بسم الله الرحمن الرحيم

شبكة المعلومـــــات الجامعية

التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

﴿ قـــسـم ﴾

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأفلام قد اعدت دون آية تغيرات

يجب أن

تحفظ هذه الأفلام بعيداً عن الغبار

في درجة حرارة من 15 – 20 مئوية ورطوبة نسبية من 20-40 %

To be kept away from dust in dry cool place of
15 – 25c and relative humidity 20-40 %

بعض الوثائق الأصلية تالفة

بالرسالة صفحات

لم ترد بالأصـــل

STUDIES ON THE UTILIZATION OF SOME MICROORGANISMS AS DIETARY ADJUNCTS UNDER LOCAL CONDITIONS

By

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Abstract

Utilization of probiotic microorganisms as dietary adjuncts is now receiving a worldwide attention . Therefore, the present study focused on investigation and optimisation of a process for preparation of a similar combination from locally isolated and identified microbial candidates that have probiotic characteristics. So that, several topics were studied, i.e, isolation and identification of *Lactobacillus acidophilus, Bifidobacterium bifidum, B. infantis* and *Enterococcus faecium* from local sources; selection for the best probiotic strains; utilization of permeate based medium for production of probiotic cultures; optimization of a laboratory scale process for biomass production of the selected strains and manufacturing of probiotic yoghurt using

Depending on the collected samples which have been taken from local sources, i.e. goat milk, infant faeces, and Ras cheese, the obtained results indicated that twelve thermobacterium strains could be isolated from goat milk, 7 (58.3%) were identified as *Lactobacillus acidophilus*, 3 (25%) as *L. bulgaricus* and 2 (16.6%) as *L. fermentium*. As for *Bifidobacterium* isolates, out of 101 isolates, 63 (62%) were identified as *B. animalis,* 17 (16.8%) as *B. longum,* 15 (14.8%) as *B. breve,* 3 (3%) as *B. infantis* and 3 (3%) as *B. bifidum*. Finally, Six (11%) and 49 (89%) out of 55 isolates were identified as *Enterococcus feacalis* and *Ent. feacium*, respectively.

When growth performance of the isolated strains was studied, growth rate and doubling time of the selected strains were calculated. According to these parameters, the tested microorganisms could be classified into two major groups, i.e. strains with the highest growth rate (0.156 to 0.460 h^{-1}) and the shortest doubling time (1.50 to 4.12 h),.and those with the lowest growth rate (0.109 to 0.187 h^{-1}) and the longest doubling time(3.70 to 5.87 h) . The fast growing strains that

include *Lactobacillus acidophilus* L.A_6, *L. acidophilus* L.A_7, *Bifidobacterium bifidum* B_2, *B.bifidum* B_3 , *B. infantis*I_1, *B.infantis*I_2,*Enterococcus faecium* S_8 and *Ent.faecium* S_{19} were selected for further studies to confirm their probiotic properties.

The selected probiotic characteristics were Bile tolerance, ability to grow at low pH values (1-3), and antagonistic action against pathogenic bacteria (*E. coli, Staphylococcus aureus, Salmonella typhimurium* and *Bacillus cereus*). As for bile tolerance, the highest percentages of viable counts (%R bile) of 88 and 82% were recorded for *Lactobacillus acidophilus* commercial strain and *L. acidophilus* L.A_7 respectively. For *Bifidobacterium* strains, the commercial strain exhibited the highest percentages of viable counts of 84.6%, followed by *Bifidobacterium bifidum* B3 being 82.9%. *Ent. faecium* (commercial strain) and *Ent. faecium* S_{19} were more resistance to bile salt with the precenteges of viable counts of 92% and 85.9% respectively.With respect to growth at low pH, commercial strain, and isolate *L. acidophilus* L.A_7 were found to be acid tolerant. All strains of *B. bifidum* tested were tolerant to pH 3 for 3hrs. Also, isolate *B. infantis* I_2 was more resistance to low pH than isolate *B.infantis* I_1 Among *Enterococci*, the commercial strain *Ent. faecium* has the highest resistance to low pH followed by isolate *Ent. faecium* S_{19}.

With respect to antibacterial activity, commercial strain of *L. acidophilus* exhibited the maximum antibacterial activity against *E. coli*, *Staph. aureus* and *S. typhimurium*, respectively, followed by isolate *L. acidophilus* L.A_7. As for *Bifidobacterium* strains, the commercial strain exhibited the highest antimicrobial activity against pathogenic bacteria, followed by *Bifidobacterium bifidum* B3 and *B.infantis* I_2. On the contrary, isolate *En. faecium* S_{19} has the highest antagonistic effect followed by commercial strain.

Finally, the locally isolated and produced probiotic strains were used separately as dietary adjuncts during yoghurt production. After yoghurt coagulation, a panel test was conducted in order to evaluate the organoleptic properties of the enriched yoghurt. Yoghurt produced by combining *Bifidobacterium* strains exhibited the highest records which demonstrate their superiority as dietary adjuncts under local conditions.

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Dedication

I dedicate this work to the soul of my mother,
And with great pleasure to my father
And with all of my love to my husband,
To dear my son Asser ,
To lovely daughters Norhan,Nermin and Nancy
whose love and patient support make my busy life possible

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