste, smell, texture and overall acceptability but insignificant ($P>0.05$) in colour.

The comparison of the three varying levels of lemon juice inclusion, revealed that 2.5% had highest value significantly which differed to ($P<0.05$) to 3.5% inclusion while the least of them is 3.0% ($P>0.05$) inclusion. This is in agreement with the work of (O'Connor 1993) who recommend 3.0% inclusion. This could be due to production of lactic acid which is involved in the fermentation of press cheese QBC while other unripped and cream cheese has difference starter culture.

Table 2. Effects on microbiological contents

First Day Microorganism Evaluated	2.5%	3.0%	3.5%
1 st Total Count	198 x 10 ³	174 x 10 ³	163 x 10 ³
2 nd Total Count	169 x 10 ⁴	141 x 10 ⁴	163 x 10 ⁴
Second Day			
1 st T. Count	196 x 10 ³	185 x 10 ³	168 x 10 ³
2 nd T. Count	175 x 10 ⁴	156 x 10 ⁴	149 x 10 ³
3 rd Day			
1 st T. Count	189 x 10 ³	166 x 10 ³	172 x 10 ³
2 nd T. Count	187 x 10 ⁴	169 x 10 ⁴	166 x 10 ⁴

Table Plate Count of Queso Blanco cheese made with varying levels of lemon juice.

The mean total colony plate count were taken for three days with the counting listed above in the table. The numbers of various microorganisms (Total Colony Count (TCC) in these cheese were relatively higher for 2.5% than 3.0% while 3.5% has the least for first counting for first day, second and third days while second counting revealed highest number of microbes for 2.5% and third day counting also followed the same trend for total colony counts. The specific types of microorganisms species present count not be identified due to limited time this experiment was conducted, but most likely major microorganism encountered in traditional cheese is lactobacilli (Poznanski et al 2004) and the gerobic spore forming bacteria some times found in cheese came from raw milk and pasteurization would likely not cause any reduction in their numbers (Saubois et al 1991). These various groups of micro-organisms identified are part of those generally encountered in raw milk cheese (Badis et al 2003).

Conclusion

In the present work, it was based on the production of Queso-Blanco (White Cheese) with the use of lemon juice as coagulant and preservatives. This was used at varying levels of 2.5%, 3.0% and 3.5% which was characterise by significant changes in colour, taste, smell, texture and overall acceptability of this cheese. The heat treatment of 85°C destroyed most of some spoiling micro-organisms and probably other undesirable pathogenic organisms of raw milk and this improved the shelf stability of the cheese.

References

- Adegoke, G. O. (2000). Understanding Food Microbiology. Shalom Prints, Ibadan.
- Allan, G.C and Brian A. F. (1991). Food Science Chemical approach 4th edition
- Badis A, Guetarni D, Moussa Baoudjema B, Henni D. E. Tornadijo M. E and M Kihal (2003) identification of cultivable lactue acid bacteria isolated from Algerian raw goat's Milk and evaluation of their technological properties. Foot Microbiology, Volume 21 (3) 343-349
- Faist B. Charislonnet P and Nibogora J. (1987). Technologie fromagere artisanales en zone tropical: Resultats techniques d'une fruitiere en milieu rural au Burundi, Revue d'levage et Medecine Veterinaire des pays Tropicaux, Volume 40 (2) 191-197
- International Development Research Center (IDRC) (1984). The Potential for small scale milk production in Eastern and Southern Africa. Ottawa Canada. IDRC MR 98E
- Karneni A, Mbanya N. J and Robinson R.K (1994). A Study of the Manufacture and Characteristic of Bafut, a local cheese produced at a convent in Cameroon; Dairy Industry International, Volume 59 (6) 27, 29.
- Marth E. H. (1978). Standard Methods for the examination of dairy products 14th edition American Public Health Association, Washington D.C.
- O'Connor C. B. and B. R (1993). Milk processing techniques Sour milk. Audiotutorial Module 2. ILCA (International Livestock Centre for Africa), Addis Ababa, Ethiopia 20pp.
- Ogundiwin J. O. and Oke L. O. (1983). Factors affecting the processing of Wara A Nigerian White Cheese Food Chemistry, Volume 11, 2 (1) 1-13.
- O'Mahony F and Peters J. (1987). Sub-Saharan Africa Options for Smellholder milk processing. World Animal Review Volume 62: 16-30
- Powers J. J. (1984). Current practices and Application of Descriptive methods: In Sensory Analysis of Food. Editor J. R. Piggot, Elsevier Applied Science Publisher, London.
- Poznanski E, Cavazza G. A. Cappa F and Cocconcelli P. (2004). Indigenous Milk Microbiota Influences the bacterial development in traditional cheese from an alpine natural park. International Journal of food microbiology, Volume 92 (2) 141-151.
- Saubias A, Basilico J. C and Simonetta A. (1991). Calidad microbiologica de leche cruda III and incidencia de bacterias esporuladas aerobias y anaerobias, levaduras, Hongos, Revista Argentina de lactologia, Ano 3 (5) 79-90
- Sanni A. I. Onilude A. A and Monoh M. O. (1999). Selection of starter and a starter mediated novel procedure for production of Wara, a West African Soft Cheese, International Journal of Food Technology, Volume 34: 325-333
- SAS Institute Inc (1985). User's guide: Basis, Version