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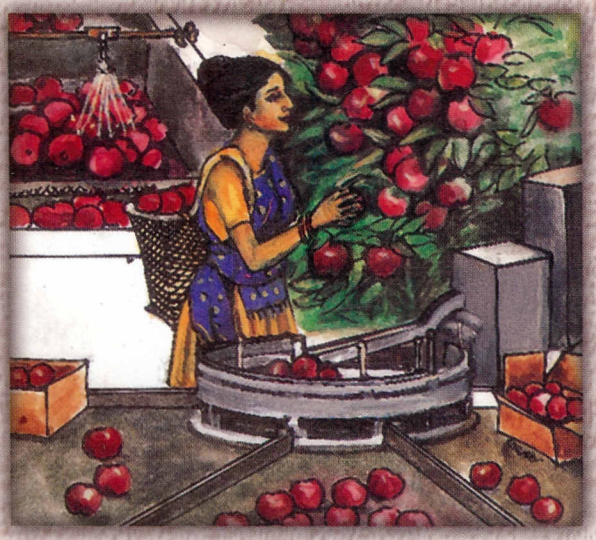

SAARC Agricultural Information Centre

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minutes, or (c) as (b) for 20 minutes. After pulsing, all variants were placed in flasks containing 250 ml distilled water. Vase life in (a), (b) and (c) was 2.6, 5.3 and 6.3 days, respectively.

1246 REDDY, TV; NAGARAJAIAH, C. 1988. **Silver nitrate pulsing of cut Queen Elizabeth rose stems to increase vase life**. *Current Research, University of Agricultural Sciences, Bangalore*, 17: 3, 37-38; 9 ref.

Vase life of cut roses, pulsed for 10 or 20 minutes with AgNO3, was 6.0 and 5.3 days, respectively. Vase life of the control (in water) was 3.0 days.

1247 SHROTRI, SC; GUPTA, JS; SRIVASTAVA, RN. 1986. **Seed-borne fungi of aster, their significance and the control**. *Journal of the Indian Botanical Society*, 65: 4, 446-449; 8 ref.

Of 31 seedborne fungi associated with 6 seed samples of aster (*Callistephus chinensis*), *Aspergillus flavus*, *A. niger*, *A. repens*, *Alternaria alternata*, *Botrytis cinerea*, *Curvularia pallescens*, *Fusarium spp.*, *Cladosporium sphaerospermum*, *Drechslera [Cochliobolus] hawaiiensis*, *Phoma putaminum*, *Myrothecium verrucaria* and *Trichothecium roseum* caused seed and seedling death. *A. alternata*, *B. cinerea* and *F. moniliforme* [*Gibberella fujikuroi*] also caused severe foliar disease. Seed treatment with Ceresan dry [methoxyethyl mercury silicate], Dithane M-45 [mancozeb] (0.3%) and aureofungin (0.02%) gave effective control.

1248 THANGARAJ, T; RAJAMANI, K; THAMBURAJ, S. 1990. **A study on the vase life of gerbera (*Gerbera jamesonii Bolus*)**. *South Indian Horticulture*, 38: 5, 265-267; 2 ref.

Freshly cut flowers of 24 accessions, placed in glass tubes with no water, were held at room temperature for 24 h. Data are tabulated on weight loss, flower stalk bending, petal drooping, petal necrosis and vase life. The following accessions were found suitable for use as cut flowers: GJ 8, GJ 10, GJ 16, GJ 18, GJ 23 and GJ 44. In these, no flower stalk bending, petal drooping and petal necrosis were observed after 24 h.

DAIRY SCIENCE

DAIRY INDUSTRY

1249 AHMED, M. 1991. **Pakistan's dairy industry**. *Indian dairyman*, 43: 3, 137-138.

Milk and milk products account, on av., for 25% of a Pakistani's food budget, and milk processing is an important part of the food processing industry in Pakistan. The processing capacity for UHT milk has increased considerably since 1983 to >1 million litres/day. The following problems that face the UHT milk industry are briefly discussed: over-capacity; high packaging costs; competition from raw milk; import duties on dried skim milk; unrealistic milk standards; poor product image; raw milk procurement; and seasonality and dried milk production. Indigenous products, none of which are produced at milk processing plants, are listed.

1250 BANERJEE, AK. 1991. **Problems of dairying in India in the nineties**. *Indian dairyman*, 43: 7, 293-305; 7 ref.

Many of the dairying problems in India arise from large human and cattle populations being sustained on a limited land mass. Cattle are kept mainly as draught animals, buffaloes being reared specifically for milk production only where the farmer has some access to the milk market. Seasonal and regional variations in milk production, the growing demand for milk and the establishment of milk supply schemes, particularly through Operation Flood, are discussed. Projected figures are presented for 2 targeted levels of milk demand in the 1990s, and ways in which these could be met through breeding, feeding/nutrition, ensuring regularity of milk supply, suitable packaging and reasonable prices are considered. Developments in the dairy industry in the 1990s are predicted to include modernization of dairy plants, product diversification, improved packaging and manpower training.

