

Using of soybean extract to produce some dairy like products

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Soybeans is one of the most important crops for human feeding as it contains a high protein content which accounts for about 35 - 38%. Soymilk represents an inexpensive and abundant source of good protein quality, that could be the best choice to replace or extended the dairy products, to reduce their price and achieve the nutrients and healthy properties. The aim of the present work was to study the possibility of using soymilk for OF Feta-like cheese making from a mixture of milk and soymilk in rate of 2:1, with the using of starter culture from 1 to 3% containing 25% or 50% probiotic bacteria (*Bifidobacterium locus Bb 12*). The produced cheeses were more acceptable than the control either that made from milk or from soy milk and more effective in lowering the total cholesterol, LDL-cholesterol and triglycerides. The results of our investigation have been presented and discussed in two main parts as follows: Part 1: Section 1: Preparation and chemical properties of soymilk In this section, the soymilk was prepared from soybean seeds and the chemical composition was studied. The obtained results cleared that: 1-preparation of soymilk reduced the antinutritional factors of soybean and soymilk like, trypsin inhibitor, phytic acid and urease activity. 2-A slight increase in protein, ash and fat%. Also, a slight decrease was recorded in moisture, fibers and carbohydrates%. 3-The mixture of milk and soymilk with ratio of 2:1 reflect a slight increase in protein and carbohydrate, however a slight decrease was noticed in moisture, ash, and fat compared with milk. Section 2: Production and properties of probiotic OF Feta-like cheese made from mixture of milk and soymilk (2:1). In this section the mixture of milk and soymilk 2:1 was concentrated by ultrafiltration technique up to -28% total solids. The final concentrate was then heated to 75°C for 2 min., cooled to 40°C and then divided into two parts. The first one was treated with 1, 2 and 3% mixed starter containing 50% *Bifidobacterium lactis Bb12* + 50% *Lb. casei sub spp. casei* + *L. lactis sub spp. lactis* + *L. lactis sub spp. cremoris* (1:1:1). The second part was treated with 1, 2 and 3% mixed starter containing 25% *Bifidobacterium lactis Bb12* + 75% *Lb. casei sub sub spp. casei* + *L. lactis sub spp. lactis* + *L. lactis sub spp. cremoris* (1:1:1). The control cheese of soymilk or whole milk were only treated with 1% mixed starter containing *Lb. casei sub spp. casei* + *L. lactis sub spp. lactis* + *L. lactis sub spp. cremoris* (1:1:1) without *Bifidobacterium*. The cheese of different treatments were made as described under materials and methods and were analyzed when fresh and after 15 days intervals up to 45 days for organoleptic, chemical and microbiological properties. The obtained results can be summarized as follows: 1. The chemical composition, namely, moisture, fat, salt and total nitrogen contents of all cheese samples were not significantly affected for different treatments and the slight effect was due to the lowering of moisture content. 2. The moisture content of all cheese treatments were gradually decreased all over the storage period. The acidity was gradually increased by advancing the storage. The acid development was proportional to the percentages of the added starter to retentate during cheese preparation. On the other hand. T3 and T6 recorded the highest acidity during the storage. 3. The ripening indices of the cheese samples showed that the protein and fat breakdown were proportional to the percentages of starters added containing 50% *Bifidobacterium lactis Bb12*. The increase of soluble nitrogen, SN/TN, soluble tyrosine, tryptophan and total volatile fatty acids indicating an increase of ripening during storage. Treatment 3 and 6 (treated with 3% starter of 50% or 25% *Bifidobacterium lactis Bb12* + 50% or 75% mixed lactic starter respectively) recorded the highest ripening indices compared with the

control.4.The sensory evaluation for the produced cheese showed that treatment 3 and 6 were the best treatments. This was a reflection of the mixing of both soymilk and Bifidobacterium lactis Bb12.5.The firmness of all cheeses were increased gradually by increasing the storage period in all treatments compared with soy cheese (control T8).6.The microbiological examination of all cheese samples recorded an increase of total bacteria count, lipolytic bacteria, proteolytic bacterial and Bifidobacteria count at the beginning of the storage period compared with control treatments. At the end of storage there was a gradual decrease. The coliforms were not detected all over the storage period in all treatments. The mould and yeasts were absent at the beginning and till 15 days of storage however they were detected at the end of the storage period.

