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SUSTAIN

WORKSHOP

JANUARY 30 - FEBRUARY 4, 1995

RUSSIA

S haring
U nited
S tates
T echnology to
A id in the
I mprovement of
N utrition

A U.S. Private Food Industry initiative
in collaboration with the U.S. Agency for International Development
through a Cooperative Agreement with the National Cooperative Business Association

Upgrading the Food Processing Industries in Developing Countries.

Why SUSTAIN?

SUSTAIN represents a successful collaborative effort between the U.S. food industry and the Agency for International Development (A.I.D.) to upgrade food processing in developing countries. It provides an excellent model for similar private-public sector joint ventures in health, agriculture and other areas of concern to developing countries.

Food processing is a major contributor to development. It serves multiple roles. Food processing can increase the available food supply by extending the life of perishable food products. It can improve the nutritional quality of the diet by making nutritious foods available the year round. It can lead to the growth of related enterprises in transportation, storage, distribution and marketing. And, it can produce much needed foreign exchange by creating value added products both for export and for internal substitution of imported processed foods.

The U.S. food industry has embraced the concept that freely sharing its expertise and knowledge is of mutual benefit to recipient and donor - to the recipient by improving current operations - to the donor by contributing to a healthier global future.

How SUSTAIN Works

A.I.D. missions and trade associations in developing countries publicize SUSTAIN's goals and activities. Executives of U.S. food companies with technical expertise and overall knowledge of the food industry serve as the SUSTAIN Steering Committee, providing guidance and overseeing activities.

Food related companies in developing countries submit their requests to SUSTAIN through the A.I.D. mission or a designated organization in their country. SUSTAIN screens all incoming requests and if necessary asks for additional information. Appropriate U.S. companies are then invited to respond.

Some problems can be readily resolved by providing information. Others require that consultants be sent. When a consultant is sent, the usual assignment is for one to three weeks. Upon completion of the assignment, the consultant prepares a report describing findings and making recommendations. Depending on need, some consultants may return for follow-up visits to ensure that recommendations have been appropriately implemented.

SUSTAIN Helps

Requests are diverse. Help may be needed to solve processing problems, to identify equipment needs and sources of new and used equipment, to train personnel in the use of new equipment and new technologies, to find new uses for indigenous commodities, to establish or improve quality assurance procedures, to control insects and rodents in food processing plants and to improve plant layouts and materials handling.

In the past, U.S. food companies, large and small, have provided technical assistance in the form of information, consultants and training to food processors in Africa, Asia, Latin American and the Caribbean.

WORKSHOP: Dairy Production, Diversification, Development, and Improvement

Russia

January 30 - February 4, 1995

by

SUSTAIN Volunteer

James De Tolla II, Director of Quality Control of Dairy Products
Dean Dairy Products Company

in collaboration with the

CBI/NCBA Project in the Russian Federation

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NCBA/SUSTAIN Project 111.058

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I. INTRODUCTION

A. REQUEST FOR ASSESSMENT AND TECHNICAL ASSISTANCE

At the request the Cooperative Business International (CBI) project in the Russian Oblast of Tver, SUSTAIN volunteer James De Tolla II (Director of Quality Control, Dean Dairy Products Company) taught a workshop on dairy product development, quality control, and packaging from January 30 - February 4, 1995. He also covered microbiology, sanitation, profit and loss, economics, cost determination, advertising, creating brands, and environmental impacts and concerns. Mr. De Tolla brought 30 pounds of various cheese samples along with examples of packaging materials for dairy products.

The workshop was held in Kimrski region of Russia. It was organized by Maria Douglass (Director) and the staff of CBI/National Cooperative Business Association (NCBA) in the Russian Federation. Approximately 50 - 55 participants, including dairy farmers and micro- and small dairy processors and food processors attended. Workshop format included presentation and discussion sessions in the morning and site visits to local dairy farms and processing plants in the afternoon.

This workshop provided Russian dairy farmers and processors information on the basics of product development, quality control, and packaging. The participants also used the opportunity to ask questions related to dairy processing operations and management. Mr. De Tolla remains available to answer questions via correspondence and has been asked to return to Russia to conduct follow-up training in dairy processing.

B. IMPLEMENTING ORGANIZATIONS

SUSTAIN *(Sharing U.S. Technology to Aid in the Improvement of Nutrition)* provides access to U.S. expertise in food processing to help improve the nutritional quality, safety, and availability of food in developing countries. Technical assistance, training, and needs assessments are conducted by executives and technical specialists from U.S. food companies, universities, and professional associations who donate their time and expertise. SUSTAIN is supported by a grant from the U.S. Agency for International Development's Office of Health & Nutrition under the Food Technology & Enterprise Project. Cash and in-kind contributions are contributed by individuals and corporations.

CBI was established in 1984 with the assistance of NCBA to promote trade and investment, primarily with and among cooperatives. Under the U.S. Department of Agriculture's Food for Peace program, CBI and NCBA are helping to improve Tver's food processing and distribution systems through loans and technical assistance to small and medium-sized private food processing enterprises. SUSTAIN volunteers provide technical assistance and training to these enterprises.

RUSSIA, DAIRY PRODUCT DEVELOPMENT

SUSTAIN, Workshop February, 1995 presented by James A. De Tolla II. Organized in conjunction with: Tver Oblast Administration, Cooperative Business International, American International Development Agency, SUSTAIN Program Representation of NCBA, Joint Stock Company "Kolos", Kimrski region. January 29 - February 3, 1995.

This was the first officially conducted SUSTAIN workshop on dairy processing in Russia. This meeting took on additional character, as well as importance to the people attending, as the meeting took place on the Eve of the New Year by the old calendar. The people accepted the information as a basis for a new beginning, remembering things once forgotten and the future of thing to come. Although a language barrier existed it was easily over come through the help of a gracious translator.