1251 BHATT, PK; UPADHYAY, KG. 1992. **In search of 'pointers of quantum-leap' as 'catalysts' for accelerated dairy development - some thoughts to ponder**. *Indian dairyman*, 44: 9, 451-454; 16 ref.

Recent successful developments within the Indian dairy sector that have resulted in increased productivity, and their potential to act as catalysts for accelerating development of the dairy industry in India, are discussed. These include the implementation of the Operation Flood programme, introduction of productivity awards by the National Productivity Council, and development of village cooperatives.

1252 CHAUDHRY, IM. 1989. **dairy production in Pakistan**. *World Farmers' Times*, 4: 11, 28-29.

The author reviews the current status of the dairy industry in Pakistan and highlights the major problem areas such as high packaging costs, requirements for new technology and the necessity to improve quality and throughput.

1253 DOORNBOS, M; GERTSCH, L; TERHAL, P; CLAY, E. 1991. **dairy aid and development: current trends and long-term implications of the Indian case.** *Food aid reconsidered: assessing the impact on Third World countries; EADI Book Series, 11*/edited by E Clay; O Stokke. London: Published in collaboration with The European Association of Development Research and Training Institutes (EADI), Geneva, p. 117-142; 34 ref.

Operation Flood, the large-scale Indian dairy development programme, aims at replicating all over the subcontinent a successful type of dairy cooperative which originated in the Kheda district of Gujarat. The programme is based on institutional and technological innovations directed at linking cooperatively organized rural milk producers to the main urban markets for milk and dairy products. The programme has been supported by considerable amounts of dairy food aid from the EC since 1970 and has become the largest single dairy aid programme in the world. It is widely considered to be a test case for the feasibility and suitability of using the dairy surpluses of developed countries to develop the dairy sector in Third World countries. This paper explores some of the long-term implications inherent in the model of dairy development adopted, and, in doing so, it describes the mechanics of some of the strategies employed. The paper begins with a description of the institutional model and its mode of replication. The strategies of procurement and production are described (the National Milk Grid and the National Herd). These structures point to disincentive features of the programme. The section on the foreign connection which follows discusses the motivations for giving and receiving aid, the uses of aid and its implications. Issues of access and social benefits also provide an indirect perspective on aid. More resources do not guarantee changes in the patterns of access. Questions of who benefits, to what degree, and who has access to what resources, also arise. Long-term constraints and opportunities are prominent themes in the subsequent two sections dealing with participation and side effects. Some observations are made on the repercussions of aid on the institutions that implement development. suggested that aid is res-ponsible in part for certain characteristics of the project-implementing agency, (centralization, sta-ndardization, accelerated pace of development).

1254 HANSEN, AP. 1990. **The state of the dairy industry in Pakistan.** *Journal of Dairy Science*, 73: Supplement 1, 118.

Pakistan has about 10 million water buffaloes and 15 million cows, producing 9.8 million tons of milk/year. Milk is the major agricultural product and the largest contributor to the GNP of Pakistan. Of the 19 dairy plants established during 1950-1975, 16 closed while 2 converted to UHT technology. Pasteurization of milk was not successful due to the combination of high summer temp. and poor hygiene. By 1980, the production of aseptic milk was achieved. Currently, there are 12 UHT milk plants with a total capacity of 560 000 litres per day. While steam-injection or steam-infusion processing systems are most common, several plants have tubular and plate systems. Most of the UHT milk is packaged by Tetra Pak in brick or tetrahedron containers, although 1 Combibloc and 2 PrePac fillers are used for aseptic milk. Aseptic products include milks of different fat content, cream, flavoured milks, yoghurt, evaporated milk, ice cream mix, puddings and custards. Shelf life of UHT products in Pakistan averages 60 days due to high summer storage temp. UHT products are popular due to limited availability of refrigeration and refrigerated distribution. UHT milk sales have increased from 11.25 million litres in 1981 to 74 million litres in 1986.

1255 JUL, M. 1983. **The place of dairying in development.** *Proceedings of the Sixth International Congress of Food Science and Technology. Vol. 1*/edited by JV McLoughlin; BM McKenna. Dublin: Boole Press Ltd, p. 235-236.

In most Third World countries there are non-arable grazing lands and large quantities of agricultural byproducts that can be utilized by ruminants to produce milk which could provide a useful cash income for rural populations. Examples are given of Operation Flood in India, which has built up a system of cooperative rural dairy societies, collecting milk from producers who sometimes own only 1 buffalo. In South America, cheese factories have been established where milk produced by cows grazing on inaccessible parts of the Andes can be processed. Similarly, in the Dominican Republic, small rural cheese plants process milk produced by cows grazing among coconut palms. The income resulting from these projects is often used to buy more food, and can thus be of nutritional importance.

