SUMMARY

Pulses, a *Leguminosae* family are rich with carbohydrates, protein components including more of fibers, vitamins, minerals, fatty acids and phytochemicals. Pulses contribute in treating several health associated diseases, but the main drawback limiting their consumption is presence of high galactosides.

Humans lack in producing this α- galactosidase enzyme. Therefore, to overcome and enhance nutritional value of food; using bacteria producing enzyme will help in degrading this oligosaccharide by fermentation using lactobacilli.

This study was undertaken for developing fermented pulse-based food product using single isolate. Hence, flour of pulse split beans was source for isolating lactobacilli to maintain their functionality, growth characteristics and activity during food processing. These lactobacilli act as a carrier in pulses and serves food of high calorie, improved functionality and sensory qualities.

Using flour fermentation, total of four isolates were obtained. Further, growth kinetics of species was investigated using Gompertz equation to describe behavior of growth in organism following the exponential law. Lag phase was clearly observed for three hours after which the bacteria started to grow exponentially for all the species. This might be due to low initial bacterial count that caused increase in lag phase of bacterial growth. The main factor influencing the growth during lag phase is the inoculum size and the change in the physiological environment of original and new growth medium. Also, maximum production of lactic acid in this experiment was obtained by U1.

As per the carbohydrate composition of pulse seed, mono- di-saccharides such as sucrose (1-3%) are slightly higher in amount. The concentration of sucrose varies among species in pulses, reportedly up to 7 % in some varieties. Based on the composition of carbohydrate in pulse seeds, sucrose, sucrose + starch, raffinose and raffinose + starch grew well in m-MRS

medium.

Screening of isolates and standard strain for production of α-gal activity showed TIP1 as the highest enzyme producer compared to other isolates. This enzyme showed good temperature stability, while loss in activity was observed at higher temperature. With different carbon source raffinose expressed strongest induction, followed by starch, starch + raffinose, sucrose and sucrose + raffinose. Another time course experiment on TIP1 revealed that raffinose decreases to a non detectable level in the medium.

TIP1 isolate was successfully able to grow and utilize non-digestible oligosaccharide from pulses. This confirmation was done by thin-layer chromatography, hydrolysis of raffinose and sucrose was observed in treated sample than in control sample indicating the reduction in NDO.

Also, in this study, simplest medium prepared using pulses, YE and manganese sulphate as a carbon, nitrogen and mineral source, were used for high production of LA. However, TIP1 expressed maximum production of acid and no acetic acid was not detected in samples at 24 h.

This work also focuses on anti-nutritional factors on beans processing treatment showed significant effect on nutritional quality with effective anti-nutrients reduction. Hence, use of combined food processing technologies and fermentation can be used to overcome problem of anti-nutritional factors in beans. Fermentation resulted in decline of tannin and saponin content for all fermentation batches.