

## The Amylolytic Properties of Probiotic Lactic Acid Bacteria (ALAB) and Their Application in the Development of a Sorghum Based, High Energy Foods Suitable for Young Children

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### Abstract

Poor food practices such as low dense foods given to young children, and malnutrition are still a public health problem in developing countries, South Africa inclusive, since the commercial weaning foods may not be quite affordable to everyone. The aim of this study was to establish the alpha-amylase production by selected probiotic, lactic acid bacteria (ALAB) which could be used to develop a sorghum based high energy food product with functional, probiotic properties. The two LAB have already been isolated from home-based ting (fermented sorghum), identified and their probiotic properties have been established. The microbial counts and pH levels of the identified ALAB when added to the sorghum gruels was assessed. The inhibitory activity of the two *Lactobacillus* strains against bathogenic bacteria (*Salmonella typhimurium* ATCC 14028, *Escherichia coli* ATCC 8739 and *Staphylococcus aureus* ATCC 65838) was also assayed. The results showed that *Lb. helveticus* D7 and *Lb. amylolyticus* D12 were positive for amylase production and the presence of the amylase gene was confirmed. Moreover, at 37 °C, determination of the alpha amylase enzyme activity by *Lb. helveticus* D7 and *Lb. amylolyticus* D12 was found to be 1.37 mg/mL and 1.28 mg/mL of reducing sugar (maltose), respectively. The two tested *Lactobacillus* strains, *Lb. helveticus* D7 and *Lb. amylolyticus* D12 were able to decrease the viscosity of the sorghum gruels from 2854 to 940 cP, producing a semi-liquid fermented gruel presenting the necessary characteristics to fulfil the energy requirement of young children. The two ALAB were able to decrease the pH of the gruels to the acceptable level of less than 4 and produced high amount of lactic acid after 24 hours. They were also able to completely inhibit the growth of pathogens after 24 hours of fermentation. It could therefore be concluded that this study was able to show that the two LAB with probiotic properties and high amylase activity could be used to create a high energy, functional (probiotic) high dense cereal based gruels that could be given to young children. This could thereby contribute towards the alleviation of malnutrition amongst young South African children.