



Modification of milk composition

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Milk is considered as one of the nature's perfect food, because of its high content of essential amino acids, fatty acid, vitamins and bioavailable calcium. Milk and its products provide up to 30 % of the dietary proteins for human beings in developed and developing countries. This has resulted in considerable research being directed towards molecular biology of milk specific genes.

Milk composition differs widely between species and also between individuals of the same species. It may be due to genetic, environmental and physiological factors. In ruminants, the four phosphoproteins (b, a_{s1} , a_{s2} , and k- casein) account for 80 per cent of the total protein. Major specific whey proteins are b - lactoglobulin and a - lactalbumin. On the contrary, human milk contains 70 per cent of whey proteins (a - lactalbumin, lactoferrin and lysozyme) and is devoid of b- lactoglobulin. All these caseins and whey proteins have genetic variants. These variants are important for the future milk processor to consider the genetic make up of the milk, which is the raw material for the particular product being formed.

Why alter milk composition ?

(a) Preservation: Preser-

vation of milk solids through dehydration and manufacture of fermented products prove that preservation is the oldest reason for altering milk composition.

(b) Pricing systems: Milk has disassembly of many components. The components can be reassembled into dairy products. The costs are different for each product and each has multiple uses. Thus, milk composition is economically important to milk producers, processor and nutritionally important to consumer.

(c) Health concern: Now a days people are more health conscious especially regarding fat and cholesterol. This has a very significant impact on dairy industry. The demand for low fat dairy products is increasing. calcium's role in combating osteoporosis and hypertension is also one of the factors which has enhanced interest in dairy products.

(d) Regulation: In USA, Milk fat content must be standardised to meet minimum fat requirements in the cheddar cheese. In India, as per PFA act, the milk meant for sale should contain 3.5% fat.

How to alter Milk composition?

Before processing, the milk composition can be altered by management, nutritional or by altering the genetic potential of our cattle.

Geneticist can bring about changes in 3 ways;

1. Utilization of genetic differences between breeds by crossbreeding.
2. Utilization of genetic variations within breeds by selective breeding.
3. Creation of new genetic variation using transgenesis.

Among different components of milk, genetic variation is more for fat, less for protein and very little for lactose. So selection for an altered fat : protein ratio will be quicker, and the selection for change of lactose concentration will be slower. This is because of high and positive correlation between fat and protein and negative correlation between fat/protein and lactose.

Linear selection index is another method that can be used for altering milk composition. Giving appropriate economic weightages to each of the milk component will help in bringing about suitable genetic change in a population.

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