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1. Inleiding

Van 29 september - 3 oktober 1986 werd in Den Haag het 22e Internationale Zuivelcongres gehouden. Dit is een 4-jaarlijks gebeuren. Het is de derde keer dat dit congres in Nederland werd gehouden.

Dit congres werd door 1018 deelnemers bijgewoond, afkomstig uit 54 landen. Nederland was vertegenwoordigd door 201 deelnemers.

Daarna volgden Engeland met 75, Frankrijk met 56, Finland met 50, Australië met 44, Denemarken met 43, Zweden met 42 en Ierland met 40 deelnemers.

Ca. 90 deelnemers uit 21 landen leverden een bijdrage.

In aparte seminars werden 9 onderwerpen uitvoerig behandeld. In twee plenaire bijeenkomsten werden visies op de toekomstige ontwikkelingen in de zuivel gegeven. Daarnaast werden ca. 200 posters gepresenteerd. Thema's die aan de orde kwamen, waren onder andere:

- kwaliteitsbeheersing: o.a. de problemen met integrale kwaliteitsbeheersing in de moderne procesindustrie en onderzoek met moderne analysemethoden
- technologie: nieuwe methoden voor concentreren en drogen en vooruitgang in de kaastechnologie
- voeding: de rol van melk als voedingsmiddel en als ingrediënt voor andere produkten
- melkproductie en melkprodukten in ontwikkelingslanden: een belangrijk aspect is onder andere de zuivelbereiding met lokaal gewonnen melk en de microbiologische problemen hierbij
- markt en marketing van zuivelprodukten.

De opening werd bijgewoond door Koningin Beatrix en minister Braks.

Via een diapresentatie met "Holland Happening" muziek werden verschillende facetten uit de Nederlandse samenleving belicht. Afgesloten werd met een prachtig "Tableau vivant" van de Nachtwacht.

Het congres dat als slogan "Milk, the vital force" meedroeg, was breed opgezet en derhalve interessant voor een ieder die op de een of andere manier bij de zuivel betrokken is. Er werd veel kennis opgedaan. Wat het analytisch chemisch onderzoek van melk en melkprodukten met moderne analysemethoden betreft presenteerden slechts 2 deelnemers een lezing.

Het congres was deels opgebouwd uit parallelsessies. Er moest derhalve een keuze worden gemaakt voor wat het bijwonen van de sessies betreft. In een bijlage bij dit verslag zijn samenvattingen van alle presentaties bijgevoegd. Omdat deze soms erg summier zijn, volgen hieronder enkele meer uitgebreide samenvattingen.

2. Samenvattingen van verschillende lezingen

2.1 Lezingen van plenaire openingssessie.

In zijn welkomstwoord wees de voorzitter dr W.IJ. Aalbersberg (NIZO) op de vele problemen die tijdens dit congres aan de orde zullen komen. Gedoeld werd op de grote overproduktie van melk ten gevolge van schaalvergroting en de afname van het aantal banen met een faktor 2, gerekend vanaf 1970.

Het congres moest resulteren in het doen van aanbevelingen of resoluties.

Minister Braks meldde in zijn inleiding dat er in de wereld twee tegengestelde ontwikkelingen gaande zijn. De rijke geïndustrialiseerde zuivellanden staan voor een bio-technologische ontwikkeling die hun voorsprong alleen maar groter zal maken en de arme ontwikkelingslanden kunnen hun lokale produktie steeds moeilijker op poten zetten.

In de rijke landen is de overproduktie zo groot, dat er thans voor elke aardbewoner 1 pakje boter in de pakhuizen opgeslagen ligt, terwijl de arme landen wegzinken in het moeras van steeds hogere schulden, wegvallende olie-inkomsten, een verstoorde markt en een lage dollar koers. Het steeds groter wordende gat tussen aanbod en vraag moet gedicht worden. Hiermee is de EG bezig, maar die gemeenschap kan dat niet alleen. Ook de producenten moeten hun produktie in toom houden. Gelukkig is dit besef groeiende.

Aandacht dient gegeven te worden aan het stimuleren van de lokale zuivelproduktie in de ontwikkelingslanden en verbetering van de lokale agrarische structuur. Dit is, naast produktievermindering in de rijke landen, essentieel voor een beter marktevenwicht.

Dr M.J. Williams (United Nations World Food Council, New York, US) pleitte met name voor het afbouwen van de steun die alle westerse landen aan hun eigen landbouwexport geven. Hierdoor wordt het handelsverkeer natuurlijker en soepeler.

De industrie in de ontwikkelingslanden moet verstrekt worden, immers hierdoor neemt de vraag naar produkten uit het buitenland toe.

Verder stelde hij dat tot ver in de 21e eeuw de voedselvoorziening gegarandeerd is voor alle aardbewoners. De voedselproduktie groeit sneller (2 procent per jaar) dan de groei van de wereldbevolking (1 à 1,5 procent per jaar).

Om tot een meer evenwichtige verdeling van de produktiemiddelen te komen dient echter de markt veranderd te worden.

Drs H. Schelhaas (Produktschap voor Zuivel, Rijswijk) wees er op dat tot het jaar 2000 de produktie van melk door de huidige veestapel nog wel met 15% kan toenemen. Dit houdt verband met de verdergaande robotisering en het vaker melken per dag. Melk is een unieke, maar ook dure grondstof.

Om het hoofd te kunnen bieden aan de concurrentie van imitatieprodukten is onafgebroken research naar nieuwe produkten nodig.

Ook Schelhaas pleitte voor een structurele verandering van de markt en tevens voor een schuldensanering. Het Westen geeft elk jaar 30 miljard dollar hulp, maar de derde wereld moet jaarlijks alleen al 100 miljard dollar aan rente terug betalen. De schulden vormen een tijdbom onder de economie van de wereld.

Dr P. Robertson (New Zealand Dairy Research Institute, Palmerston North) wees op het belang van de kwaliteit van zuivelprodukten en het omlaag brengen van produktiekosten via automatisering en mechanisering. Verder zag hij goede mogelijkheden voor verwerking van zuivelprodukten, met name de wei-eiwitten met hun hoge voedingswaarde, in allerlei voedingsmiddelen. Daarnaast wees hij op de mogelijkheid om uit geconcentreerde, gereconstitueerde melk kaas te bereiden (Lablée methode). Wat de lange-termijn research betreft wees hij o.a. op het belang van genetisch onderzoek, "cheese flavour" en gezondheidsaspecten (caries, vitaminen, calcium).

2.2 Lezingen van parallelsessies

De lezing van dr J.J.Mol (Nederland) handelde over de problemen van microbiologische besmetting en dus over de beperkte houdbaarheid van melk bij de melkwinning in ontwikkelingslanden, waar het melken nog handmatig gebeurt, niet gekoeld wordt op de boerderij, de melk

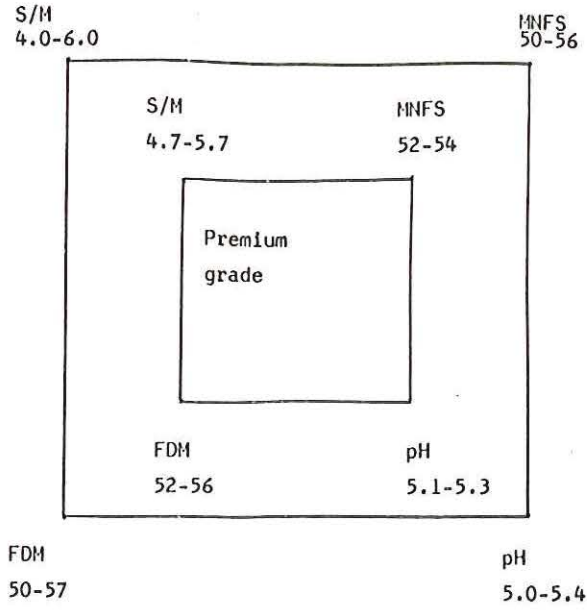
verzameld wordt in bussen en in niet gekoelde tankauto's naar de melkfabriek of verkoopcentra wordt afgevoerd. De grootste microbiologische besmetting treedt op tijdens het melken en het inzamelen door de tankauto's. Voor de kwaliteitsbeoordeling wordt gelet op uiterlijk en geur en wordt de zgn. alcohol-stabiliteitstest uitgevoerd. In twijfelgevallen wordt de zuurtegraad van het vet bepaald of wordt de reductaseproef uitgevoerd. Conservering van de melk gebeurt o.a. door verhitten of koelen of chemisch met waterstofperoxide.

Dr R.C. Lawrence (Zuivelinstituut Nieuw Zeeland) gaf een indeling voor de kwaliteit van kaas als functie van een aantal parameters. Zo is de NFS-(not-fat-solids) factor een betere parameter voor de kwaliteit dan het vochtgehalte. Hij wees op de relatie tussen het calciumgehalte in de kaas en het ontstaan van de structuur en de smaak tijdens het rijpingsproces.

