# ABSTRACT

Pulses are an excellent source of carbohydrates and other nutrients. Many traditional fermented foods are prepared from cereals and combinations of cereals and pulses that usually contain LAB, *Bacillus, Enterococcus* and yeast. Lactobacilli can be used as a starter culture for such fermentation using pulses, as very few reports are available on fermented pulse-based products. Hence, pulses dal flour was used as a source for isolation of lactobacilli to maintain their functionality, growth characteristics and activity during food processing. In this study, we investigated the potential of lactobacilli from fermented pulses in reducing carbohydrates, ability to degrade non-digestible oligosaccharides, production of α-galactosidase enzyme, optimizing production of lactic acid and change in anti-nutritional factors.

Lactobacilli isolated from different pulse dal flour, exhibited excellent growth during fermentation in MRS-glucose medium. The nature of growth curve for these strains in MRS-glucose medium was described using a modified Gompertz equation and showed shortest latency phase in MRS-glucose medium. All the lactobacilli performed very well in terms of survival efficiency in modified-MRS containing sucrose, sucrose + starch, raffinose, raffinose + starch based mediums. Among studied species only *Levilactobacillus* (*Lev.*) *brevis* displayed the highest α-galactosidase activity (1.24 U/ml), where raffinose was added as the sole carbohydrate source in the medium. The isolate was further tested in bean fermentation, where it showed maximum activity (1.86 U/ml) and complete hydrolysis of non-digestible oligosaccharides was observed. Further, screening for maximum lactic acid production was carried out using a simple synthetic medium consisting of pulses, yeast extract, and manganese sulphate as a carbon, nitrogen and mineral source, respectively. The maximum lactic acid obtained was 6.30 (g/l) in optimized pigeon pea fermentation; while, acetic acid was not detected at 24 h in any samples.

Finally, effect of lactobacilli on anti-nutritional factors was determined in pulses bean fermentation. This research showed that lactobacilli were able to ferment soaked red lentil, black gram, faba beans, pigeon pea beans and lower the tannin and saponin content significantly. Fermentation lowered these anti-nutrients better when inoculated with *Lactiplantibacillus* (*Lpb.*) *plantarum* M1, *Lactiplantibacillus* (*Lpb.*) *pentosus* U1, *Lpb. plantarum* VIP1 and *Lev. brevis* TIP1 cultures. Overall, usage of *Lactobacilli* could be an excellent opportunity to design and develop a novel pulse-based fermented product contributing to beneficial bioactive compounds and improve properties of food.