The preparation for the program took approximately 90 hours. Approximately 50 pounds of cheese from America was sampled. Swiss Cheese was donated by Middlefield Cheese, Middlefield, Ohio, as well as post cards and brochures. Provolone and mozzarella was donated by Farmer's Cheese, New Wilmington, Pennsylvania. Packaging material was donated by Dean Dairy Products Co., Sharpsville, Pennsylvania. Dean Dairy Products Company also donated several reference books as well as some supplier and ingredient source books. The reference material was left with Maria and Sergei so that questions asked after the workshop could be more easily answered.

TOPICS ADDRESSED IN PRESENTATION

A. PRODUCT DEVELOPMENT

This covered the typical old familiar dairy products, and addressed formulation, package size, line extensions, package combinations. It also addressed enhancing current sales with new recipes, and addressed advertising in a fashion that would challenge the imagination.

The need to evaluate current products, as well as the market in an effort to determine what types of new products are needed. Through a well-thought- out approach, you should be able to reduce risk and increase success for new products.

Also addressed was, as the perceived need of a new product is carried through, it is important to realize answers to specific questions such as: How much risk are you willing to take? How much cost are you willing to bare? Advertising? Research and development? Trial and Error runs? Packaging? Nutritional claims? Is your facility capable of production on existing equipment or is special equipment necessary? How bad does the consumer want it? Does the product appeal to the sensory, taste, or nutritious, wise consumer? Who is the intended buyer or consumer? How long will this product last?

It is important to remember that dairy products have an image of being healthy, and nutritious but sometimes perceived as fattening or just for kids. New products that are developed need remember these factors .

The top ten new product development areas according to a survey done by "Dairy Foods Magazine" December, 1994 issue were discussed. These included: (1) Reduced - fat foods, (2) Fat- Free product development, (3) Least cost ingredient reformulations, (4) Reduced - calorie diet foods, (5) New food product categories, (6) Nutritional Database development, (7) New Market line extensions, (8) All-Natural / no-additive foods, (9) New food product concepts, (10) Reduced - cholesterol foods.

B. QUALITY CONTROL

A straight forward HACCP type approach to quality was presented. Looking at quality as a total concept. Building a strong foundation and realizing that quality is not an accident but a conscious, cooperative effort of making intelligent decisions and using wise choice alternatives.

The chemistry of cleaning including the four variables of time, temperature, chemical concentration, and velocity were discussed. Type of soils, and methods of cleaning were also addressed. As well as how to trouble shoot equipment faults and determine the real problem. Types of cleaning chemical compounds and what there major function is.

Types of bacteria and pathogens common to the dairy industry and how to control them. As well as optimum temperatures for their growth. Also how environmental controls are necessary to keeping quality of finished products. Microorganisms

addressed included: Lactobacillus, E coli, Thermophile, Mesophile, Psychrotrophs, Psychrophiles, Campylobacter jejuni, Salmonella, Listeria monocytogenes, Staphylococcus aureus, and Shigella.

Also addressed was storage temperatures and the importance of proper refrigeration.

C. PACKAGING

Many type of packaging were addressed. Types of packaging touched on were:

Zipper retrofit bags. Blow molded plastic bottles. Spouted paper cartons. Plastic cups for cottages cheeses, sour creams and yogurt. Edible films, including milk protein base films. Envelope packaging operations. Partnering packaging, sausage and cheese, crunch cereals and yogurt. Ice cream hard and soft serve.

Along with packaging slides of American processing plants were viewed showing processing, production, packaging, refrigeration and storage as well as distribution.

The environmental impact of packing was also addressed. Both pre-consumer and post consumer uses. What is recyclable, assuming that these type programs exist. What is biodegradable and compostable? Source reduction use lager sizes and less packaging material. Aerosols should be ozone friendly. Solid waste strategy, the concern is that packaging be environmentally friendly, sending food waste to compost using paper and plastics for fuel. Most waste management recycling programs add costs but the benefit is a safer environment for future generations.

D. ADDITIONAL TOPICS DISCUSSED, AS A RESULT OF INTERACTION

Additional topics discussed as a result of group interaction included the following.

Economics, determine cost of components , including over head, factor in a profit and determine a selling price. Evaluation of a High Temperature Short Time (HTST) pasteurization system and explain temperature and product flow through out the system. Management, microbiology, and testing. Why America has so many lowfat dairy products. What cholesterol was and how it affects the arteries and the bodies circulatory system. Brand name development. Environment concerns. Recycling.

How the development of new enterprises create more opportunities for additional new enterprises. Advertising, and marketing.

ON-SITE VISITS

On- site visits to several regional collective farms were made, also several agriculture related production facilities. These farms include dairy farms along with horse farms. The Joint Stock Company "Kolo's" was visited. Here a basket cheese operation, a potato chip plant, and a future slaughter house and meat processing facility were toured. Also toured was the Servis - 22 company that produces swiss cheese.

FUTURE NEEDS

Presentations for the future should include the following areas but should also not be limited by them:

1. Hands-on working and training at processing plants. Training to include areas of production, quality, laboratory practices, management, sanitation and distribution.

2. Seminars dealing in management principles, cost accounting, and business administration. So that as new enterprise spring up the people have the knowledge to help make them successful.

3. Seminars dealing with increased production and productivity, both at the farm level and the processing plant level.

4. Development of an effective distribution system. Food products are very perisnable, as such refrigerated products need to get processed and to the consumer as quickly as possible.

5. Farm methods and practices that include raw milk cooling as well as herd health. Control of mastitis will be one of the most important factors that will help to increase milk production.

6. Establishment of a water quality so that drinking water for both animals and people

is not a problem. Water quality for plant and farm sanitation is also important both from the stand point of adequate supply and hot water temperature.

7. Training in other areas of agriculture, including meat production, timber, crops as well as dairy. Example: Russia has a vast supply of timber, but has not established processing facilities to meet the countries paper needs.

8. Currently there is very little waste. As new enterprises develop and distribution channels become established, new packaging will become more prevalent. Recycling and waste management will need attention.