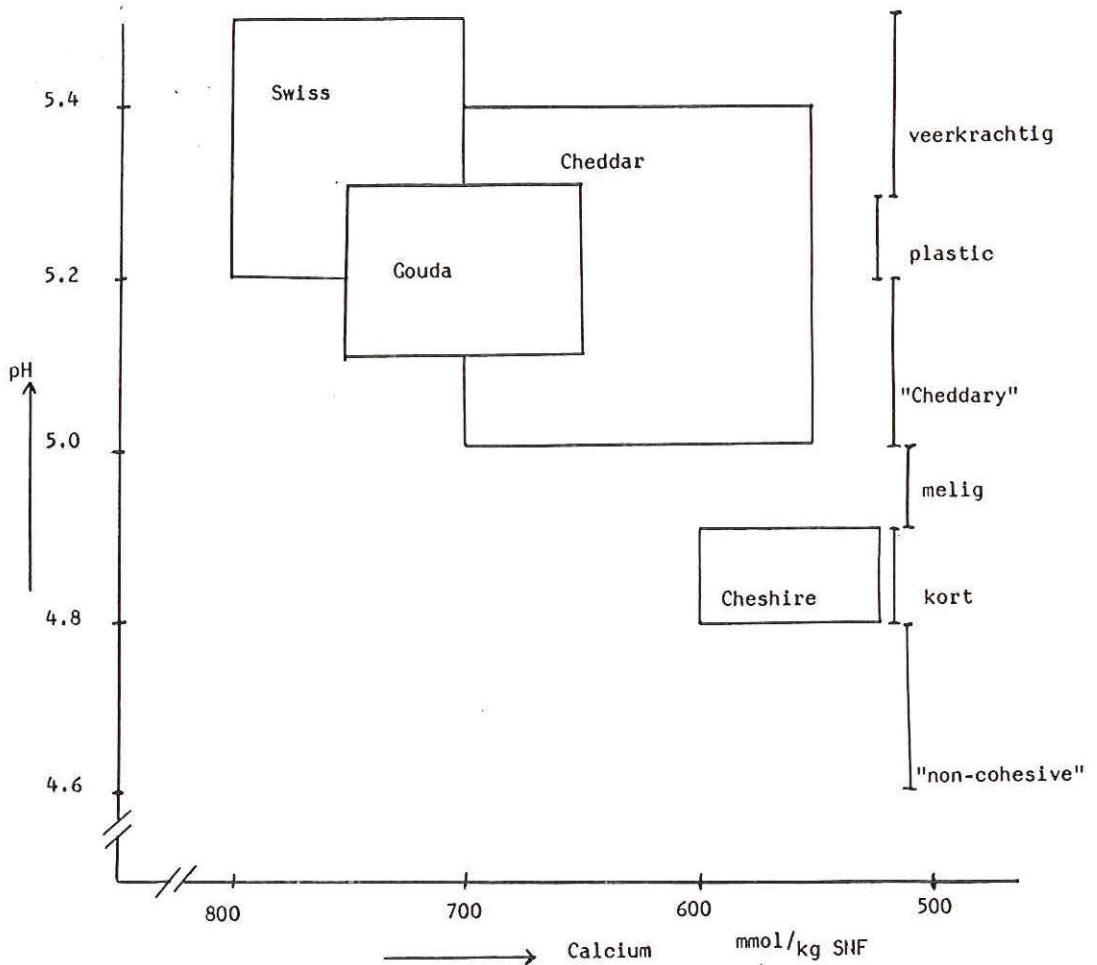
Bij de bereiding van kaas is de controle van de pH van de gestremde melk belangrijk, met name voor cheddarkaas.

Onderstaande figuren geven een kwaliteitsindeling voor cheddarkaas, respectievelijk een indeling voor kaastypen als functie van de pH en het calciumgehalte. Gewezen werd op de relatie tussen % MNFS en % FDM. Een hoger calciumgehalte en aanwezigheid van wei-eiwitten geven een zachtere structuur aan kaas.

Kwaliteitsindeling Cheddarkaas.



S/M = Solid/Moisture
 FDM = Fat in dry matter
 MNFS = Milk non fat solids



Het type Feta heeft een niet-samenhangende structuur.

Dr F.O.'Connor (Ierland) meldde o.a. de resultaten van een ringonderzoek waarbij op 20 verschillende bactoscans 1665 melkmonsters waren geanalyseerd. De resultaten waren slecht. Dit en houdt verband met de referentiemethode, die te slecht is om de bactoscan goed te kunnen ijken.

Prof. dr R.J. Brown (Utah Universiteit Ver. Staten), presenteerde een lezing over de snelle bepaling van hoofdcomponenten in melk(produkten) met (nabij) infrarood apparatuur. Apparatuur dient "accurate, precise, sensitive, selective, stable, robust (especially for industry) and affordable (maybe most important)" te zijn. Hij verwacht in de toekomst een verlegging naar een specificatie van de thans onderzochte hoofdcomponenten, dat wil zeggen, naast bepaling van het totaal vetgehalte ook die van de vrije vetzuurgehalten, naast totaal eiwit ook het wei-eiwit en de caseïnes. Hiervoor zijn snel scannende instrumenten nodig in plaats van filterapparatuur.

Hij weest er op dat de huidige apparatuur "precise" werkt, maar dat de "accuracy" te wensen overlaat ten gevolge van de tekortkomingen van de referentiemethoden. De verwachting is dat deze accuracy zal gaan toenemen, immers, alle informatie van het monster is in het spectrum aanwezig, dus zonder calibratie moeten gehalten te bepalen zijn (bijvoorbeeld via standaardditie). Apparatuur dient daarbij niet in hardware, maar in software aangepast te worden en wel zo, dat de apparatuur via de spectrum informatie "self calibrating" wordt.

Ir M.G. van den Berg (Melkunie Holland BV) belichtte in algemene zin het kwaliteitsaspect aan de hand van een drietal invalshoeken: de consument, de producent en de produktspecialist. Hij wees onder andere op het belang van het ontwikkelen van nieuwe produkten, de blijvende aandacht voor het scala van bestaande produkten, het belang van "packaging and labelling" als deel van het produkt en de introductie van gecertificeerde produkten. Een aantal definities omtrent de kwaliteit passeerde de revue: "Quality is like a choral singing under the direction of hundred conductors".

"Quality is the totality of features and characteristics of a product or service to bear on its ability to satisfy a given need".

"Quality is the measure of a products' fulfilment of consumer expectations".

Verder haalde hij Juran aan met "Quality cannot be inspected into a product but must be built in" en Crosby met "Quality is too important to leave it to the professionals".

Hij wees op het gevaar van "the bureaucracy as the mortal enemy" in het gehele kwaliteitsgebeuren.

Dr. F. Harding (Milk Marketing Board, UK) wees op de enorme schaalvergroting in en centralisatie van de kwaliteitscontrole van melk. Voor de uitbetaling is de samenstelling van de melk (gemiddelde samenstelling: 3,96% vet, 3,27% eiwit en 4,63% lactose) van belang, de hygiënische kwaliteit (onderzocht met het "total bacterial count system"), het celgetal en de afwezigheid van antibiotica en desinfectantia (fenolen verboden). Voor het voorkomen van zware metalen gelden geen boeteregelingen.

Dr. D.I. Jervis (St. Ivel Ltd, UK) wees op het verband tussen het aantal aanwezige psychrotrofe bacterien en de mate van vetzuursplitsing in rauwe melk en de scores van smaakpanels. De kwaliteit van rauwe melk beïnvloedt de kwaliteit van kaas. Voor rauwe gekoelde melk zijn derhalve specificaties vastgesteld.

Dr ir J.N. de Wit (NIZO) kwam in zijn lezing over toepasbaarheid van wei-eiwitten in voedingsmiddelen tot de conclusie dat deze hoogwaardige eiwitten gelatine niet kunnen vervangen voor wat betreft de waterbindende capaciteit en schreef dit toe aan het "unfolding" vermogen dat bij gelatine in tegenstelling tot wei-eiwitten irreversibel verloopt bij verhoogde temperatuur.

2.3 Lezing en sluitingssessie

Tijdens de plenaire sessie op de laatste dag van het congres, die overigens maar matig bezet was, betoogde Dr. E.W. Speckmann (National Dairy Council, Ver. Staten) dat "Dairy foods are protecting foods" en daarmee goed voor de gezondheid, zoals uit een reeks onderzoeken bleek.

De bijdrage van zuivelprodukten aan de nutrientenbehoefte bedraagt in Amerika voor: Ca 76%, P 36%, Zn 20%, Mg 19%, eiwit 21%, vit. B2 35%, vit. B6 11%, vit. B12 20% en vit. A 12%.

Calcium speelt een belangrijke rol bij de skeletopbouw, de regeling van de bloeddruk en het voorkomen van kanker. Voor volwassenen is de aanbevolen dagelijkse opname van calcium gesteld op 800 mg. Voor vrouwen in de leeftijd van 12 tot 24 jaar is deze aanbevolen opname 1200 mg en in de leeftijd tot 8 jaar 800 mg. Speckmann meldde dat uit onderzoek is gebleken dat consumptie van 3 glazen melk per dag de kans op het krijgen van darmkanker met een factor 2 deed afnemen. Door zuivelconsumptie neemt ook de kans op maagkanker af. Uit Japans onderzoek bleek de combinatie groente, sojabonensoep en melk een risico-verlagende uitwerking op maagkanker te hebben.

