



جامعة الإمارات العربية المتحدة  
United Arab Emirates University

The College of Graduate Studies and the College of Food and Agriculture

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**Master Thesis Defense**

Entitled

*PROBIOTIC CHARACTERIZATION OF LACTIC ACID BACTERIA (LAB) ISOLATED FROM DRIED EMIRATI FISH AND THE HEALTH PROMOTING BENEFITS OF FERMENTED FISH SAUSAGES BY SELECTED ISOLATES*

by

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Date & Venue

8:00 AM

Wednesday, 18 April 2018

Room 043, Building F3

Abstract

Probiotics have great positive impacts on human health. Therefore, finding new probiotics possess novel probiotic characteristics would be greatly appreciated by medical, scientific and food industrial societies. This study aimed to isolate lactic acid bacteria (LAB) from traditionally dried fishes, characterise their probiotic features (gastric and intestinal tolerances, bile tolerance, cholesterol removal, antibiotic susceptibility, antimicrobial activities, attachment capabilities, EPS production, and non-hemolysis) and investigate their potential health-promoting benefits *in-vitro* ( $\alpha$ -amylase and  $\alpha$ -glucosidase inhibitions, antihypertensive, antioxidant and proteolytic activities). The reduction in LAB populations ranged from 0.5-5.2  $\log_{10}$  CFU/ml during 2 h of incubation. The 85 isolates were more vulnerable toward taurocholic acids compared with oxgall and cholic. Out of 85 isolates, 29 isolates showing the considerable tolerances to gastrointestinal conditions and bile salts. Out of 29 isolates, 13 isolates had remarkable tolerances and were selected for additional characterization as potential probiotic properties. The cholesterol removal ranged from 6.5% to 59.1% during 24 h of incubation. All evaluated *Enterococcus spp.* exhibited no clear-halos which expressed as no hemolysis (gamma-hemolysis). All isolates were more susceptible to penicillin and ampicillin compared to other antibiotics. The 13 *Enterococcus spp.* demonstrated a good percentage of autoaggregation ranging from 8.2 - 21.3 % and 29 - 67% throughout 3h and 24h of incubation, respectively. The following 6 strains were selected to prepare functional fermented fish sausages: *E. faecium* MF047470, *E. faecium* MF047495, *E. faecium* MF047509, and *E. faecium* KY962874, *E. faecalis* KY962905, and *E. durans* KY962882. The amylase and glucosidase inhibition in fish sausages fermented by *Enterococcus spp.* extended from 29.2% to 68.7% and from 23.9% to 41.4%, respectively, during 21 days of storage. The DH%, DPPH%, ABTS%, amylase and glucosidase inhibitions had a positive correlation.

**Keywords:** *Enterococcus*; probiotic; fish sausage; antihypertensive; lactic acid bacteria.