9. As distribution improves and new products are developed. Sales, marketing and ways of advertising and well as the development of private and brand labels, will need more attention.

10. As new technologies develop and the global markets open up there will need to be some assurance that the products produced meet some international quality and sanitation standard.

11. Improvement to the communication system will be needed. From the United States you are currently able to call into Russia, but a call out is extremely difficult at best.

To: Maria Douglass Director
From: Sergei Ukhov, Technical Director
10 February 1995.

SUSTAIN seminar Jan. 30- Fab. 4 1995 Kimry Tver oblast report.

This seminar took place in Kimry on the base of the Joint stock Company "Kolos". The attached Program of the seminar let me do not pay much attantion on the schedule of the seminar and I will concentrate on its merits. We began this seminar afternoon 30 January with a joint meeting of the members. We got through all schedule and explained to the participants the main idea of the event of that kind. We hope that this let them to understand better what will be more interesting to everyone and make thier choice which part of the seminar to join. We'v described the places for on-site visits and explained why have we choose each one. It was very important to everyone and the most important to our guests-consultants De Tolla and Sandberg.This day we had a wonderfull diner party. organised by the head of the JSC "Kolos"Vladimir Sukovatitsin, our host. According to our old Russian tradition Bread and Salt nave been gifted to the American consultants. It was a very touching moment and very impressive to them because it was their first abroad visit. After that we had a beautiful concert by the local folk group. Next day our real work began. Thanks to the local administration we were able to use a hall at the House of Culture in down town Kimry. It is very important because about 50-55 persons attended both sections of the seminar every day. De Tolla was the first who had a lecture and Sandberg together with his group visited the cow barns of 'Kolos".Afternoon they have changed places and De Tolla's group had a visit to "Kolos"food procesing facilities, while Sandberg's one had it's classes. I tried to attend as much as I could. I am a previous professor myself and can understand how difficult it is to find a way to communicate to a new audience. And I am very glad to confirm they did it in a shot time . In spite of the fact that main part of the audience were persons with much experience in agriculture and food processing they both nave found the topics of a mutual interest. Sometime it was not lectures and all looked as an exchage of the experience. They used a lot of overheads and slides, and about 20 kilograms of different kids of cheese samples were tasted during on- lecture testing.

On-site visits after or before lecture made a big income to a benefits of this seminar.

De Tolla gave useful advise to the head of the Swiss cheese plant "Servis-22" Khokhlov and the head of the farm "Palada" Inosemzev. Both of them produce different kinds of cheese. Sheldon Sandberg showed his experience in artificial insemination at the insemination station of the JSC

"Kimrsky".Sadberg's advised on herd improvment were so useful that they asked him to stay one more week to work together. Of course James De Tolla was very welcome to stay more at any of the local milk procesing plants. But he planned to leave on the 4th of February. He left a lot of books and papers to be used as a reference materials..

Once more I would like to mention that this seminar was useful to both the Americans and Russians. And I am very glad to say that on-site visits played an Important role and should be an integral part of any seminars in future. Both "students"and "teachers"are very interested in this. For example the last on-site visit to the horse farm "Ahaltekinets". It has not been closely connected with food quality and herd improvement but it was a very good example how to manage a good business. The real estat value of this farm are about 12 billions rubles.The head of this farm Tito Pontecorvo himself manages this farm and has only seven employees.

This seminar was the first one which took place in Tver oblast. We have developed some of experience on this kind of work. Now we are very appreciative the help of the oblast Administration (Vladimir Bobkov, first deputy of the Head of the oblast Adm.and his assistant Veniamin Lutcev) and of couse the help of the local people (Vladimir Sukovatitsin the head of JSC "Kolos"and A. Beliakov head of the local agr. dep). Soon I hope to get a reports of De Tolla and Sandberg and both will be enclosed

Sergey Ukhov.

APPENDIX I

SUSTAIN Description

SUSTAIN provides access to U.S. business and scientific expertise to improve the quality, safety, and availability of food in developing countries. Technical assistance and training are provided by executives and technical specialists from U.S. food companies, universities, and professional associations who donate their time and expertise.

Many benefits can accrue to developing countries through improvements in food processing and preservation. These technologies can help meet food and nutritional requirements and reduce post-harvest losses. Improved processing can reduce food-borne illness, malnutrition, and micronutrient deficiencies that are devastating to children and other vulnerable populations. Strengthening food businesses helps reduce poverty by providing a means for enhancing job and economic growth in poor urban and rural communities. And the transfer of efficient technologies and management practices in waste handling, utilization, and reduction promotes environmental protection.

Through technical assistance and training, SUSTAIN volunteers help build the capacity of food businesses and local organizations in food manufacturing, management, and problem-solving. Areas of assistance include: food processing, preservation, and storage; food safety and quality assurance; fortification; packaging; marketing; waste handling; and business development and management.

How SUSTAIN Works

SUSTAIN conducts its activities in collaboration with USAID missions and local organizations. It receives support from the Food Technology and Enterprise Project of USAID's Office of Health & Nutrition in the Global Bureau (G/PHN/HN). SUSTAIN also receives support from the U.S. Department of Agriculture and cash and in-kind contributions from corporations and individuals. SUSTAIN receives advice from a Steering Committee made up of private sector representatives and is managed under a cooperative agreement with the National Cooperative Business Association (NCBA, known overseas as CLUSA).

SUSTAIN receives requests for assistance from individual food companies, research institutions, and business organizations in developing countries. Depending upon the nature of the request, SUSTAIN volunteers may be sent to conduct one-on-one technical assistance and workshops or participate in assessment missions. Overseas projects are typically one to three weeks in duration. Through repeat visits of volunteers on particular projects, SUSTAIN is able to provide continuity and on-going problem-solving expertise. SUSTAIN is also able to address many problems through correspondence by providing information that exists either in technical literature or in the "memory" of a company.