De waarschuwing van de Amerikaanse regering om minder vet te eten om het ontstaan van hartinfarcten tegen te gaan vond hij wetenschappelijk ongegrond. Zo wordt geadviseerd magere melk (<1% vet), plantaardige margarines en magere kaas (<2% vet) te gebruiken in plaats van de vetrijke dierlijke produkten. Uit wetenschappelijk onderzoek is geen correlatie gevonden tussen het vetgehalte in de voeding en het voorkomen van hartinfarcten en dit is een bemoedigend resultaat voor de zuivelsector. "The problem is not the dinner, but the diner".

Genoemde Amerikaanse aanbeveling zal volgens hem overigens op korte termijn teruggedraaid worden.

Speckmann meldde verder nog dat het gebruik van volle melk door kinderen beter is dan het gebruik van magere melk. De laatste groep kinderen bezocht gemiddeld 5 maal vaker de arts (maag-darmstoornissen). In verband met de groei en ontwikkeling van kinderen is het belangrijk gedurende de eerste 20 levensjaren de zuivelconsumptie niet te veranderen. Hij besloot met "Dairy foods are protective foods and this is a challenge for the producers".

2.4 Synopsis

Dr. E. Mann (IDF) gaf een synopsis van het congres. Melk kan een nieuwe dimensie krijgen door het te gebruiken als bron van ingrediënten voor andere voedingsmiddelen.

De zuivel kan zich wereldwijd staande houden b.v. via een wereldzuivelovereenkomst, inhoudende een produktiebeperving in de rijke landen en steun aan de derde wereld teneinde de groeiende kloof tussen vraag en aanbod te slechten.

Erkend werd dat de zuivelindustrie niet op zichzelf staat maar een deel is geworden van de voedingsmiddelenindustrie, onder andere door het verwerken van uit melk geïsoleerde grondstoffen in voedingsmiddelen. Een bekend voorbeeld zijn de wei-eiwitten, die aanvankelijk als afvalprodukt van de kaasbereiding beschouwd werden maar thans als hoogwaardige grondstof brede toepassing vindt in de voedingsmiddelen- en farmaceutische industrie.

Mann hield een aantal aanbevelingen voor, waarbij de nadruk lag op de groeiende ongelijkheid tussen verschillende delen in de wereld. Zo moeten er gepaste maatregelen komen voor produktiebeperkingen van melk in de westerse wereld, maar daarbij dienen de blijvende gevolgen voor de melkveehouders wel opgevangen te worden. De kosten van melkproduktie moeten en kunnen omlaag door gebruik te maken van alle moderne genetische, wetenschappelijke en technische instrumenten waarover wij beschikken, dit om de concurrentiekracht ten opzichte van de andere voedingsmiddelen te behouden.

3. Conclusies

Afsluitend kan gezegd worden dat er veel interessante informatie werd opgedaan bij het International Dairy Congress. De methoden van onderzoek zijn wat weinig aan bod gekomen. Er viel zelfs een lezing uit bij het seminar "Modern methods of analysis of milk and milk products". Aan het onderzoek van zuivelprodukten, met name de produktontwikkeling, wordt veel aandacht besteed. Vele nieuwe produkten zullen een weg naar de consument vinden. Ook wordt veel aandacht besteed aan de bereiding van niet traditionele kaas.

Hieruit valt voor het RIKILT te concluderen dat er voor wat betreft het ontwikkelen van nieuwe methoden van onderzoek nog veel op ons af zal kunnen komen.

Bijlage:

Summaries van alle lezingen

Literatuur

Gepresenteerde posters: op bibliotheek RIKILT als boekwerk onder de titel: "Milk, the vital force". Posters Presented at the XXII International Dairy Congress, The Hague, September 29 - October 3, 1986. Edited by International Dairy Federation.

Proceedings van het congres: op bibliotheek RIKILT (zal binnenkort verschijnen).

Monday 29 September 1986

SUMMARIES OF THE PLENARY SESSION PAPERS

Plenary session on
WORLD ECONOMIC DEVELOPMENTS
AND AGRICULTURE
Dr. M. J. Williams,
United Nations World Food Council, New York, US

Since the mid-1970s we have witnessed dramatic changes in the world food situation – from Malthusian fears in 1974 of diminishing food availability in the face of expanding populations, to a situation today where excess agricultural capacity in the industrial countries is placing serious strains on the economies of developed and developing countries alike. Only in Africa are the Malthusian fears very real. In an agricultural era characterized by unmarketable surpluses and many hungry people, the linkages among the food economies of the developed nations and the Third World make public policy inherently complex, politically difficult, and incredibly costly. Moreover, such actions are potentially far-reaching, with ramifications for the future. The major food-producing countries are only now – slowly – beginning to address these issues. The result of these changes will have a fundamental impact on the farmers and economies of all countries and on the prospects for a food secure world.

Plenary session on
ECONOMIC DEVELOPMENTS AND DAIRYING
Drs. H. Schelhaas,
Commodity Board for Dairy Products, Rijswijk, NL

In recent years a number of major changes have occurred in the dairy sector and in agriculture in general. Factors which play a role here are: almost unprecedented rapid technological advance, an unstable world economy (worldwide economic depression, debt crisis, oil price), mass unemployment, scale enlargement, steeply rising productivity, growing attention for factors such as environment, health, etc., growing urbanisation, more leisure time, rising food production in the Third World but still no solution to the hunger problem.

From the economic point of view, the dairy industry is based on a relatively expensive raw material which makes its competitive position (substitution products) vulnerable; on the other hand the unique quality of that raw material (over 100 elements) offers almost unlimited opportunities for product variation and the manufacture of products unique in quality and high in added value.

More than other agricultural sectors, the dairy industry has in recent years come up against the limits of growth. Compared with the 1970s, dairy policy has already changed fundamentally and seems likely to change further in the years to come. Dairying will not be able to become a protected reserve in the middle of a dynamic (world) economy.

The forthcoming GATT negotiations, aimed at continuing liberalisation of international trade, may

prove very important and lead, among other things, to improved economic relations, a rise in purchasing power (especially in the Third World) and greater international specialisation. The present, almost chaotic, situation on the world dairy market in any case calls for urgent reinforcement of international cooperation.

Plenary session on
DEVELOPMENTS IN MILK PRODUCTION
AND DAIRY FARM MANAGEMENT
Dr. R. Jarrige,
Institut National de la Recherche Agronomique,
Theix, FR

The genetic milk potential of dairy cows will continue to increase as a consequence of 1) the massive gene transfers from the North American breeds (Holstein Friesian, Red Holstein and Brown Swiss) and 2) the probable increased rate of genetic change by embryo transfer and splitting. Dairy farmers in the EEC can adapt to milk quotas either by a reduced number of cows at a higher production level, as in North America, or by a reduced concentrate feeding. The influences on milk quality of these different trends and of possible changes in herd management and in milk collection are discussed.

Plenary session on
DEVELOPMENTS IN DAIRY PROCESSING
Dr. P. Robertson,
New Zealand Dairy Research Institute, Palmerston
North, NZ

Future applied research on dairy processing will centre upon reducing manufacturing costs and on improving the quality and consistency of products. Speed of processing will be less important than quality. Research and processing will give increasing emphasis to functional properties as the potential for dairy ingredients in food systems is recognized. More basic studies will focus particularly on aspects of genetic engineering, fermentation, especially in relation to by-products, and recovery of minor components of milk.

Tuesday 30 September 1986

SUMMARIES OF SEMINAR PAPERS

Seminar I PROGRESS IN CHEESE TECHNOLOGY

COAGULANTS AND THEIR ACTION

Prof. Dr. P. F. Fox,
University College, Cork, IE

The primary function of rennets is to specifically hydrolyse micelle – stabilizing κ -casein with the minimum of general proteolysis (which reduces cheese yield). Gel strength, and consequently cheese yield, are influenced by rennet action. Rennet retained in the curd plays a key role in the ripening of low/medium-cooked cheese. Secondary rennet proteolysis is primarily responsible for textural changes and resulting large peptides are hydrolysed by bacterial proteinases/peptidases to small peptides and amino acids which contribute to cheese flavour; amino acid catabolism leads to several sapid products. Proteolysis is important for the release of such compounds.

Starters:

FUNDAMENTAL ASPECTS

Prof. Dr. M. Teuber,
Bundesanstalt für Milchforschung, Kiel, DE
The function of microbial starter cultures in cheese manufacture is the initiation of biochemical processes (e.g. lactic fermentation, proteolysis, aroma production) which contribute essentially to the overall ripening and final quality of cheese. Some of the necessary enzymes as well as some bacteriophage resistance systems are genetically linked to plasmids. This opens the possibility to stabilize microbial functions in cheese making by genetic manipulation of the involved cultures. Progress and prospects will be discussed.

Starters:

AS A MEANS OF CONTROLLING CONTAMINATING ORGANISMS

Dr. A. V. Gudkov,
All-Union Research Inst. of Butter and Cheese-making,
Uglich, SU

Besides acids some species and strains of lactic acid bacteria produce other antimicrobial substances. Lactic streptococci and lactobacilli strains producing inhibitors against Enterobacteria and Clostridia were used for manufacture of semi-hard cheeses from milk seeded up to 100 cfu/ml of *E. coli* or *C. tyrobutyricum*. These cheeses and cheeses made of unseeded milk were of the same quality.

