



mariovska volna

mariovski med

mariovsko meso

mariovsko sirenje

Antibiotics in Milk

The direct injection of these agents into the bloodstream of a milk animal or even intake through the mouth, leads to milk being secreted that contains varying amounts of bactericidal or bacteriostatic compounds. The effect of these antibiotics, or indeed other chemotherapeutic agents, in cheese milk is to destroy those organisms necessary for development of acidity, flavour and aroma in the cheese. Volatile carriers (e.g. alcohols) are agents which can appear as taints in the milk, and may, therefore, be equally harmful.

While remedial treatments are possible, such as the use of the enzyme penicillinase to nullify the activity of penicillin in milk, the cheesemaker is not always aware of the type of antibiotic present. Even if the cheesemaker is aware that penicillin has been employed and makes use of penicillinase, problem can still arise. For example, micrococci and clostridia are susceptible to penicillin but the enterobacteria are not, and hence blown cheese curds can result from a preponderance of coliform organisms in a penicillin-treated milk.

However, more recently, penicillin has been replaced by other natural and synthetic antibiotics and, although their use is controlled by veterinary practice, the antibiotics of choice may vary from time to time. Synthetic penicillins are derivatives of the nucleus of penicillin, 6-amino penicillanic acid, and include benzyl penicillin, methicillin and cloxacillin. Other antibiotics which have been used at some time for the treatment of animals include the following: aureomycin, chlortetracycline, neomycin, chloramphenicol, benzathine, bacillin, erythromycin, oxytetracycline, streptomycin, novobiocin, ampicillin, cepharpirin and bacitracin.

These antibiotics are not all used for direct udder injection, although they can still be secreted in milk. Some flavoured treatment have involved two antibiotics together, e.g. penicillin and dehydrostreptomycin, for direct udder injection. A dye marker, Food Blue No.2, has been used with some injected preparations so that the milk is coloured for the duration of the treatment

As mentioned earlier, bulking of milk in large silo tanks will, by dilution, reduce the level of antibiotics in the total supply. In other circumstances, cheesemakers have used extra large amounts of



MARIOVO EKO SREDINA ZA EKOLOSKI PRODUKTI

www.mariovo.mk



mariovska volna

mariovski med

mariovsko meso

mariovsko sirenje

starter culture (10-20 times the normal dose rate) on the assumption that, if the inhibitory antibiotics is absorbed by some of the bacterial cells, others will be left to continue the desired acid development. This method worked when penicillin was the only antibiotic being used, but it became less applicable when a wider range of chemotherapeutic chemicals became available. **Lactococcus lactis** sub-sp. **cremoris** and **Streptococcus thermophilus** are both susceptible to antibiotics, and the latter, in particular, has been widely used to test for the presence of antibiotics in milk. The more thermophilic **Bacillus stearothermophilus** has now replaced **Str.thermophilus** as the organism of choice, because the test can be run at 64°C 147°F as against 37°C 99°F for **Str.thermophilus**; as a result, the test can be completed in two hours rather than four. The use of *B.stearothermophilus* has given rise to a number of practical tests, such as the Delvo Test (Anonymous, 1995) or the Charm Test (Marshall, 1992) and, in general, the procedures require the minimum of basic laboratory facilities. It is worth mentioning that **Propionibacterium shermani** is also susceptible to penicillin, and this is the reason why cheese such as Emmentaler have been suffered from defective eyeholes when milks treated with penicillin have been used.

The production of acid in milk- by bacteria sensitive to antibiotics - can be used as a test for inhibitory substances, provided that precautions are taken to avoid the inhibition of acid development by phage infection. A more satisfactory test for inhibitory milks is based on the use of reducible dyes, i.e. Methylene blue, Resazurin or Tetrazolium salts, all of which change colour in the actively growing micro-organisms. As the time taken for the dye to change colour is broadly correlated with metabolic activity, the addition of a standard inoculum under standard conditions should induce a colour change in approximately the same time for each batch of milk. As the test can be completed in under 30 min, it provides a simple, routine guide to the acceptability of the milk for cheese production.

There are regulations regarding the use of antibiotics and similar treatments in most countries, especially those interested in manufactured milk products. Financial penalties are used to discourage the sale of milk containing these agents but, in spite of the penalties and regulations, success in cheesemaking requires routine testing of incoming milk supplies.



www.mariovo.mk info@mariovo.mk mariovo@t-home.mk

+389 47 203 900 ul,Braka Mingovi br.18 P.fax.Br 52 Makedonija

MARIOVO EKO SREDINA ZA EKOLOSKI PRODUKTI

www.mariovo.mk

mariovska volna

mariovski med

mariovsko meso

mariovsko sirenje



www.mariovo.mk info@mariovo.mk mariovo@t-home.mk

+389 47 203 900 ul,Braka Mingovi br.18 P.fax.Br 52 Makedonija