SUSTAIN covers international travel costs. Companies or host organizations requesting SUSTAIN assistance are asked to contribute towards in-country expenses. Priority is given to requests that can demonstrate an ability to improve the nutritional quality, safety, and availability of food in the local community. SUSTAIN does not fund product or equipment acquisitions.

SUSTAIN publishes a quarterly newsletter (*SUSTAIN Notes*) on food technology issues. It is provided gratis to over 2000 recipients in more than 50 countries. For more information, contact:

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APPENDIX II

Biography of SUSTAIN Volunteer

James A. De Tolla II is Director of Quality Control of Dean Dairy Products. His responsibilities include overseeing certified laboratory operation, setting up and directing quality control programs, developing new products, and overseeing an independent farm raw milk supply program. He creates working production formulas, customer specific, or experimental formulas for fluid milk products, ice cream and soft serve mixes, cultured buttermilk, and juice drinks. Mr. De Tolla also has practical experience working with butter and cultured products including sour cream, yogurt, cottage cheese. He previously served as Director of Safety at Dean's for seven years. Prior to joining Dean's, Mr. De Tolla was Sanitation Supervisor of Dunkirk Ice Cream Company where was responsible for sanitation programs. He also worked on quality control of products and product development of ice cream and low fat ice cream products. Mr. De Tolla is the Past President of the Northeast Dairy Technology Society and the Pennsylvania Association of Dairy Sanitarian and Dairy Laboratory Analysts.

APPENDIX III

Workshop Participants

"Dairy Production Diversification Development and Improvement"

SUSTAIN Workshop 30 Janury – 3 February, 1995

LIST OF PARTICIPANTS

Dairy Production Section

1. Beriozkin A.I.	Bezhetsk Dairy Plant
2. Mishenko S.I.	Sonkovo Dairy Plant
3. Trusin S.S.	Vesjegonsk Dairy Plant
4. Isakov A.V.	Krasnokholmsk Dairy Plant
5. Vinokurov N.B.	Tver Butter–Cheese Depot
6. Ponereko V.E.	Tver Butter–Cheese Depot
7. Zhulina O.V.	Kaliazin Dairy Plant
8. Markirova G.S.	Ostashkov Dairy Plant
9. Lantajev S.E.	Goritsi Dairy Plant
10. Semenkovskaja E.S.	Tver Oblast Department of Agriculture
11. Derkatch V.I.	Udomlia Dairy Plant
12. Orlov M.M.	Kolesnikovski Dairy Plant
13. Khokhlov A.V.	Kimry Dairy Plant
14. Khrabrova O.S.	Rameshki Region
15. Kharinski N.M.	Toropets Region
16. Matashuk I.M.	Kashin Region
17. Boloban L.G.	Kashin Region

Dairy Herd Improvement Section

1. Kabirov A. Kh.	Tver Oblast Department of Agriculture
2. Poderevskaja V.F.	Pig Breeding Farm "Tverskoe"
3. Ignatev N.P.	Pig Breeding Farm "Tverskoe"
4. Shestova V.V.	Pig Breeding Farm "Tverskoe"
5. Korieva N.A.	JSC "Zavjlzhskoe"
6. Sherba E.K.	"Tversvinprom" Association
7. Pikalov V.D.	Kolkhoz "Tver"
8. Maksimov A.S.	Kolkhoz im. Kirova
9. Zhukov M.N.	State Farm "Zaveti Lenina"
10. Derbyshev G.I.	Tver Oblast Department of Agriculture

APPENDIX IV

Workshop Materials

REINVENTING THE WHEEL

and

PRODUCT DEVELOPMENT

FROM AN ENGINEERING STAND POINT

1. NEW WAYS TO DESIGN?

2. NEW WAYS TO MANUFACTURE?

3. NEW WAYS TO SELL?

AT THE SAME TIME

FROM A CONSUMER STAND POINT

1. CREATE PRODUCTS THAT ARE SAFER.

2. MORE DURABLE (LAST LONGER).

3. HIGH QUALITY

AT THE SAME TIME

FROM THE PRODUCTION STAND POINT

1. **CREATE PRODUCTS CHEAPER**

2. **MORE EFFICIENT, QUICKER**

3. **EASIER TO MANUFACTURE**

THE END RESULT

CREATING A STRATEGY

AND END PRODUCTS

THAT WILL YIELD

GREATER PROFITS

AND

CONSUMER ACCEPTANCE

Moo - Juicers

Yields 3 cups

Ingredients: **1 can (6 oz.) frozen juice or juice blend concentrate*, thawed**
3 juice cans of milk

Directions: **Place juice concentrate in a pitcher. Add 3 full juice cans of milk. Refrigerate covered, up to 4 days. Stir before serving.**

Variations: **Add 2 tablespoons sugar to juice and milk mixture. Pour into 6 (5 oz.) paper cups. Freeze until nearly firm, about 4 hours. Frozen it tastes like a popsicle.**

* ***Do not use frozen lemonade or limeade concentrate.***

Frozen Orange Juice Concentrate, apple or grape juice or fruit punch make absolutely delicious drinks kids love.

Sometimes providing a simple recipe on the side of a package offers a nutritious treat that enhances sales. While providing consumers simple alternative.

The 1995 Top 10 New Product Development Efforts

for Dairy and Frozen Novelty Companies

According to the December 1994 issue of "Dairy Foods"

1995 RANK		1994 Rank
1.	Reduced-fat foods	1
2.	Fat-Free product development	3
3.	Least cost ingredient reformulations	7
4.	Reduced-calorie diet foods	6
5.	New food product categories	8
6.	Nutritional Database development	2
7.	New Market line extensions	4
8.	All-natural/no-additive foods	10
9.	New food product concepts	5
10.	Reduced-cholesterol foods	9

LOOKING AT QUALITY CONTROL AS A TOTAL CONCEPT

1. QUALITY IS NOT AN ACCIDENT.

2. QUALITY IS A CONSCIOUS EFFORT.

3. QUALITY IS A COOPERATIVE EFFORT.

4. QUALITY IS A RESULT OF MAKING INTELLIGENT DECISIONS.

THE BOTTOM LINE IS:

QUALITY IS THE RESULT, REPRESENTED BY USING THE WISE CHOICE ALTERNATIVE.