Starters:

APPLICATION IN THE DAIRY

Prof. Dr. Ch. Daly,
University College, Cork, IE

The demands of modern intensive cheese production have stimulated advances in the application of starters. Careful selection, propagation and storage procedures have provided stable mixtures and defined

strain blends in a variety of forms suitable for either bulk tank or cheese vat inoculation. Approaches to bulk culture preparation have included consideration of: protection against disturbing bacteriophage; yield; activity and cost. Scientifically based activity tests have evolved to ensure maximum process control and facilitate strain selection.

CHEESE COMPOSITION

Dr. R. C. Lawrence,
New Zealand Dairy Research Institute, Palmerston
North, NZ

Specific cheese varieties can be classified by their normal ranges of pH at one day and calcium content. The latter is largely determined by the pH of the curd at draining, which also controls proportions of residual chymosin and plasmin in cheese. Rates of proteolysis by these enzymes are determined by the ratios of salt to moisture and of moisture to casein. These should therefore also be within specified ranges to achieve uniform cheese quality.

Mechanization:

SOFT CHEESES

Dr. J. L. Maubois,
Inst. Nat. de la Rech. Agronomique, Rennes, FR
Summary not received.

Mechanization:

BRINE SALTED CHEESES

Ir. G. van den Berg,
NIZO, Ede, NL
Many factories specializing in semihard and hard brine salted cheeses have installed during the last years new mechanized and automated production lines. Nowadays they are based more on modern scientific insights into biochemistry and technology with respect to maximum yields, quality assurance and minimum cost price. Attention will be paid to the background and test results of the most important equipment for curd making draining and pressing, brining and ripening.

Mechanization:

DRY SALTED CHEESES

Prof. Dr. N. F. Olson,
University of Wisconsin, Madison, US
Mechanical handling of dry-salted cheese, i.e. Cheddar, has progressed at all stages of manufacturing to enhance efficiency, sanitation, and cheese quality and yield. Computer-mediated process monitoring and control are integral parts of mechanized systems. These controls include milk standardization, temperature, time, pH and coagulum firmness. Methods of pressing salted curd and of cheese packaging are rapidly evolving technologies. Ultrafiltration is used to make cheese for processing and is being applied to hard cheeses.

AUTOMATION

R. Ahlström,
Alfa-Laval Food Engineering A.B., Lund, SE
Automation is a most relevant factor in today's cheese factories where size and degree of mechanisation are large. Today a computer system is the best solution to store information and control the process parameters.

It is still difficult today to match a transmitter system ideal for every parameter to a computer system to take advantage capabilities of all the capabilities of all the computers.

Seminar II MILK PRODUCTION AND MILK PRODUCTS IN DEVELOPING COUNTRIES

COWS' MILK

Prof. Dr. H. Bakker,
Hendrix' B.V., Boxmeer, NL, former Professor at University of Agriculture, Wageningen, NL
A brief description will be given of cattle numbers, farming systems with dairy cattle in developing countries and the relative importance for dairy production of this species.
Relevant production factors will be discussed such as breeding, nutrition, management, housing and infra-structural facilities.
Milk yield, milk composition and production efficiency figures will be given for different breeds and circumstances and some examples of dairy cattle improvement programmes will be presented.

MILK OF OTHER ANIMALS

Dr. V. N. Tripathi,
National Dairy Research Institute, Karnal, IN
Besides cattle, the species of livestock contributing to the supply of milk are water buffaloes, goats, sheep and camel. In developing countries buffaloes and goats are very important sources of milk. Of the total annual supply of 38 million tonnes of milk in India around 60 per cent is contributed by water buffaloes. The most important dairy breeds of water buffaloes belonging to the Indian subcontinent are the Murrah, Nili-Ravi, Jaffarabadi, Mehsana and Surti. The first three breeds are of the large type while the last two are medium sized. The average fat, proteins and SNF contents in milk of the Murrah breed were 7.45 ± 0.03 , 4.43 ± 0.01 and $11.13 \pm 0.01\%$ respectively. The performance of the Nili-Ravi breed of buffaloes is similar to that of the Murrah. The Jaffarabadi breed is of a very heavy type and has a high milk yield potential and is found in the Saugarashtra region of India. Very little research work has been done on this breed. The Surti breed is early maturing and noted for the high content of fat (8%) in its milk, but it yields a lesser amount of milk than Murrah.

COLLECTION, TRANSPORT, COMPOSITIONAL AND QUALITY ASSESSMENT

Prof. Dr. A. W. Morsy, } *lezing door J.J. Mol.*
Cairo University, Giza, E }
In Egypt, 63 milk collecting centres have been established to serve collection, cooling and transport of milk delivered from producers to 8 well-equipped dairy plants, where it is heat treated as fluid milk or manufactured into certain dairy products. Compositional and quality control tests are applied according to the Egyptian Standard Specifications and legal requirements.
Small private dairies, supplied with milk from small producers, are scattered all over the country, and take

active part in manufacturing of some milk products. A dairy training centre has been recently established in Egypt (Alexandria), in collaboration with FAO, for training those sharing in dairying whether from Egypt or other regional developing countries.

COMPOSITION AND QUALITY OF MILK AS A BASIS FOR PAYMENT OF FARMERS

Ir. J. C. T. van den Berg,
Dept. of Agriculture and Fisheries, Wageningen, NL
The composition and quality of fresh milk affect the properties of the milk products to be manufactured. Therefore, the introduction of a system for payment of milk is essential to improve its quality and to prevent adulteration.
The choice of a system for payment and the way it should be introduced and implemented largely depends on local conditions, with technological and psychological implications. The payment of farmers will be discussed in this light.

SPECIFIC ASPECTS OF THE PROCESSING OF MILK

Prof. Dr. M. R. Bachmann,
ETH-Zentrum, Zürich, CH
Forty years after the beginning of development-cooperation little is known of the mechanisms controlling success or failure of technology transfer. This uncertainty together with the extremely perishable raw material 'milk' make dairy technology in developing countries most hazardous. However, fortunately successful dairy projects also exist in developing countries. With the aid of positive and negative examples the problems of technology transfer in general and of milk processing in particular are discussed.

INTO MILK, CREAM, CONDENSED AND EVAPORATED MILK

Ir. A. Sjollema,
ccFriesland/Cooperative Company,
Leeuwarden, NL
Recombination is in principle a simple mixing process. However, especially for the title products, selection of raw materials is essential for producing products of good quality. 'Tailor-made' skim milkpowder should be used. For example, evaporated milk needs a heat-stable powder and sweetened condensed milk a viscosity-specified powder.
In fact, the recombining process starts in the factory of the raw materials supplier, making the total process less simple than it seems at first sight.

INTO FERMENTED PRODUCTS (INCL. CHEESE), BUTTER AND ICE-CREAM

S. Bøjgaard,
Danish Turnkey Dairies, Ltd. Aarhus, DK
Recombined, fermented milk products such as yoghurt, laban drink and Labaneh are produced in large quantities in the Middle East. Furthermore, in this area a lot of recombined cheeses, especially white cheeses, are produced.
Ice cream from recombined milk has a long world-wide tradition, and a large part of today's production is made of recombined milk.
Recombined butter is a fairly new product which is produced in very limited quantities today.

NUTRITIONAL ASPECTS

Dr. T. N. Maletnlema,
Tanzania Food and Nutrition Centre, Dar es Salaam, TA
Summary not received.

Seminar III MARKET AND MARKETING OF DAIRY PRODUCTS

PLANNING THE DAIRY ENTERPRISE TO MEET THE CHALLENGES OF THE MARKET PLACE

R. Ristola,
Valio Finnish Co-op. Dairy's Ass., Valio, FI
What is our market, local, national, export market or the combination of all?
The significance of the changes which have taken place over the past years on the market scene and the challenges posed to the dairy industry by the same. What trends of development can we detect on the market and what should we do in order to be able to respond to the challenges and to cope with the foreseeable changes.

PLANNING THE DAIRY ENTERPRISES TO MEET THE CHALLENGES OF THE MARKET PLACE

Dr. R. Hilker,
Meierei-zentrale Nordmark e.G., Hamburg, DE
Research successes in the natural and technical sciences, embodied in new technologies, are steadily increasing investment requirements in the dairy industry. To minimize risks, investment decisions must, more than ever before, be supported by the market. The paper discusses changes resulting from population trends and developments in nutrition and shopping habits.

PRODUCTION AND MARKETING OF MILK AND MILK PRODUCTS IN EAST EUROPE

Y. S. Shilnikov,
USSR Ministry of Meat and Dairy Industries, Moscow, SU
Actions undertaken by the governments of the East European countries to improve dairy cattle-breeding and to increase milk production resulted in considerable rise in dairy products manufacturing. Dairy enterprises are being built and provided with the newest equipment. Fermented products and baby foods on milk basis are produced ahead of schedule. The task is to further increase dairy products manufacturing to gain per head consumption recommended by physiologists. More funds are given for research.

