

Short Communication

Algerian fermented butter “Smen/Dhan”: lipolytic flora composition and comparative study of their lipase production

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Abstract:

In Algeria, traditional dairy products are prepared according to know-how inherited by rural women. These products are part of the Algerian heritage and have a great cultural and economic importance. Among these foods, fermented butter “Smen/Dhan” prepared from fresh butter according to different processes. During the maturation, the product develops organoleptic and nutritional qualities whose lipolysis is the main mechanism of this transformation and this activity could arise from the microbial cells. The aim of this work is the search and isolation of lipase-producing microbial strains from the “Smen/Dhan” and evaluates their potential. Isolation of lipolytic strains was realized from five samples of fermented butter obtained with different preparation methods and the storage times (years): 1 (E1), 3 (E2), 23 (E3), 5 (E4) and, 10 (E5). Samples were collected from different areas of Algeria (El-Oued, Stif, Jijel and Bjaa). To obtain a diversity of lipolytic flora, we have used several culture media (Ordinary Nutrient Agar, Man Rogosa Sharp agar, Terzaghi agar, Sabouraud Dextrose agar). These entire mediums are added with olive oil and / or Tween 80 to make them selective. The incubation was carried out at 37 C for 5 days. The strains obtained are classified with her potential activity. Titration is the method used to estimate of the free fatty acids or lipase activity. 95 strains were selected for their lipolytic activity and classified as bacteria. 29 strains producing lipases: were preselected for their ability to develop a high lysis height on the agar medium. They are Gram+, catalase +, immobile and unpopulated and cocci (04), rods (04) and filamentous (21). This shows that different preparation methods and storage times of these five products have effects on their microbial counts. After a hierarchical ascending classification, six strains (SG5, BG14, SG9, SG26, SG25, and SS46) were screened for their ability to produce high levels of extracellular lipases independently on the nature of the lipid substrate in the medium.

Keywords

Lipolytic strains, Microbial cells, Tween 80

Background

Although horticulture is generally classified as a subdivision of agriculture which deals with plant gardening, it is actually different from agriculture. It is easy to relate the two because some of the techniques employed are used interchangeably in both sciences, for instance in the cultivation of crops which is an agricultural process, many horticulture methods are employed. Horticulture is a complete science of its own as well as a full industry.

Horticulture is defined in the strict sense as the science that employs special techniques and methods to cultivate plants, including methods used to properly condition the soil for seed planting or planting tubers. The domain of horticulture includes cultivation, plant propagation, breeding of plants, production of crops, plant physiology as well as biochemistry and genetic engineering. The plants looked at are mainly vegetables, trees, flowers, turf, shrubs, fruits and nuts. Horticulturalists carry out extensive research in their domain in order to get better quality crop yields, improve their nutritional value to humans, make crops pest and disease resistant and adjust to environmental stresses. The most notable difference from agriculture is that horticulture deals with small scale gardening and usually in enclosed gardens although this is not a necessity while agriculture is done on large scale with extensive crop cultivation.

Agriculture is the science of growing food crops and rearing animals for farming. It involves the whole web of processes employed in the redirection of the natural flow of the food chain and the rechanneling of energy. The natural food web starts with the sun providing sunlight to plants which is then converted to sugars which are processed into plant food in a process called photosynthesis. Herbivores animals will eat plants as their food and the carnivores animals will eat the herbivores for food. Dead animals and plants will be decomposed by bacteria and return to the soil as plant nutrients and the whole chain repeats afresh. Agriculture actually rearranges this web so that plants are protected for human consumption although plants can be grown specifically for animal (herbivores) consumption like cattle, which is in turn reared for human consumption. Agriculture can be divided into two categories, which are conventional and sustainable agriculture. Conventional agriculture deals with modifying some environmental factors like trees, soil tilling, and irrigation and all activities that favor single crop growing especially for crops like wheat, rice and corn. Sustainable agriculture is where ecological principles are employed in the farming. It is also known as agro-ecology. It aims at sustainable farming practices. It involves planting of a variety of crops together so the farming garden will never be bare at any time.

Improving lipase production

Among the lipolytic organisms are the genera of *Clostridium*, *Pseudomonas* and mold fungi (*Penicillium*, *Cladosporium* and *Aspergillus*), covering both aerobes and anaerobes. Lipolytic organisms use lipase enzymes for decomposing vegetable and animal fats, in the process of which glycerol, fatty acids and water are formed.

Lipases are produced by substrates such as natural oils, synthetic triglycerides and esters of fatty acids. Bacterial lipases are used extensively in food and dairy industry for the hydrolysis of milk fat, cheese ripening, flavour enhancement and lipolysis of butter fat and cream.

Introduction

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History of lipase production

Lipase helps your intestines break down the fats in the food you're eating. Certain levels of lipase are needed to maintain normal digestive and cell function. But abnormally high levels of the enzyme in your blood can indicate a health problem. A serum lipase test measures the amount of lipase in the body.

Conclusion

To obtain a diversity of lipolytic flora, we have used several culture media (Ordinary Nutrient Agar, Man Rogosa Sharp agar, Terzaghi agar, Sabouraud Dextrose agar). These entire mediums are added with olive oil and / or Tween 80 to make them selective. The incubation was carried out at 37 °C for 5 days. The strains obtained are classified with their potential activity. Titration is the method used to estimate of the free fatty acids or lipase activity. 95 strains were selected for their lipolytic activity and classified as bacteria. 29 strains producing lipases: were preselected for their ability to develop a high lysis height on the agar medium. They are Gram+, catalase +, immobile and unpopulated and cocci (04), rods (04) and filamentous (21). This shows that different preparation methods and storage times of these five products have effects on their microbial counts. After a hierarchical ascending classification, six strains (SG5, BG14, SG9, SG26, SG25, and SS46) were screened for their ability to produce high levels of extracellular lipases independently on the nature of the lipid substrate in the medium.