THE CHEMISTRY OF CLEANING

THERE ARE FOUR VARIABLES OF CLEANING:

A. TIME

B. TEMPERATURE

C. CHEMICAL CONCENTRATION

D. VELOCITY (MECHANICAL ACTION)

ALL FOUR VARIABLES ARE EQUAL IN IMPORTANCE.

SANITATION CANNOT TAKE PLACE WITHOUT THE USE OF ALL VARIABLES TO ONE DEGREE OR ANOTHER.

CLEANING COMPOUND SELECTION

Cleaning compound selections depends upon the following factors:

A. The type and the amount of soil on the surface
B. The surface to be cleaned
C. Physical nature of the cleaning compound (liquid or powder)
D. Method of cleaning (foaming, CIP, soaking, manual cleaning)
E. Quality of available water
F. Economically priced for the job
G. Time available
H. Temperature allowance

Solution temperature is important!!!

Heat breaks up fat and grease and assists in its removal.
An increase in temperature by 18 F (10 C), will double the activity of the chemical.

Excessive temperatures can cause cleaning problems.

QUALITY

EFFECTS OF CHEMICAL CONCENTRATION

1. USING THE CORRECT CHEMICAL & AT THE PROPER SOLUTION STRENGTH.

   A. GOOD QUALITY

   B. CONTROLLED COSTS

   C. HANDLER SAFETY

2. USING THE INCORRECT CHEMICAL & AT AN IMPROPER SOLUTION STRENGTH.

   A. QUESTIONABLE QUALITY

   B. UNCONTROLLED COSTS

   C. GREATER SAFETY RISKS

TROUBLE SHOOTING AN EQUIPMENT FAULT

CIP # ? WON'T WORK OR DOESN'T WORK!!

WHY?

1. IDENTIFY THE REAL PROBLEM

A. NO TEMPERATURE

IS STEAM ON?
IS PSI SENSING OK?
DO YOU HAVE CIRCULATION?

B. NO RETURN

IS POWER ON?
IS PSI PROBE DIRTY?
ARE THE VALVES OPEN?
DO YOU HAVE WATER?

C. NO CIRCULATION

ARE ALL THE HAND VALVES TURNED RIGHT?
ARE ALL THE AIR VALVES OPENING?
DO YOU HAVE AIR PSI?
IS THE POWER ON?
DO OTHER PROGRAMS WORK?

To summarize the basic compounds and cleaning terminology, the following quick references will help.

CLASS OF COMPOUND	MAJOR FUNCTIONS
Basic alkalis	Soil displacement/emulsifying, saponifying and peptizing
Complex phosphates	Soil displacement by emulsifying and peptizing, dispersion of soil, water softening and prevention of soil deposition
Surfactants	Wetting and penetrating soils, dispersion of soils and prevention of soil redepositions
Chelating	Water softening, mineral control, and prevention of redeposition
Acids	Mineral deposit control

TERMS	DEFINITION
Sequestering/ chelating	The ability to prevent deposition of undesirable mineral salts on surfaces being cleaned
Wetting	The ability to lower the surface tension of the water medium so as to increase its ability to penetrate soil.
Saponification	The chemical process of breaking down an animal (insoluble) or vegetable fat by alkali into soap (soluble) and glycerol. (The old time method used for making soap.)
Emulsification	This is a mechanical process. Fats are broken into tiny globules and are suspended in the cleaning solution. The alkalis and the complex phosphates and surfactants are used for emulsification.

TERMS	DEFINITION
Synergism	When a chemical is used as a builder with a soap or detergent, the detergency which results from this combination is greater than the total detergency of the chemical and the soap if used independently. In other words, it is like adding 2 + 2 and getting 7.
Surfactant	A wetting agent or a compound reducing surface tensions.
Peptizing	The breaking up of solid particles into extremely small particles.
Dispersion or Deflocculation	The act of breaking up solid aggregates of soil into small particles.

Mycobacterium is probably the most heat resistant of all non-sporing forming bacteria.

Micrococcus' optimum growth temperature is usually about 28°C (82.4°F)

Streptococcus are members of the heat resistant *Enterococcus* group and are frequently found in high count raw product and on inadequately sanitized plant equipment.

Arthrobacter and the ***Micrococci*** have optimum growth temperature that is usually below 32°C (89.6°F).

Bacillus was historically of little importance. Modern high temperature processing forces a re-evaluation of the significance of aerobic spore-formers in raw supply and their effect on long storage of conventionally cooked/processed/pasteurized product.

Lactobacillus although usually numerically insignificant, may at times become numerous in some raw milk supplies due to mastitis and external contamination.

Clostridium, an anaerobic spore-former, is not enumerated by a plate count procedure, but may wreak havoc in cured cheeses not containing nitrites.

Actinomycetes are bacterium. This earthy smelling "fungus" is quite thermoduric. Its white, hard colonies are frequently found on plates prepared from pasteurized milk that were incubated at 37°C (98.6°F).

Coxiella burneti is another bacterial species. This pathogenic agent of "Q" fever is relatively resistant to temperatures approaching pasteurization.

Suppliers and processors may be equally responsible for development of a thermoduric flora in the product. Since laboratory tests, in themselves, do not constitute a complete program, laboratory control must be integrated. Control measures must always be ambilateral, detailed and persistent.