CHANGES IN FOOD DISTRIBUTION SYSTEMS AND THEIR IMPLICATIONS FOR DAIRY ENTERPRISES

A. Dare,
St. Ivel Ltd., Swindon, UK
The UK market has witnessed some major changes:
– Van selling has almost disappeared, being replaced by pre-order distribution systems.
– There has been a major concentration in buying power which has had effects on distribution systems as well as product catalogues.

– There has been significant investment in chiller cabinets by retailers and improved chill chain facilities by manufacturers.

These major trends have fundamentally changed the nature and the control of the distribution systems in the UK.

MAJOR PROBLEMS IN THE MARKETING MANAGEMENT OF MODERN DAIRY ENTERPRISES

Ir. A. J. Kranendonk,
ccFriesland/Cooperative Company, Leeuwarden, NL
Changes are taking place, making it necessary to alter the dairy industry's traditional approach to marketing. Balance of payment difficulties are reducing demand in the traditional export markets and there is a strong drive for self-sufficiency in dairy production. Physical distribution and retailing systems are making fresh milk supply possible to consumers even in tropical countries and overcapacity in the producing countries is adding extra urgency to those changes. Finding creative answers to these trends is a major challenge to the marketing of dairy products.

MAJOR PROBLEMS IN THE MARKETING MANAGEMENT OF MODERN DAIRY ENTERPRISES

H. R. Felix,
Milchverband Winterthur, CH
Major problems of the dairy industry arise from saturated markets, narrow margins, government controlled retail prices for commodity items (milk, butter, cheese) and low wholesale prices. Therefore, dairies concentrate on special products in expanding market segments which do not come under government control (yogurt, desserts). Successful marketing strategy of TONI:

- attractive product range
- image for high quality products and excellent customer service
- responsibility for environmental protection

With the system of returnable packaging TONI is not only economically successful, but also contributes, together with retailers and consumers, to a greater ecological awareness.

THE LIQUID MILK MARKET

R. Hall,
Dairy Trade Federation, London, UK
Presentation will concentrate on European Community and will be divided into two parts. First will review national markets over last ten years, in particular trends from fresh to long life, from whole to low fat, from glass to cartons, from controlled prices to increasing competition and from small outlets to large retailers. Second will discuss major issues foreseen in next 15 years, especially diet and health debate, growth of substitutes, opportunities for added value and importance of maintaining wide distribution.

THE BUTTER MARKET

B. A. Joyce,
Irish Dairy Board, Dublin, IE
The inadequacies of the planning instruments used in the dairy producing countries of the world manifest themselves in the international butter market. The

availability of product is very rarely related to consumer demand patterns because ordinary supply and demand considerations are rarely if ever allowed to operate. We have in the butter industry the added dimension of vested interests making outrageous and unsustainable claims against our product in the interests of promoting their own. We have failed to respond adequately to these outrageous claims and consumer demand has suffered as a consequence. The time has come for a more spirited response.

THE CHEESE MARKET

L. Raun,

Danish Dairy Board, Aarhus, DK

The international trade in cheese is probably the least depressing when discussing trade in dairy products. While a development in trade in most dairy products has shown a steady decrease over the last years and the outlook at present seems rather grim, the cheese market has proven an overall stability even though there are great variations between product types in the world trade for cheese. There has been a shift towards the more value-added and speciality products. EEC is the main cheese exporter in the world and the cheese market is the only one where the EEC up till now has successfully defended the position mainly due to the great variety of the product range.

PRESERVED MILK PRODUCTS

Dr. K. J. Kirkpatrick,

New Zealand Dairy Board, Wellington, NZ

SMP: Growth in world production has recently eased back. Consumption in developed countries has remained static for a decade and exports which grew throughout the 1970's have recently flattened out. *WMP*: While exports over the last five years have shown a healthy growth this has now eased and may not be sustainable unless the product is further improved.

Condensed and evaporated milk: Exports have recently made a comeback.

Casein: Both production and exports over the last decade have increased markedly. The trend towards use in specialised food ingredients continues and future demand growth will depend on further product and market development and the stability of price and supply.

INCREASING DAIRY PRODUCT SALES WITH NON-BRAND ADVERTISING

E. Hoy McConnell,

D'Arcy Masius Benton & Bowles Inc.,
Chicago, US

Total milk production in the US has been increasing faster than consumer demand – resulting in a growing surplus problem. To counteract this situation, US dairy farmers are undertaking an aggressive and multi-faceted effort backed by a \$ 100 million non-brand advertising campaign to stimulate increased sales. Four key programmes will be analysed, including fluid milk, cheese, and two all-products campaigns – one featuring dairy calcium and one combatting imitations.

DO ADVERTISING, SALES PROMOTION AND NUTRITION EDUCATION PAY?

C. Chevalier,

Canadian Dairy Bureau, Toronto, CA

The investment in advertising in North America exceeded 27 billion dollars in 1985. Pepsi Cola and Coca Cola spend over 800 million dollars on advertising and promotion each year just to sell 10 ounce cans of water with a little flavouring, syrup and 8 teaspoons of sugar.

Are they successful?

Combined, the 2 softdrink giants sold over 13.3 billion dollars' worth last year – that's 1 huge pile of pop that has no nutritional value.

Companies don't invest huge amounts of money in advertising because they want to. They do it because they have to ... to compete successfully for their share of consumers' minds, they must constantly keep their products within the peripheral vision or hearing of their audiences.

If they don't, the old adage prevails, 'out of sight, out of mind', and we may add 'out of business'.

Promotion is the single largest influence on purchase decisions-bar – none. Whether we like it or not, if we want to be successful, we must promote louder, longer and better than our competitors or we die. As Henry Ford said decades ago: 'I don't care what the press says about me, as long as they get my name spelled right'.

DO ADVERTISING, SALES PROMOTION AND NUTRITION EDUCATION PAY?

E. Schmekel,

SMR, Stockholm, SE

It is difficult to give a straight answer in terms of cash. To achieve any impact on the market, the dairy industry must earn the trust and confidence of the consumer and the retail trade which can only be earned on the basis of a thorough understanding of the products. The consumer, with only a vague concept of the product will prove an easy prey to the propaganda of competitors and the mainstream of public debate. To get his message across to the consumer in a modern supermarket, the manufacturer needs to ensure that the volume and quality of his promotional material is on a par with that of his competitors. A continuous flow of information on the importance of dairy products to a balanced diet must be made available to physicians, teachers, journalists and other moulders of public opinion. These critical groups need to be kept supplied with information and induced to adopt a positive attitude towards the products as their opinion on nutritional matters is the one that finds most frequent expression in the media and elsewhere.

Wednesday 1 October 1986

SUMMARIES OF SEMINAR PAPERS

Seminar I PROGRESS IN CHEESE TECHNOLOGY

CONSISTENCY

Prof. Dr. Ir. P. Walstra,
University of Agriculture, Wageningen, NL
Cheese is a visco-elastic material with a very low yield stress and a very high apparent viscosity. Although rheological parameters vary considerably in magnitude, qualitatively the behaviour is the same, at least for small deformations and long times. Greater differences are experienced if deformation is rapid and large, as is the case during eating, cutting, grating or spreading of cheese. The application of fracture mechanics opens new and better ways for understanding these phenomena. The effect of several compositional and environmental variables, including proteolysis, will be discussed.

FLAVOUR

Dr. J. Adda,
Institut National de la Recherche Agronomique,
Jouy-en-Josas, FR
Flavour develops in cheese during the ripening period through enzymatic, microbial and chemical transformations of the curd constituents. If some mechanisms have been well enough demonstrated we are still far from controlling the flavour development as if some basic understanding was still missing. Attempts have been nevertheless made to use lipolytic and/or proteolytic enzymes to accelerate the ripening process but these have often resulted in unbalanced flavour or bitterness.

NUTRITIONAL ASPECTS

Prof. Dr. E. Renner,
Justus-Liebig-Universität, Giessen, DE
Because of protein hydrolysis during cheese ripening the digestibility is increased. Cheese is suitable for persons suffering from lactose malabsorption and for diabetics, as it has a very low lactose concentration. Calcium, phosphorus and magnesium in cheese are as well utilized as those in milk. During ripening, B vitamins are both used and synthesised by the cheese microflora. By heating or ultrafiltering the cheese milk, whey proteins pass into fresh cheese, thereby the biological protein value is increased.

SAFETY ASPECTS

Prof. Dr. H. A. Morris,
University of Minnesota, St. Paul, US
Milk has been preserved as cheese for centuries. Improvement in sanitation and milk treatment has minimized contamination by pathogens. Inhibition by starter bacteria, high acid, high salt, low moisture, metabolites and curing conditions inhibit growth and survival of pathogens. Progress has occurred in monitoring and eliminating possible health problems

associated with cheese. Application of research findings has resulted in minimizing contamination and closer control of harmful microbes, making cheeses among man's safest foods.

Combined morning session

Seminar II MILK PRODUCTION AND MILK PRODUCTS IN DEVELOPING COUNTRIES

Seminar III MARKET AND MARKETING OF DAIRY PRODUCTS

QUANTATIVE ASPECTS

Dr. D. E. de Roon,
Commodity Board for Dairy Products, Rijswijk, NL
This paper presents a picture of the development of the production of milk of all types and the processing of that into dairy produce during the years 1978-1984 while also the trends in the external trade are described and analysed. As basic material served the FAO production Yearbooks and national statistics of foreign trade. For the formation of homogeneous groups of countries the classification described by the World Bank in its Development Reports was used.

