Fayoum University Faculty of Agriculture

ANTIBACTERIAL ACTIVITIES OF SOME PROBIOTIC ISOLATES AGAINST *HELICOBACTER PYLORI* AND THEIR APPLICATIONS IN SOME FUNCTIONAL DAIRY PRODUCTS

By

Nesreen Mohammed Nasr Mahmoud

B.Sc. Agric. Sci. (Dairy Sci.), Fac. Agric., Cairo Univ., Fayoum Branch (2004)
M.Sc. Agric. Sci. (Dairy Sci.), Fac. Agric., Fayoum Univ. (2012)

Thesis

Submitted in Partial Fulfillment of the Requirements for the Degree of

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ABSTRACT

Probiotics has number of benefits on gastrointestinal diseases where it used as a preventive approach to maintain the balance and stabilization of intestinal microflora through preventing colonization of pathogenic bacteria such as *Helicobacter pylori* (*H. pylori)*. Infection by *H. pylori* is the most common one worldwide and it is associated with peptic ulcer diseases. Most of duodenal ulcers (90%) and gastric ulcers (70%) are associated with *H. pylori* infections. In this study, eight isolates of lactic acid bacteria (LAB) were examined; all of them gives antibacterial activity against *H. pylori*. The most effective and promising isolates were *Lactobacillus casei* HQ177095 and *Lactobacillus paracasei* HQ177096.1; both isolates were selected and examined for some probiotic properties. The results of acid and bile salt tolerance showed a survival of both isolates with a significant ($p<0.001$) resistant for *L. paracasei* more than *L. casei*, as it was higher viability than the later. On the other hand, as the bile salt concentrations, increased the viability were decreased for both strains. The viability of *L. casei* and *L. paracasei* and mix of them (1:1) was tested under different technical conditions such as different levels of milk fat, sugar, salt and oats (as a prebiotic agent). Results showed that the viability of the mixed starter was higher than each of single strain. Starter's viability didn't affected significantly by salt at level of 1%, sugar at 5 - 10% and milk fat till 4%, while the viability was significantly increased as level of oats increased till 4%.

Moreover, both strains were tested for in vivo (animal model). The histological features of gastritis and the presence of *H. pylori* were also examined. The gastric mucosa sections showed that rats which treated with *L. casei* HQ177095 or *L. paracasei* HQ177096.1 daily for a week before infection by *H. pylori*, then infected rats treated with the same isolates for more 6 weeks (Group 3 and 5, respectively); and rats

infected first by *H. pylori* and after 4 weeks of infection treated with *L. casei* HQ177095 for 6 weeks (Group 4) showed negative *H. Pylori* colonization as control negative group (Group 1).

Also, the study included making some functional dairy products for enhancing human health such as Labneh, fermented milk drink and peach sweetened fermented milk drink. All products were fermented using mixed starter of *L. casei* HQ177095 and *L. paracasei* HQ177096.1 (1:1) and supplemented with oats at ratios of 1 and 2%. Samples of labneh and fermented drinks were stored at 5±1°C for 35 and 21 days, respectively. Microbiological, chemical, physical, organoleptic properties and nutritional value were carried out during storage period. Results indicated that there were slight changes in some chemical composition of all products during storage, while changes in lactose content, pH values and titratable acidity were significant. Also, the microbiological examination indicated that treatments of all products significantly affected the viability of LAB, total viable counts, fungi and psychrophilic bacteria during storage. Regarding to organoleptic properties for all products, it was noticed that labneh, fermented milk drinks and fermented peach drinks which supplemented with oats had the higher total scores than controls. Moreover, fermented drinks supplemented with oats (2%) showed better physical characteristics (viscosity and synerisis) than others. All products made in this study can be recommended as a good source of iron and protein and can be considered as healthy foods, contain low fat and low calories.

Keywords: *Probiotics, Lactic acid bacteria. L. casei, L. paracasei, Gastric ulcers, duodenal ulcers, Helicobacter pylori, Labneh, fermented milk drink and oats.*