Psychrotrophic bacteria will grow from 32°F-90°F. They are not "cold loving" as the name implies. They are a subgroup of the mesophilies that have the abilty to grow at refrigerated temperatures. This group is often most responsible for spoilage in refrigerated foods. Optimum growth temperature is defined as that temperature at which the rate of growth is maximum. For the ***E. Coli*** (*figure 1-9)*, that temperature is about 105°F; for the ***Psychrotrophic Pseudomonad*** it is about 92°F. Also note that the maximum rate of growth achieved by the ***Psychrotrophic Pseudomonad*** is about two-thirds that of the ***E. Coli.***

Contrary to some belief, cold or freezing usually does not kill bacteria instantly. In most cases it just stops their growth.

The maximum growth temperature and minimum growth temperature is defined as those temperatures where the rate of growth approaches zero with increasing or decreasing temperature respectively. For *E. Coli*, the maximum growth temperature is about 122°F and 48°F for minimum growth. For the particular Psychrotrophic Pseudomonad discussed here, the maximum growth temperature is 90°F and the minimum growth temperature is 32°F.

It should also be noted that at temperatures below 80°F, the Psychrotrophic Pseudomonad has a growth rate faster than that of E. Coli. It can generally be said that the Psychrotrophes grow better at refrigerated temperatures than most Mesophilies. However, refrigerated temperatures are not their optimum growth temps.

By varying the temperature, growth can be enhanced or inhibited, or the bacteria can be destroyed. We can pasteurize material by increasing the temperature to a point where pathogenic (disease producing) bacteria are killed and it can be sterilized by increasing the temperature until all bacteria are killed. For example, to pasteurize fluid milk, the temperature must be kept at 145°F for 30 minutes or at 161°F for 15 seconds. To sterilize, the temperature must be maintained at 250°F for a minimum of 15 minutes.

The effect of destructive heating on bacteria varies. One generally observes the destructive effects by determining the number of survivors per unit of volume (e.g., ml, quart, gm, etc) over the time of heating *(figure 1-10)*. In the example the vertical scale is divided by factors of 10 and the food products started with a concentration of 10,000 bacteria per pint. If the scale is read from top to bottom, there will never be zero living cells per pint; instead, after one cell per pint, there are 0.1 cells per pint and so forth. Theoretically the point is never reached where all the pints heated are free of cells. Absolute sterility is therefore not statistically possible.

The example indicates that the rate of killing bacterial species A in milk is faster than bacterial species B. Thus, the rate of kill does vary with the type of microorganisms involved. Also, given two heating media (milk and water) and the same species (species A), the rate of kill varies with the media being heated, with the rate in water being faster. The milk actually "protects" the microorganisms from heat destruction. Temperature also has a marked influence on the rate of destruction, the higher the heating temperature, the more rapid the rate of kill (*figure 1-11)*.

Since absolute sterility is never statistically achieved, we must decide at which point we are willing to accept the risk spoilage of, for example, one pint in 1,000,000. This is then by definition commercial "sterile".

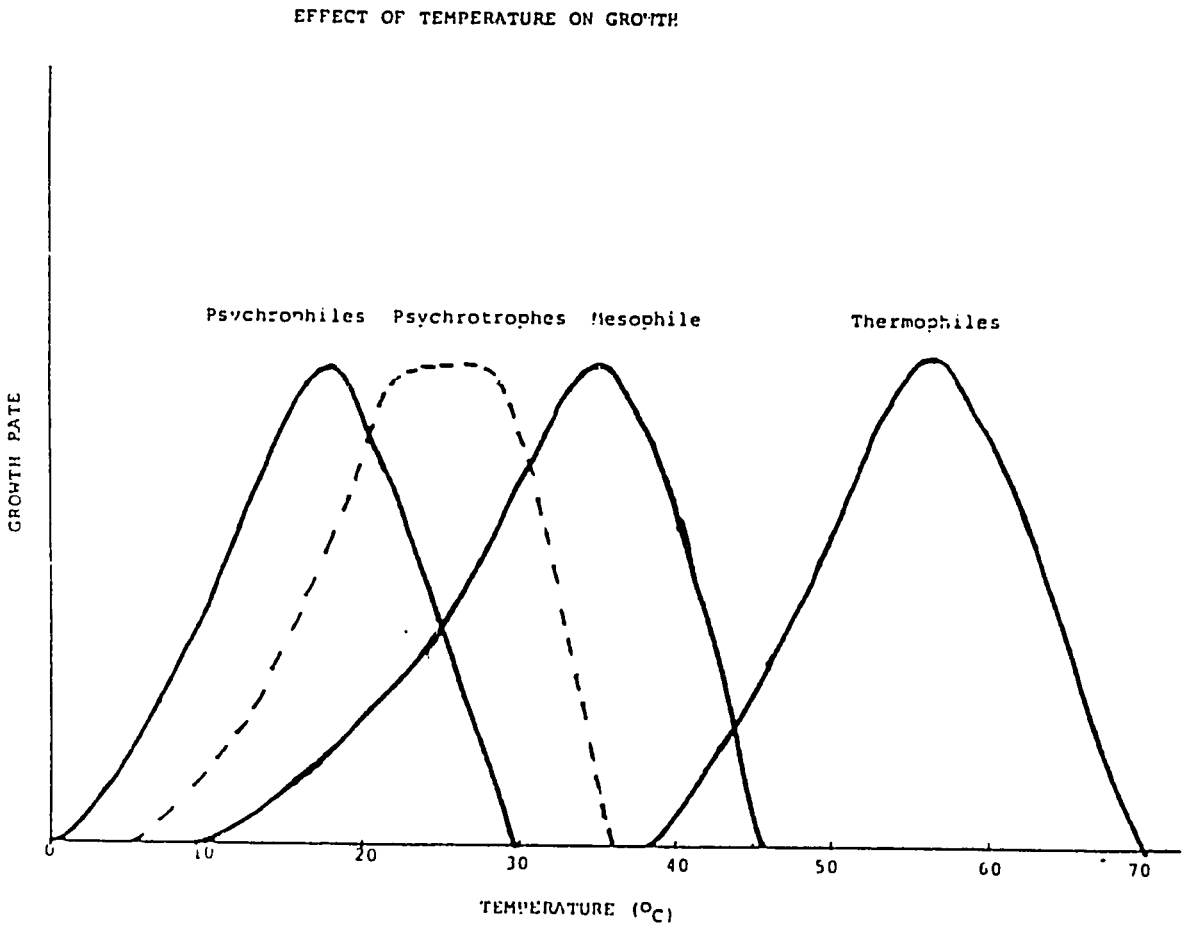
Finally, it should be obvious that the higher the concentration of microorganisms initially present in the food, the longer the time needed to achieve the defined sterile condition. For example, for species A in milk, sterile or pasteurized is defined as a condition where there is only one microorganism per 100 pints, then three minutes of heating will be required to reduce the microbial concentrations to 0.01 microorganisms per pint.