MARKETING ASPECTS

Dr. F. Jolliet,
Nestec Ltd., Vevey, CH
Although basic marketing rules apply to all markets, either developed or less developed, they have to be adapted to the realities of individual markets, or of a given region, if habits/consumer attitudes towards foods/political/agricultural/economic and infra-structural constraints are homogeneous. Consequently, it is not recommended to develop an International centralized marketing strategy except in the case of branding policy. Important overall marketing constraints will be discussed.

SOCIAL AND ECONOMIC ASPECTS OF RECOMBINATION AND INDIGENOUS MILK PRODUCTION

Dr. L. A. Barrón del Castillo,
FAO, Rome, IT
Dairy development is being promoted in a number of developing countries. It has proved to be a valuable instrument in effecting economic development and social change. The small producers benefit through the generation of employment, improved farm income, etc. Successful integrated dairy development projects in some developing countries confirmed that the standards of living of rural families can be significantly raised through organized dairying. The introduction of recombined milk should not adversely affect these achievements.

ADVANTAGES AND PROBLEMS ASSOCIATED WITH DAIRY DEVELOPMENT

Dr. V. Kurien,
National Dairy Development Board, Anand, IN
Milk production is a labour-intensive and agricultural by-product based subsidiary occupation of farmers.

Milk producers are socio-economically disadvantaged and disorganized rural people, who, having no access to market, fall prey to the 'middleman' exploitation. The result is unremunerative prices and stagnation in milk production. This must change by putting the instruments of development into farmers' hands – like India's successful experiment of 'Anand Pattern'. 'Dairy surpluses' in the West provide excellent opportunities for bringing about this change, when handled with care by those committed to farmers' interests. Properly handled dairying can serve as an instrument of socio-economic change in the rural sector of developing countries.

DAIRY FOOD AID

F. Pronk, WFP, Rome, IT

The purpose of dairy food aid can be either improved feeding of malnourished people or promotion of local dairy production through assistance to dairy farmers and the processing and marketing industry.

In the first case, logistical and distribution problems as well as sustained financing are the major issues to consider.

In the second case, a national integrated livestock policy and dairy price policy are the first requirements to be met if the project is to achieve its aims.

CRITERIA FOR SUCCESS OR FAILURE OF DAIRY DEVELOPMENT PROGRAMMES

M. J. Walshe,

The World Bank, Washington DC, US

A strong demand for milk and milk products is a prerequisite for dairy development. A country's resources, particularly its feed base, must enable efficient competitive development to take place. Institutions must be established to handle collection, processing and marketing; and provide support services and credit. Governments must provide strong support for institutions which are given powers to protect fledgling dairy industries and are capable of guiding, directing and implementing dairy sector development.

Seminar III MARKET AND MARKETING OF DAIRY PRODUCTS

THE CHANGING ROLE OF GOVERNMENT IN DAIRY POLICY

G. Haydock, OECD, Paris, FR

Earlier efforts to contain milk production without cutting prices having largely failed, governments in most Western European countries have joined Canada in applying quotas. These should be seen as a change in policy measure not a change in policy. The United States still eschews quotas and is applying a new mix of financial incentives and disincentives. Two traditional exporting countries, Australia and New Zealand, are reducing the support they give to their dairy exporters.

THE CHANGING ROLE OF GOVERNMENT IN DAIRY POLICY

T. O'Dwyer,

Commission of the European Communities, Brussels, BE

Developments over recent years at national and international levels reveal two important policy aspects:

- a) The financial burdens and non-economic effects of national support policies, and
- b) The instability of the world market.

The rapidly growing market imbalance, due to production efficiency and weakening consumption trends, demonstrates certain elements for policy consideration and adaptation. The importance of international trade and limited scope for market expansion also require active policy cooperation at international level.

TRENDS IN WORLD TRADE IN DAIRY PRODUCTS AND FUTURE PROSPECTS

W. Krostitz, FAO, Rome, IT

Only 5 percent of world production of milk and milk products enters international trade, with western Europe, Oceania and North America as the main suppliers and the USSR, Japan and the developing countries as the main importers. Following rapid growth up to the early 1980s, international trade has decreased more recently and, with supplies far in excess of effective demand, prices have been very depressed. There is little scope for recovery in the short term.

MILK SUPPLY MANAGEMENT PROGRAMMES, THEIR STRENGTHS AND WEAKNESSES

Prof. Dr. F. Hülsemeyer, Bundesanstalt für Milchforschung, Kiel, DE

Summary not received.

MILK SUPPLY MANAGEMENT PROGRAMMES, THEIR STRENGTHS AND WEAKNESSES

Prof. Dr. G. Syrrist,

Dairy Research Inst., Ås, NO

The strengths and weaknesses of milk supply management programmes can hardly be evaluated on an absolute and general basis. One meaningful appraisal of their appropriateness would, in the author's opinion, be to register to what extent such a programme fulfils political goals (strengths) and increases the deviations from political goals (weaknesses) in a given situation in a given country. The situation in Norway in the beginning of the 1980's may serve as an illustration.

Seminar IV MODERN METHODS OF ANALYSIS OF MILK AND MILK PRODUCTS

RAPID DETERMINATION OF MAIN COMPONENTS

Prof. Dr. R. J. Brown,

Utah State Univ., Logan, US

Moisture, fat, protein and lactose are the milk components of most importance to those who test dairy products. Newly available testing techniques which are fast, robust and affordable coupled with

improved capacity for collecting, processing and storing data are making assays for these components possible in routine and on-line applications where they were previously impractical. The same advances in instrumentation are improving accuracy and precision and making calibrations better.

DETERMINATION AND EVALUATION OF HYGIENIC QUALITY

Dr. F. O'Connor,
An Foras Taluntais Moorepark Research Centre,
Cork, IE

The fundamental aim of the dairy processor is to secure a raw material which will in no way limit his options in processing or jeopardise the quality of the finished product. To achieve this aim the critical quality parameters must be clearly understood and defined and the necessary control procedures rigidly applied on the route between the cow and the process. The operation of a comprehensive control programme which takes full advantage of the major developments in modern analytical methodology is the key to successful milk quality control in today's industry. The application of these methods is discussed in detail in the paper.

USE OF OFF-LINE AND ON-LINE SYSTEMS FOR REGISTRATION, PAYMENT AND FARMERS' INFORMATION

G. Johnsson, *Verva/les*
SMR Centrallaboratorium, Malmö, SE

There will always be a need for easily available information, in order to ensure proper management at farm level, at dairy plant level as well as at national level for the dairy industry. Significant progress in modern data capturing techniques (microprocessors) and data processing (computers) has made it possible to meet different demands. Some examples are given of how to benefit from these modern techniques within schemes for milk collection, milk analysis (e.g. milk quality payment schemes and dairy herd improvement programmes) and milk processing.

Seminar V NEW METHODS OF CONCENTRATING AND DRYING

REVERSE OSMOSIS: ITS TECHNICAL, TECHNOLOGICAL, ECONOMICAL AND LEGAL ACHIEVEMENTS AND LIMITATIONS

B. S. Horton,
Horton International Inc., Cambridge, Mass., US
The capabilities of reverse osmosis as a means for concentrating milk and whey products are reviewed with respect to membrane materials, design of the systems and specific roles of the process. The history of the uses of reverse osmosis in the dairy industry is outlined in terms of costs relative to the costs of evaporation. The acceptability of membrane materials and of the use of the process in cheese making in the United States is discussed.

MULTISTAGE EVAPORATION AND WATER VAPOUR RECOMPRESSION WITH SPECIAL EMPHASIS ON HIGH DRY MATTER CONTENT, PRODUCT LOSSES, CLEANING AND ENERGY SAVINGS

Prof. Dr. Ing. H. G. Kessler,
Südd. Versuchs- und Forschungsanstalt für Milch-
wirtschaft, Freising-Weißenstephan, DE
With regard to energy saving measures the recent developments in evaporation are mechanical recompression and processing with low temperature differences. Consequently longer residence times of the product in a plant and higher evaporation temperatures are required. But this can increase deposit formation and shorten running times. Evaporation experiments with whey and ultrafiltration-permeates will show influences on overall heat transfer coefficients and possibilities of reducing deposits, increasing running times and efficiency of evaporation plants.

NEW DRYING TECHNIQUES FOR IMPROVED PROCESSING AND FOR WIDER PRODUCT VERSATILITY

Dr. W. B. Sanderson,
New Zealand Dairy Research Institute,
Palmerston North, NZ
Recent developments in spray drying include the supply of high capacity driers incorporating integral fluid-beds and the increasing use of nozzle atomization. Integrated air heating and heat recovery systems are being introduced. More plants are being supplied with fire and explosion control systems and bag filters for environmental and economic benefits. New systems employing multiple drying stages have allowed versatility in the manufacture of product types with characteristics not previously attainable.

