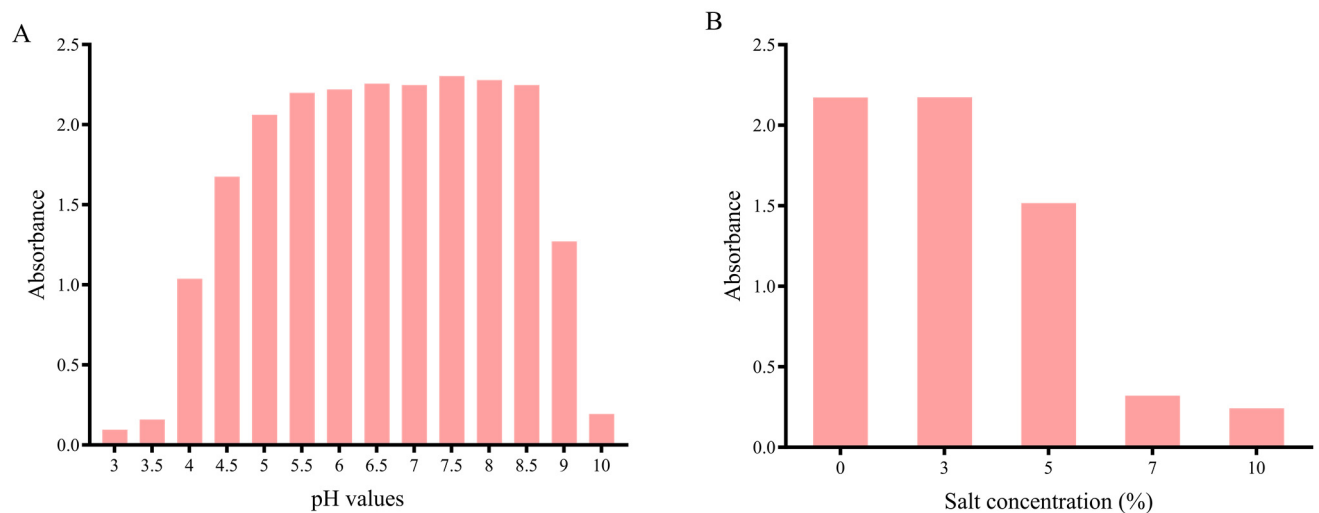


The growth of *L. plantarum* A50 exhibited variations at various pH levels, as illustrated in Supplementary figure 1A. Specifically, *L. plantarum* A50 failed to thrive at pH 3, 3.5, and 10, while it demonstrated normal growth at pH 4 and 9, and robust growth at pH 4-5-8.5. Moreover, the growth profile of *L. plantarum* A50 in response to different salt concentrations is depicted in Supplementary figure 2B. It displayed favorable growth up to a 5% salt concentration and showed no growth when the salt concentration exceeded 5%.



Supplementary Figure S1 The ability of *L. plantarum* A50 to withstand acidity and alkalinity (A) as well as salt tolerance(B).

Supplementary table 1 displays the available carbohydrates for *L. plantarum* A50. *L. plantarum* A50 demonstrates positive utilization capacity towards LARA, RIB, GAL, GLU, FRU, MNE, MAN, SOB, MDM, NAG, AMY, ARB, SAL, CEL, MAL, LAC, MEL, SAC, TRE, MLZ, RAF, GEN, TUR, and TAG. In addition, it showed weakly positive utilization of GNT and 2KG.

Supplementary Table S1 The carbohydrate fermentation characteristics of *L. plantarum* A50

| Number | Substrate | Utilizing capacity | Number | Substrate | Utilizing capacity |
|--------|-----------|--------------------|--------|-----------|--------------------|
| 0 | 0 | - | 25 | ESC | - |
| 1 | GLY | - | 26 | SAL | + |
| 2 | ERY | - | 27 | CEL | + |
| 3 | DARA | - | 28 | MAL | + |
| 4 | LARA | + | 29 | LAC | + |
| 5 | RIB | + | 30 | MEL | + |
| 6 | DXYL | - | 31 | SAC | + |
| 7 | LXYL | - | 32 | TRE | + |
| 8 | ADO | - | 33 | INU | - |
| 9 | MDX | - | 34 | MLZ | + |
| 10 | GAL | + | 35 | RAF | + |
| 11 | GLU | + | 36 | AMD | - |
| 12 | FRU | + | 37 | GLYG | - |

| | | | | | |
|----|-----|---|----|------|---|
| 13 | MNE | + | 38 | XLT | - |
| 14 | SBE | - | 39 | GEN | + |
| 15 | RHA | - | 40 | TUR | + |
| 16 | DUL | - | 41 | LYX | - |
| 17 | INO | - | 42 | TAG | + |
| 18 | MAN | + | 43 | DFUC | - |
| 19 | SOB | + | 44 | LFUC | - |
| 20 | MDM | + | 45 | DARL | - |
| 21 | MDG | - | 46 | LARL | - |
| 22 | NAG | + | 47 | GNT | w |
| 23 | AMY | + | 48 | 2KG | w |
| 24 | ARB | + | 49 | 5KG | - |

GLY, Glycerol; ERY Erythritol; DARA, D-Arabinose; LARA, L-Arabinose; RIB, D-Ribose; DXYL, D-Xylose; LXYL, L-xylose; ADO, D-Adonitol; MDX, Methyl- β -D-xylopyranoside; GAL, D-Galactose; GLU, D-Glucose; FRU, D-Fructose; MNE, D-Mannitol; SBE, L-Sorbose; RHA, L-Rhamnose; DUL, Dulcitol; INO, Inositol; MAN, Mannitol; SOB, Sorbitol; MDM, Methyl-alpha-D-mannopyranoside; MDG, Methyl-alpha-D-glucopyranoside; NAG, N-Acetyl Glucosamine; AMY, Amygdalin; ARB, Arbutin; ESC, Esculin; SAL, Salicin; CEL, D-Cellobiose; MAL, D-Maltose; LAC, D-Lactose; MEL, D-Melibiose; SAC, D-Sucrose; TRE, D-(+)-Trehalose; INU, Inulin; MLZ, D-melezitose; RAF, D-(+)-Raffinose; AMD, Amylum; GLYG, Glycogen; XLT, Xylitol; GEN, D-Gentiobiose; TUR, D-Tulose; LYX, D(-)-lyxose; TAG, D-Tagatose; DFUC, D-Fucose; LFUC, L-Fucose; DARL, D-Arabinitol; LARL, L-Arabinol; GNT, Potassium gluconate; 2KG, Potassium 2-ketogluconate; 5KG, Potassium 5-ketogluconate.

+, positive; -, negative; w, weakly positive.