INFLUENCE OF ACID OR ALKALINE ON GROWTH RATE

The concentrations of acids and bases in a liquid medium are often expressed in terms of pH (*figure 1-12)*. A medium with a neutral pH, neither acid or base, has a pH of 7.0. As pH value increases to 14, the medium becomes more alkaline, values from pH 7 to pH 0 indicate more acid. The shift of a unit or value of 1 requires an

Cardinal Temperatures for Prokaryotic Microorganisms

Group	Minimum Temp °C	Optimum Temp °C	Maximum Temp °C
Thermophiles	40-45	55-75	60-90
Mesophiles	5-15	30-45	35-47
Psychrotrophs	-5-+5	25-30	30-35
Psychrophiles	-5-+5	12-15	15-20



5. All sanitary connections in CIP circuits should be checked regularly to be sure that no product seepage has occurred. If leaks do occur during the day's run, the joint should be tagged, dismantled for hand cleaning and re-gasketed before daily CIP. This is true regardless of type of fittings used.
6. Automatic time and temperature recording charts should be installed in return line of each CIP circuit near point of discharge in order to give an accurate record of daily CIP times and temperatures.
7. Outside surfaces of all sanitary lines and equipment should be cleaned regularly with a bucket and brush or foaming equipment to maintain good plant appearance.
8. All equipment in CIP systems as well as all other plant equipment should be thoroughly sanitized just before production.
9. Recommended procedures and amounts of cleaners should be closely adhered to each day to assure optimal results.
10. Frequent spot inspection at critical points in the circuit should be made to be sure of complete cleaning.

ENVIRONMENTAL CONTROL IN PROCESSING AND PACKAGING

1. Make cleaning and sanitizing of walls, ceilings, floors and drains part of the daily clean-up program. Use a foaming chlorinated cleaner. This saves time and is a positive approach to environmental hygiene.
2. Eliminate all direct openings from outside into the processing and packaging rooms even though they may contain screens, curtains and louvers.
3. Use bacterial filtering systems on air handling units and create a positive pressure in the processing and packaging areas. Keep air from blowing on to product or food contact surfaces. This may seem extreme, but it is a positive approach to environmental hygiene.
4. Make sure dehumidifiers or air conditioning units drain away from the processing or packaging room and prevent condensate from re-entering the atmosphere. Coils and pans must be cleaned and sanitized routinely. Use a chlorinated foam product.
5. Repair all cracks in walls and floors. This is especially important in areas around floor drains.
6. Introduce raw product and packaging materials to the processing or packaging rooms in as clean a condition as possible. Sanitize pallets (wet) before placing them in the process areas.
7. Keep areas under floor conveyors and equipment clean and sanitized, especially in and around coolers. This is a critical point. There are numerous instances where *Listeria* has been detected at these points. Another application for chlorinated foam products.

8. Allow only employees associated with processing and packaging into these areas. Supplement traffic areas with properly maintained foot sanitizing baths.
9. Require use of proper clothing and footwear which must not be worn outside the plant at any time.
10. Establish a specific environmental cleaning and sanitizing program for all areas of the plant and include floor drains. Consider using a special crew for this purpose.

Sanitation is a way of life. Incidence of foodborne illness and death are always traced to the food handler. A quality product is the result of quality people.

Foodborne Pathogenic Microorganisms
Cause for Concern

Microorganism

Listeria monocytogenes

Source in Nature

Soil, silage, water and other environmental sources, birds, mammals, and possibly fish and shellfish.

Characteristics of Illness

Healthy individuals generally have mild flu-like symptoms. Severe forms of listeriosis include septicemia, meningitis, enciphalitis and abortion.

Associated Foods

Raw milk, soft cheese, cole slaw, ice cream, raw vegetables, raw meat sausages, raw and cooked poultry, raw and smoked fish.

Foodborne Pathogenic Microorganisms
Cause for Concern

Microorganism

Salmonella ssp.

Source in Nature

Water, soil, mammals, birds, insects, intestinal tracts of animals, especially poultry and swine

Characteristics of Illness

Nausea, vomiting, abdominal cramps, diarrhea, fever and headache. Normal incubation period 6 to 48 hours.

Associated Foods

Beef, turkey, pork, chicken eggs, and chicken egg products, meat salads, crabs, shellfish, chocolate, animal feeds, dried coconut, baked goods and dressings.

Foodborne Pathogenic Microorganisms
Cause for Concern

Microorganism

Escherichia coli

Source in Nature

Intestinal tracts of human and animals

Characteristics of Illness

Mild to severe bloody diarrhea, vomiting, cramping, dehydration and shock. Can result in more serious symptoms, Some illnesses may last up to 8 days.

Associated Foods

Raw or rare meats and poultry, raw milk and milk products, unprocessed cheese, salads

Foodborne Pathogenic Microorganisms
Cause for Concern

Microorganism

Yersinia enterocolitica

Source in Nature

Soil, natural waters, intestinal tracts of various animals; (pigs, birds, beavers, dogs and cats,)

Characteristics of Illness

Diarrhea, and/or vomiting, fever and abdominal pain and hallmark symptoms; pseudoappendicitis. Onset is 24 to 48 hours. Recovery is 1 to 2 days.