Part II:Section 1: The Hypocholesterolemic effect of the probiotic and UF Feta-like cheese on rats fed on cholesterol enriched diet:This part of the study aimed to explore some of the health promoting effect of probiotic UF Feta - like cheese with regard to their potential role in lowering the cholesterol by feeding the rats on cholesterol-enriched diet containing probiotic UF soy Feta - like cheese .The results could be summarized as follow:1)The beginning period of feeding showed a significant differences between negative group and other groups in total cholesterol level, triglycerides, HDL-cholesterol and VLDL + LDL -cholesterol levels .2)The groups of rats which fed on T3 and T6 recorded the highest lowering in total cholesterol level .3)The triglyceride level showed a significant difference of decrease in all groups of UF Feta-like cheese and the lowest level recorded in T3 .4)The HDL-cholesterol level decreased up to the end of the fourth week all of groups fed on UF Feta-like cheese treatment, but at the end of 6 weeks the level of HDL-cholesterol increased.5)The (VLDL+ LDL)-cholesterol level gradually increased up to 4 weeks then it decreased at the end of 6 weeks which recorded the lowest level compared with its content at the first week .

Section 2: Histopathological profile of rats fed on cholesterol-enriched diet as a functional of probiotic UF feta-like cheese:

- Group (1) : Fed on basal diet (negative control). The organs showed no significant changes.
- Group (2) : Fed on basal diet + 0.5% cholesterol (positive control) Kidney, liver and heart had a degenerative changes in the renal tissues. Cloudy swelling in the tubular epithelium which showed intracytoplasmic and some glomeruli fragmentation of the tuft and replaced by basophilic calcified mass, degenerative changes in the hepatocytes include vacuolar & hydropic degeneration with pale acidophilic. Cytoplasm and Hyaline degeneration in the cardiac muscles, intermuscular hemorrhage were recorded in the blood vessels respectively .
- Group 3 — 8 (treated groups): Fed on 0.5% cholesterol + different treatments from 3 to 8 supplemented with (10% casein, 10% fat) basal diet:•Some histopathological changes were recorded in the renal tissue of the kidney include, cloudy swelling in the renal epithelium, with intracytoplasmic eosinophilic granules with star shape lumen. In the liver mild degeneration changes in the parenchyma in the form of hydropic degeneration with pyknotic nuclei, congestion in the portal blood vessels with mild mononuclear cellular infiltration. But non significant changes were recorded in the heart.
- Group 9 : Fed on 0.5% cholesterol + treatment 7 supplemented with (10% casein, 10%fat) basal diet :Mild degenerative changes in the form eosinophilic substance in the lumen of the tubules of kidney , also some of the glomeruli showed destruction and others showed shrinkage. In the liver, the hepatocytes showed vacuolation & the central vein showed dilatation. But the cardiac muscle of heart showed non-significant histopathological changes.
- Group 10 : Fed on 0.5% cholesterol + treatment 8 supplemented with (10% casein, 10 % fat) basal diet : the histopathological changes of kidney were mild, only represented by desquamation of the lining epithelium of the renal tubules with some destruction of few glomeruli. The degenerative changes of liver were present as that of previous group, only a new finding represented by severe congestion of the blood vessels. Finally mild intermuscular edema of heart, also intermuscular congestion of some blood vessel were recorded in same microscopic observation.

from the previous study it could be concluded that

- Prepared soy milk by previous described method to obtained soy milk with good quality and characteristics.
- Soy milk can be used with milk up to 28% total solids in making UF Feta-like cheese without any affects on the cheese characteristics which supplemented with Bifidobacterium lactis Bb 12 + Lactic culture (Lb. casei sub spp. casei + L. lactis sub spp. lactis + L. lactis sub spp. cremoris 1:1:1) at ratio of 3%
- Producing UF Feta-like cheese from healthy properties by adding 3% from starter culture containing 50% Bifidobacterium lactis Bb 12 + 50% Lactic culture (Lb. casei sub spp. casei + L. lactis sub spp. lactis + L. lactis sub spp. cremoris 1:1:1).
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produced cheese lowered the serum of total cholesterol level in the rats blood which fed on cholesterol-enriched diet.