Seminar VI CONVERSION OF FEEDSTUFFS IN THE RUMINANT UNDER DIFFERENT CONDITIONS

INTAKE AND COMPOSITION OF TROPICAL FORAGES AND CEREAL CROP RESIDUES

Dr. J. D. Reed,
ILCA, Addis Ababa, ET
Basic feed resources in tropical developing countries are grasses (from fallow land, rangeland and other uncropped areas) and cereal crop residues. Intake and digestibility are limited by high cell wall and low protein. Potential protein supplements consist of oil seed cakes and legume forages and fodder trees. Factors that limit nutritive value of these feed resources are discussed in relationship to appropriate methods of laboratory analysis and development of feeding systems for tropical dairy production.

SUPPLEMENTATION OF FORAGE DIETS, THE NATURE OF THE INGESTED FEED

Dr. T. R. Preston,
Conyenio Institucional para la Produccion
Agropecuaria en al Valle del Rio del Cauca, Cali, CO
Locally available feed resources for dairy cattle in the tropics are native and/or sown pastures, crop

residues, agroindustrial byproducts and tall-growing forages. Most of these feeds are low in total nitrogen, in protein and in lipids; and the non-fibrous carbohydrate fraction is more likely to be present as sugar than as starch. Efficient utilization of these resources is by strategic supplementation in order to optimise rumen function and to balance the end products of digestion in accordance with the productive state of the animal. The overall policy is not to feed cows according to their productive potential but to match the production system with the potential of the feeds available.

FEED CONVERSION AND NUTRIENT PARTITIONING

Dr. H. J. Oslage,
Bundesforschungsanstalt für Landwirtschaft,
Braunschweig-Völkenrode, DE

There are several constraints to ruminant production in the tropics and subtropics. Metabolic and endocrine responses to high environmental temperature affect the pattern of nutrient utilization. A reduction in feed conversion efficiency during heat stress has been reported in growing and in lactating animals. Supplying ruminants in tropical regions with adequate amounts of absorbable amino acids and glucogenic substances is hampered by low voluntary intakes and by the quality and type of feed available. However, the application of sound nutritional principles paves the way for higher productive and reproductive efficiency.

Thursday 2 October 1986

SUMMARIES OF SEMINAR PAPERS

Seminar VII FERMENTED MILK PRODUCTS

DIFFERENT FERMENTED MILK PRODUCTS, THEIR SIGNIFICANCE AND THEIR CHARACTERIZATION

Prof. Dr. E. Lipinska,

Krajowa Komisja Mleczarska., Warsaw, PL

Differences in climate, vegetation and breeds of livestock have led to the emergence of various traditional fermented milk products, prepared either domestically or by cottage industry.

As understanding of the nutritional, dietary and even therapeutic qualities of fermented milk products grows, they have been fully accepted in certain industrialised countries in which their taste qualities have been diversified, and powerful production facilities have been built up.

The consumption of these products is steadily increasing.

CHARACTERIZATION OF CULTURES USED FOR THE MANUFACTURE OF FERMENTED MILK PRODUCTS

Dr. S. E. Gilliland,

Oklahoma State University, Stillwater, US

The ability to produce lactic acid from lactose is perhaps the most important characteristic shared by dairy starter bacteria. Identity of these bacteria depends heavily on their ability to ferment various carbohydrates. Serological typing has been of limited use. However, DNA homology is useful in differentiating closely related species. Characterization of organisms expected to grow in the intestines to provide benefit to the host involves other factors such as bile tolerance and host specificity.

INTERACTION BETWEEN STRAINS IN CULTURES USED FOR FERMENTED MILK PRODUCTS

Dr. V. F. Semenišina,

All-Union Dairy Res. Inst., Moscow, SU

Between starter strains there exist symbiotic and antagonistic interactions caused by lactic acid and specific antibiotic substances accumulation.

Serial dilution is the most suitable method to characterize these interactions in milk.

Because of the above mentioned it is advisable to check starter properties according to main industrial characteristics which must be equal or superior to those of the starter strains.

Furthermore it is preferable to practise cultivation of the starter and not of the separate strains.

NUTRITIONAL ASPECTS OF FERMENTED MILK PRODUCTS

Dr. M. I. Gurr,

Food Research Institute, Shinfield, Reading, UK

Two main aspects will be discussed: the effects on lactose digestion and on gut microflora. The lactose in fermented milk products is more readily digested than an equivalent amount in unfermented milk. This can be advantageous for lactose intolerant individuals.

Fermented products also influence the numbers, types and metabolic activities of micro-organisms in the gastrointestinal tract and these foods may be useful in diets designed to alleviate several disorders of the digestive system.

YOGURT AND BUTTERMILK

V. T. Meriläinen, M.Sc.,
Vailio Finnish Co-op Dairy's Ass., Helsinki, FI
Fermented milks, especially yogurt, have increased their popularity in almost every country during recent years. Their organoleptic quality and properties are determined mainly by the starters used in the production, processing techniques and the additions after fermentation used mainly for the flavoring the product. Production costs of fermented milks are affected by starter handling techniques in the dairy, treatment of milk in the process, fermentation techniques, treatment of the product after fermentation and packaging. All these aspects – their current situation and their possible future development – are discussed in the presentation.

OTHER PRODUCTS

Dr. J. Lj. Rasić,
Food Research Institute, Novi Sad, YU
The manufacturing procedures of specific products including kefir and kumiss, products containing human intestinal strains of lactobacilli and bifidobacteria, and some beverages have been briefly discussed. The preparation of kefir culture from grains, and some new methods of starter preparation have been pointed out. The use of acidophilus bacteria and bifidobacteria in fermented milk products and baby foods have been described, and specific procedures for most products are tabulated. New types of fermented beverages have been mentioned.

FERMENTED MILK PRODUCTS IN DEVELOPING COUNTRIES

Dr. P. A. Shankar,
University of Agricultural Science, Bangalore, IN
Nearly every civilisation in developing countries has relied on the fermentation process for preserving the scarce and precious nutrients present in milk. The milk is fermented at ambient temperatures by using a portion of a previously fermented product or repeated use of the same container. Lactic streptococci, lactobacilli and yeasts constitute the predominant flora. Their mutualistic interactions favour fermentation process under different climatic conditions and suppress pathogens which may enter due to unhygienic practices thus ensuring the safety of the product.

LEGAL ASPECTS

Dr. F. Winkelmann, FAO, Rome, IT
In the field of food legislation, FAO and WHO, provided a forum for international action to protect the consumers and facilitate food trade by establishing the Codex Alimentarius Commission (CAC). Standards for milk products are elaborated by a Government Expert Committee on Milk and Milk Products, a subsidiary body of the CAC. This Committee established standards for yogurt and flavoured yogurts comprising product definitions, compositional requirements

including provisions for food additives and labelling requirements.

Seminar VIII MILK AS A SOURCE OF INGREDIENTS FOR THE FOOD INDUSTRY

THE USE OF MILK POWDER IN FOOD PRODUCTS

Dr. B. K. Mortensen,
Statens Mejeriforsøg Hillerød, DK
A wide range of milk powders is available with various levels of fat and with specified properties regarding, for example, solubility. The discussion includes only ordinary milk powders without fractionation and modification of specific components. The use of different types of milk powders in meat products, convenience foods, dietetic products, beverages and pet foods is covered, and the importance of specific functional properties within the different areas of application is discussed.

THE USE OF MILK POWDER IN CONFECTIONERY AND BAKERY PRODUCTS

Dr. R. A. M. Delaney,
Frito-Lay Inc., Irving TX, US
Milk powders have been used in the confectionery and bakery industries for many years, largely on an empirical basis because of their contributions to colour, flavour, and texture of the products. In addition, incorporation of milk powders can significantly improve the nutritional value of baked and confectionery goods as well as improve their processability. This survey covers the following aspects of milk powders: composition, structure and properties; processing factors that affect the technical performance of milk powders; sources of milk powders; functional properties of milk powder solids and their relevance and application in confectionery and baked goods.

THE USE OF LACTOSE IN FOOD PRODUCTS

Dr. J. G. Zadow,
CSIRO, Highett, AU
The comparatively low sweetness and solubility of lactose has tended to limit its incorporation in formulated foodstuffs. In spite of this however, lactose has developed important markets in specific areas. It forms an essential component of many formulated infant foods and is widely employed in the pharmaceutical, confectionery and baking industries.

DERIVATIVES OF LACTOSE AND THEIR APPLICATIONS IN FOOD PRODUCTS

Dr. L. A. W. Thelwall,
Phillip Lyle Memorial Research Institute, Reading, UK
Summary not received.

THE USE OF MILK PROTEINS IN FOOD FORMULATIONS

Prof. Dr. C. V. Morr,
Clemson University, SC, US

The food industry is using greater amounts of commercially manufactured milk protein products including casein, caseinate, whey protein concentrate and co-precipitate as functional and nutritional ingredients in a large variety of formulated food products. These milk protein products offer special advantages over alternate protein sources in terms of nutritional quality, flavour, colour, protein concentration, availability, cost, compatibility with other ingredients and processing conditions, and functionality, e.g., fat emulsification, aeration, viscosity, solubility, stabilization, water binding and gelation.

