Short Communication

Isolation of antimicrobial producing lactobacilli from akamu (a Nigerian fermented cereal gruel)

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Four samples of akamu were evaluated for the presence of antimicrobial producing lactobacilli. Thirty (30) lactobacilli were isolated from these samples. They inhibited the growth of *Staphylococcus aureus* and *Escherichia coli*, four of these isolated lactobacilli were chosen and when evaluated by agar well diffusion test, they inhibited the growth of the selected indicator organisms. The spectra of activity were evaluated against five different organisms. The highest activity was against *Proteus mirabilis* and the least against *Salmonella* sp.

Keywords: Bacteriocin, Lactobacilli, akamu, inhibition.

INTRODUCTION

In fermented foods, lactic acid bacteria have a long history of application because of their beneficial effects on nutritional, shelf-life and organoleptic characteristics of food. They cause acidification of the food through the production of organic acids, mainly lactic acid (Blandino et al., 2003; Omenu, 2011). The organic acids, bacteriocins, aroma compounds and several enzymes production are highly important (DeVuyst and Frederic, 2007; Afolabi et al., 2008). A food fermentation process with lactic acid bacteria is traditionally based on spontaneous fermentation. Lactobacilli exert strong antagonistic effects against many microorganisms, including food spoilage organisms and pathogens (Hartnett et al., 2002). They contribute to the preservation of foods by producing antimicrobial agents like bacteriocins which are considered as natural food preservatives (De Vuyst and Frederic, 2007; Cigden and Abamuslum, 2009; Asmahan and Muna, 2009). In akamu, lactic acid bacteria occur in large number and they confer qualities like extended shelf life, aroma and make the product safe for consumption.

Akamu is a lactic acid fermented gruel or porridge traditionally made from maize, millet and sorghum. It contributes substantially to the daily diet of both rural and urban communities especially as a weaning food for children (Adams, 1998) and food for invalids because it is light and digests easily (Afolayan et al., 2010). It is locally prepared on small scale in homes or for commercial purposes, and its quality may depend on the skills of the producers as inherited over the years (Chelule et al., 2010). The fermentation of akamu is spontaneous and mostly uncontrolled leading to products of variable quality. Akamu could be fortified with sugar, milk or chocolate to improve taste or sooth the sour taste. This study focused on the isolation of antimicrobial producing lactobacilli from akamu.

MATERIALS AND METHODS

Isolation of lactic acid bacteria (LAB)

Fresh ready to sell akamu was bought from a local market in Nsukka. 10 ml of the sample was added to 90 ml of normal saline to make the initial dilution. This suspension was homogenized by
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The lactic acid bacteria occurred in high frequency in the sample about 100 to 200 colonies per plate.

Identification of organisms

The isolated organisms were identified as *Lactobacillus acidophilus*, *Lactobacillus delbrueckii*, *Lactobacillus lactis* and *Lactobacillus sp.* using conventional microbiological methods according to Hammes and Hertel (2006) and Bergey’s manual of systematic bacteriology (Table 1).

**RESULTS AND DISCUSSION**

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**Agar well diffusion test**

The selected *Lactobacillus* strains produced bacteriocin which showed inhibitory activity against the selected organisms. The bacteriocin had different profile of inhibition on the organisms. The least spectrum of inhibition was shown by bacteriocin produced by *Lactobacillus lactis* and the least spectrum of inhibition was shown by that of *L. acidophilus*. The highest activity was shown against *Proteus* and the least against *Salmonella typhi* (Figures 1, 2, 3 and 4).

**Conclusion**

This research showed that antimicrobial producing...
Figure 1. Agar well diffusion test for bacteriocin produced by Lactobacillus acidophillus.

Figure 2. Agar well diffusion test for bacteriocin produced by Lactobacillus delbrueckii.

Figure 3. Agar well diffusion test for bacteriocin produced by Lactobacillus lactis.

Figure 4. Agar well diffusion test for bacteriocin produced by Lactobacillus sp.

Lactobacilli can be isolated from akamu. The agar well diffusion test further confirmed the inhibitory and antagonistic effects of these lactobacilli on pathogens and food spoilage organisms. The antagonistic effect is shown through the production of antimicrobial substances, e.g. bacteriocin.

REFERENCES


