human consumption for the first time in the United States in 1994. It has been mentioned that 60% of the food offered in American stores has been produced using ingredients that come from GM cultivations. Until now, there are no specific health problems related to the intake of foods derived from these crops[7].

Current situation of GM animals

In the case of animals, the situation admits no comparison with plants, as the approaches and objectives are completely different. In this case, apart from the scientific and technical problems (in mammals, the genes have to be injected directly into the nucleus of the fertilized ovule, entering in the chromosomes, then the zygote implants in receptive females), there are other ethical, social and sanitary problems which are particularly complex[5].

Until now, the list of animals used for successful GM experiments includes the mouse, the rat, the rabbit, cattle, the pig, the sheep, and the goat amount the mammals; while birds include the chicken (the hen) and the quail. Among the successfully harvested fish, there are the salmon, the trout, the tilapia, the carp, the catfish, the medaka and the Sparus aurata [5]. Like in the case of vegetables, among the animals, the genetic modification has as its important objectives: the improvement of productive characters and of the production's quality (particularly their growth), the resistance to diseases (specially mastitis in ruminants) and, of particular interest, the development of animal models to study human diseases or to study the diseases of domestic animals or useful animals of great value, the development of GM animals as organ donors in practices of transplants (xenotrasplants) and, finally, the development of GM animals with the purpose of producing "therapeutic" proteins of high value for humans; in one word, use "pharmaceutical of molecular farms" from animals with modifications that allow them to produce substances that can only be substituted by a very complex and expensive chemical synthesis[9].

Current situation of GM microorganisms

In the fabrication of bread, the traditional strains of yeast Saccharomyces cerevisiae degrade carbohydrates present in flour dough in an order starting from sacarose, after glucose and fructose[1]. Only when those sugars have been used, the degradation of maltose starts, which, on the other hand, represents the main principle. This means, in terms of time, a significant expense. To reduce these costs, different GM yeast strains have been obtained which are capable to start the degradation of carbohydrates in bread dough caused by the maltose, resulting in a substantial increase of the fermentation capacity and of the production of CO2, which represents not only a faster fermentation, but also the obtention of a flufflier and tastier bread[1]. Also, strains of GM S. cerevisae have been obtained through the incorporation of an Aspergillus oryzae gene that is capable of expressing the α-amylase enzyme. This is translated in the obtention of a product with better organoleptic characteristics[4].

In the case of wine, yeasts have been modified by inserting the gene that codifies for L-lactate dehydrogenase (from Lactobacillus casei), capable of producing lactic and alcoholic fermentation allowing to obtain wines with more acidity.

In the case of beer production, genes from Trichoderma reesei or Tr. longibrachiatum have been inserted expressing a β-glucanase enzyme that solves an important problem in brewing like the one represented by colmatation and an accumulation of β-glucans from barley, demanding to clean the tanks and a significant expense for technical aspects[1]. Also, strains of beer yeast have been obtained which have a S. diastaticus gene that expresses a glucoamilase, characterized for degrading dextrins and starch, responsible for the great energetic load of beer (some types of them specifically) obtaining a low-calorie beer.

The genetically modified microorganisms (GMM) have been an important source for vaccine alternatives different from classic products. The genetic modification of the microbial structure that means a reduction of wild, viral strains of the tested microorganism, is a procedure that has been researched for several years with the purpose of obtaining more efficient and safer antigens[9]. The European Union has been, until now, very rigorous and restrictive regarding the authorization of GM, demanding a thorough control until assuring there is no risk for the environment and the possibility of identifying its use through detectable changes in the laboratory, as it happens, for example, in the case of vaccine against the Aujeszky's disease and few more cases[5]. In the case of humankind, clinical experiences have been informed about a vaccine against diarrhea produced by E. coli based on mitigated microorganisms that maintain their intestinal colonization capacity but they do not have a pathogenesis of their own[1].

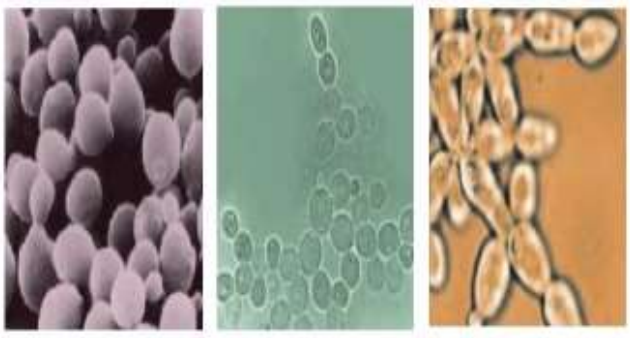

Fig.5 Different images of Sacharomyces cerevisae