1256 PRAJAPATI, PS; PATEL, AA; GUPTA, SK. 1987. **Ingredients for low-fat dairy spreads.** *Indian dairyman*, 39: 4, 181-185; 17 ref.

Ingredients for use in butter-based low-fat spreads include: milk fat from cream, butter or butter oil plus vegetable oils; milk protein from dried or concentrated skim or whole milk, buttermilk or concentrated whey; emulsifiers based on monoglycerides of fatty acids;

emulsifying salts such as citrates and phosphates; stabilizers such as carboxymethylcellulose combined with gums or gelatin; acidifying agents such as citric or lactic acid; colourings, flavourings and preservatives; other additives such as salt, antioxidants and vitamins.

1257 PURI, BPS. 1989. **Aseptic packaging of dairy products**. *Seminar on packaging of dairy products synchronising with Indiapack '89 and Ahara '89 Exhibition*. (New Delhi: 1989: 1-2 February). Bombay: Indian Institute of Packaging, p. 39-41.

Systems for aseptic packaging of milk products in thermoformed cups are described, with emphasis on a form-fill-seal machine developed by Hassia (Germany).

1258 RAO, KSH. 1990. **Reduction of losses in dairy industry**. *Indian dairyman*, 42: 4, 190-197.

The following major sources of loss in the dairy industry and ways of reducing them are discussed: spoilages; wastage of surplus materials; spills and leaks; inadequate drainage of milk from plant; processing losses; packaging losses; losses due to analytical variations; and storage losses. Processing losses, calculated for 3 product combinations, are in the order dried skim milk + *ghee* > toned milk + surplus fat converted to *ghee* > standardized milk + surplus fat converted to *ghee*.

1259 RAO, MV. 1990. **The Anand pattern - a model for dairy development in India**. *Proceedings: International Seminar on Dairying as an Instrument for Progress: the Indian Experience*. New Delhi: Anand, p. 37-54.

The Anand Pattern of Cooperatives (APC) is a structure within which dairy farming is promoted by the government in India. This article traces the development of the APC from its original microeconomic form in Gujarat to its present national network. It is argued that cooperative dairy farming is the only viable solution to the Indian dairy sector, and the APC, therefore, rightly represents a core component of India's Operation Flood (designed to raise the supply of milk and milk products). Other policies implemented by the government are also evaluated briefly.

1260 VYAS, K. 1990. **Use of technology at Amul**. *Moving Technology*, 5: 5, 43-46.

The Amul dairy (India) was formed in 1946 with 2 village cooperatives collecting about 250 litres milk/day, which was boiled, cooled by ice and transported to Bombay for marketing. The dairy now receives >1 million litres milk/day from farmers in nearly 900 villages. Ways in which the dairy has progressed by adopting the latest manufacturing, packaging and animal health care/breeding technologies, and through diversification, are discussed.

MILK PROCESSING

1261 JHA, SN; SURESH PRASAD. 1990. ***Makhana* processing**. *Agricultural Engineering Today*, 14: 3-4, 19-22; 4 ref.

Harvesting and processing of seeds of the aquatic herb *makhana* (*Euryale ferox*) is outlined. Fishermen diving into the water sweep seeds on the bottom of ponds into heaps for later collection with nets. A group of 20-25 trained people normally spend 1 week harvesting 1 ha of pond, with seed yields of 2.5 - 3.0 t/ha. Cleaning, drying, storage, size grading, preheating, roasting, polishing and packing methods are described.

1262 RAWAT, BS; VERMA, NK. 1985. **Fat and SNF losses in market milk processing**. *Asian Journal of dairy Research*, 4: 1, 47-52; 3 ref.

Milk fat and SNF losses were determined over a 12-month period at a small dairy plant during 4 stages of toned milk production, namely at (i) milk reception, (ii) separation, (iii) skim milk handling for standardization and (iv) toned milk processing and packaging. Annual loss of fat and SNF during toned milk production was 1.30 and 1.38%, respectively, the mean quantity of toned milk processed monthly being about 71 000 kg. The proportion of fat and SNF loss, respectively, that occurred at each of the 4 production stages was: (i) 37.72 and 27.86%; (ii) 0.39 and 5.99%; (iii) 0.12 and 7.15%; and (iv) 61.77 and 59.0%.

1263 SAXENA, SN; MITAL, BK; GARG, SK. 1994. **Effect of casitone and fructose on the growth of *Lactobacillus acidophilus* and its survival during storage**. *International Journal of Food Microbiology*, 21: 3, 271-276.

Supplementation of milk with combination of casitone (0.5% (w/w)) and fructose (0.5% (w/w)) resulted in greater acid production, higher viable counts, increased sugar utilization and shorter generation time for the *L. acidophilus* strains tested. The experimental product prepared by using these additives contained 1.5-2.0-fold more viable *L. acidophilus* than the control (no additives) throughout 21 days of storage. Further, both control and experimental products remained acceptable throughout the storage period. However, the former was rated superior in flavor, whereas the latter exhibited better texture.