THE USE OF CASEINATES IN FOOD FORMULATIONS

Dr. S. S. Gulyaev-Zaitsev,
Ukrainian Meat and Dairy Research Institute,
Kiev, SU

World production and usage of caseins and caseinates in food formulations is steadily growing largely due to the developments of new methods resulting in manufacture of caseins with high biological value and predetermined properties.

It is advisable to intensify research to regulate structure of proteins by chemical, enzymatic and physical treatments and to give them predetermined functional properties.

In order to get products with desired characteristics it is necessary to study protein interactions with food ingredients.

EMPIRICAL AND THEORETICAL CONSIDERATIONS ON THE APPLICATION OF WHEY PROTEINS IN FOOD PRODUCTS

Dr. Ir. J. N. de Wit,
Netherlands Dairy Institute (NIZO), Ede, NL

Whey proteins are well-known ingredients for innovation of dairy and non-dairy products, because of their versatile functional properties. A valid prediction of whey protein functionality in food products requires a thorough knowledge of protein properties under various conditions.

In this paper some properties of whey proteins are compared with those of other functional food proteins in both model systems and food products. A possible relation between physical and functional properties of proteins will be discussed.

MODIFIED MILK PROTEINS AND THEIR APPLICATIONS

Prof. Dr. J. E. Kinsella,
Cornell University, US

The functional characteristics of milk proteins are important in determining the applications in different food products. The development of a data base summarizing the relevant physicochemical properties of milk proteins and their suitability for different foods is urgently needed. To achieve this, standardized methods for measuring functional properties must be critically evaluated and adopted by the international dairy community. The effects of processing and modification on the gelling and surface active

properties of dairy protein preparations will be discussed in this presentation.

THE USE OF MILK FAT AND MILK FAT COMPONENTS IN FOOD PRODUCTS

Dr. W. Banks,

Hannah Research Institute, Ayr, UK

Milk fat, at least in the form of butter, imparts a delicate flavour when incorporated into foods. However, the main criterion, other than price, for selecting a fat for a particular use is its physical properties. The most important of these are the melting/crystallisation characteristics, which are dominated by the fatty acids present and their arrangement into triglycerides. The nature of these complex triglycerides of milk fat and their melting properties will be discussed.

Seminar IX INTEGRATED QUALITY CONTROL AND ASSURANCE

THE TERMINOLOGY LANDSCAPE

Ir. M. G. van den Berg,
Melkunie Holland B.V., Woerden, NL

Speaking of quality is the privilege of everybody. As a matter of course it will lead to confusion in terminology.

What is quality? Is it attributed to the milk or dairy product as such or, otherwise is packaging, representation and labelling included?

The meaning of design quality, quality control and quality assurance will be discussed.

Methodology denominations like Total Quality Control, Good Manufacturing Practice, Integrated Quality Control, Quality Circles and Quality Management represent various approaches in different branches of industry. It is the intention of this contribution to elucidate the most essential terms and to add some fundamental statements of founders like Juran and Demming.

FARM INSPECTION AND QUALITY CONTROL

H. Wainess,
Consultant, Northfield, Ill., US

After a comprehensive study, at the turn of the century, and research to identify and evaluate hygienic measures for prevention of milk borne diseases, the U.S. Public Health Services (1924) developed the Standard Milk Ordinance. This delineated the hygienic control requirements for dairy farms and pasteurization plants, and this report discusses those measures pertaining to farms. The twenty-two basic hygienic requirements, including the legal aspects, public health reasons and quality control procedures are reviewed.

MILK INSPECTION AND QUALITY PAYMENT

Dr. F. Harding,

Milk Marketing Board, Thames Ditton, UK

Quality control and inspection of milk at all stages of production and transportation together with quality payment incentives are necessary in order to minimise unnecessary wastage of milk or impairment of the quality of products made from it.

Such control measures, which are important to farmers who need to maximise the value of 'in quota' milk and to processors and manufacturers in maximising the quality and quantity of products produced from milk, are discussed.

RAW MILK QUALITY IN RELATION TO FINISHED PRODUCTS QUALITY

Dr. D. I. Jervis,
St. Ivel Ltd., Bradford-on-Avon, UK
Summary not received.

TRENDS IN INDUSTRIAL QUALITY CONTROL AND ASSURANCE

L. Östling,
Scania Netherlands B.V., Zwolle, NL
In the Scania 'Total Quality Concept' the customer is in the centre. His experience with today's products and the demands for future expectations is a continuous feedback-stream from Sales and After Sales organization to the factory.

Via design modifications, product improvements are introduced regularly under all aspects of Quality Assurance.

For products internally produced by Scania, or externally by suppliers, the quality demands are on the same high level.

For selecting the right truck for the purpose of the client the sales organization is well equipped. The customer receives a modern and reliable product, built under controlled conditions. The advanced maintenance facilities of the dealer-network completes this concept.

QUALITY MANAGEMENT AND MANAGEMENT INFORMATION

Dr. K. Salminen,
Valio Finnish Co-op. Dairies' Ass., Helsinki, FI
In the dairy business quality management has gained wide recognition simultaneously with the concept TQC (Total Quality Control) and the similar terms CWQC (Company Wide QC) and IQC (Integrated QC). In TQC quality has a broad meaning: it means the fitness of the product for use. Thus quality implies more, for instance service and information, than just the MUST BE properties. It is the increased competition in the food industry that has made dairy business use TQC. In the end, the competition for consumers is fought with the weapons of quality and price. Target-oriented, systematic and cost-aware TQC is the way to lead by means of quality; this is quality management. Emphasis on quality is extended to all the functions of the company. Information on the business environment, above all marketing, is important. The upper management has to coordinate this with product knowledge and production know-how.

HAZARD ANALYSIS AND CRITICAL CONTROL POINTS

Dr. J. H. B. Christian,
CSIRO, North Ryde, AU
The Hazard Analysis Critical Control Point (HACCP) system provides a more specific and critical approach to the control of microbiological hazards in a process than that achievable by traditional inspection and

quality control procedures. It involves identifying the hazards and their severity, determining the critical points where the hazards can be controlled, specifying criteria to be met at the critical control points, establishing monitoring procedures at these points and taking any appropriate corrective action.

QUALITY CONTROL AND QUALITY ASSURANCE OF PROCESSING A PRODUCT AT DIFFERENT LOCATIONS

G. Odet,
Coop. Laitière Centrale de Paris, Ivry-sur-Seine, FR
The main points of quality assurance are:

- product definition
- schedule of conditions
- training
- inspections
- presentation and communication of results
- corrective action

Self-inspection is imposed by the distances between the factories. The quoted example of SODIMA-YOPLAIT concerns companies scattered over the five continents which have adopted a common definition of fresh milk, and of yogurt in particular.

QUALITY ASSURANCE AND IMAGE IN RELATION TO THE CONSUMER

Miss M. Duke,
Nestec Ltd., Vevey, CH
Consumer satisfaction is attained if the food is above a 'plateau' of acceptability, which relates to a period after manufacture, during which the food remains sensorially pleasing.

To remain above the 'plateau', quality assurance must extend beyond the factory through distribution and to the consumer. Although for stable products there are fewer risks at the interface with distribution up to the consumer, this becomes a very critical point for fresh and chilled products.

BRITISH FOOD QUALITY MARK

D. Atkinson,
National Dairy Council, London, UK
For perishable foods, providing premium quality products to the consumer at point of sale depends on more than just the quality at manufacture. High standards, and thus the benefits of the quality mark, must be established at each stage of the distribution chain.

The advantages for a commodity product, accrue from the fact that the quality mark allows differentiation, and this can mean a premium price.

AUSTRALIAN AND NEW ZEALAND QUALITY REMARKS

K. J. Kirkpatrick,
New Zealand Dairy Board, Wellington, NZ
Several distinct quality mark schemes operate within Australia and New Zealand although few are directly associated with the food or dairy industries. In both countries a Standards Association operates with appropriate marks applicable to qualified products. There is some trend towards development of promotable quality marks for whole industries or industry sectors that can be used with individual manufacturer brands. These are related more to

authentication of origin than to compliance with rigidly measured quality standards.

SCANDINAVIAN AND DUTCH QUALITY MARKS

Ir. J. M. van der Bas,
Netherlands Controlling Authority for Milk and Milk products, Leusden, NL

Quality marks for dairy produce in Western Europe are about as old as the century. They guarantee that the produce has been subjected to a rigid control on their quality by an outside authority.

The guarantee given has extended in the course of the years as has the concept of quality. The value of the marks may have diminished due to the growing importance of trademarks. Quality marks continue to perform a function as indicators of origin.

Friday 3 October 1986

SUMMARY OF PLENARY SESSION PAPER

Plenary session on
PRESENT AND FUTURE HEALTH ISSUES AND MILK AND DAIRY PRODUCTS

Dr. E. W. Speckmann,
National Dairy Council, Rosemont, US

Government initiatives regarding health promotion and disease prevention are advocating less consumption of dairy foods to improve longevity and quality of life. Expanded research is documenting the role of dairy foods in decreasing risk of the leading chronic diseases and is identifying new facts about the nutritional contribution of dairy foods to a healthful diet. Now is the time for the dairy industry to take the offense and position dairy foods positively with health promotion.