Associated Foods

Fresh meat and meat products (particularly swine), fresh vegetables, milk and milk products

Foodborne Pathogenic Microorganisms
Cause for Concern

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Microorganism

Staphylococcus aureus

Source in Nature

Hands, throats and nasal passages of humans; common on animal hides

Characteristics of Illness

Nausea, vomiting, diarrhea, abdominal cramps, and prostration. Symptoms may be severe, Normal onset is from 30 minutes to 8 hours.
Duration is usually 24-48 hours.

Associated Foods

Ham, turkey, chicken, pork, roast beef, eggs, salads (e.g. egg, chicken, potato, macaroni), bakery products, cream-filled pastries, luncheon meat, and dairy products

Foodborne Pathogenic Microorganisms
Cause for Concern

Microorganism

Shigella ssp.

Source in Nature

Polluted water and intestinal tracts of humans and other primates

Characteristics of Illness

Diarrhea with bloody stools, abdominal cramps, and fever. Severe cases caused by *S. dysenteriae* may result in septicemia, pneumonia, or peritonitis. Onset averages 0.5 to 2 days but may be as high as 7 days. Recovery is slow.

Associated Foods

Milk and dairy products, raw vegetables, poultry and salads (e.g. potato, tuna, shrimp, macaroni and chicken)

FOODBORNE PATHOGENIC MICROORGANISMS OF CONCERN

Microorganism	Source in Nature	Characteristics of Illness	Associated Foods
Escherichia coli	Intestinal tract of humans and animals	Milk to severe bloody diarrhea, vomiting, cramping, dehydration and shock. Can result in more serious symptoms. Some illnesses may last up to eight days	Raw or rare meats and poultry, raw milk and milk products, unprocessed cheese, salads
Campylobacter jejuni	Soil, sewage, sludge, untreated water, intestinal tracts of chicken, turkey, cattle, swine, rodents and some wild birds	Fever, headache, nausea, muscle pain, and diarrhea (sometimes watery, sticky or bloody). Onset time is 2-5 days and lasts 7-10 days. Relapses are common.	Raw milk, chicken or other meats and meat products
Vibrio parahaemolyticus	Estuarine and marine waters	Abdominal cramps, nausea, vomiting, headache and diarrhea (with occasional blood and mucus in stools) and fever. Onset ranges from 4 to 96 hours. Symptoms last an average of 2-5 days.	Raw, improperly cooked or cooked recontaminated fish, shellfish or crustacea
Vibrio cholerae OI	Untreated water, intestinal tracts of humans	Copious watery stools, vomiting, prostration, dehydration, muscular cramps and occasionally, death. Incubation ranges from 1 to 5 days	Shell fish, raw fish and crustacea
Clostridium botulinum	Soil, sediment, intestinal tracts of fish or mammals, gills, viscera of fish, crabs, seafood	Neurotoxicity, shortness of breath, blurred vision, loss of motor skills, death. Onset ranges between 12 and 36 hours.	Low-acid canned foods, especially home canned. Meats, fish, smoked/fermented fish, vegetables, other marine products
Clostridium perfringens	Soil and sediment (widespread), water, intestinal tracts of humans and animals	Nausea, occasional vomiting, diarrhea and intense abdominal pain. Onset ranges from 8 to 22 hours. Short duration (24 hours)	Improperly prepared roast beef, turkey, pork, chicken, cooked ground meat and other meat dishes, gravies, soups and sauces
Salmonella spp.	Water, soil, mammals, birds, insects, intestinal tracts of animals especially poultry and swine	Nausea, vomiting, abdominal cramps, diarrhea, fever and headache. Normal incubation period 6-48 hours.	Beef, turkey, pork, chicken eggs and products, meat salads, crabs, shellfish, chocolate, animal fees, dried coconut, baked goods and dressings.

FOODBORNE PATHOGENIC MICROORGANISMS OF CONCERN

Microorganism	Source in Nature	Characteristics of Illness	Associated Foods
Listeria monocytogenes	Soil, silage, water and other environmental sources, birds, mammals, and possibly fish and shellfish	Healthy individuals generally have mild flu-like symptoms. Severe forms of listeriosis include speticemia, meningitis, enciphalitis and abortion	Raw milk, soft cheese, cole slaw, ice cream, raw vegetables, raw meat sausages, raw and cooked poultry, raw and smoked fish
Staphylococcus aureus	Hands, throat and nasal passages of humans, common on animal hides	Nausea, vomiting, diarrhea, abdominal cramps and prostration. Symptoms may be severe. Normal onset is from 30 minutes to eight hours. Duration is usually 24-48 hours.	Ham, turkey, chicken, pork, roast beef, eggs, salads (egg, chicken, potato, macaroni), bakery products, cream-filled pastries, luncheon meat and dairy products
Shigella spp.	Polluted water and intestinal tracts of humans and other primates	Diarrhea with bloody stools, abdominal cramps and fever. Severe cases caused by *S. dysenteriae* may result in septicemia, pneumonia or peritonitis. Onset averages ½-2 days, but may be as high as seven days. Recovery is slow.	Milk and dairy products, raw vegetables, poultry and salads (potato, tuna, shrimp, macaroni and chicken).
Bacillus cereus	Soils, sediments, dust, water, vegetation and a variety of food, notably cereals, dried food, spices, milk and dairy products, meat products and vegetables	**Type I** - Diarrhea type food poisoning, watery diarrhea, abdominal cramps, nausea, usually no fever or vomiting. onset time 6-15 hours. Short duration, 24 hours. **Type II** - Emetic (vomiting) type food poisoning - nausea and vomiting within ½-6 hours. Abdominal cramps and diarrhea occasionally occur. Short duration usually less than 24 hours.	Fried, boiled or cooked rice and other starchy foods, i.e., potatoes and pasta

Packaging Impact:

1. **Environmental claims**

   Have effects on both pre-consumer and post-consumer uses.

   a.) **Recyclable**

      1.) **assumption must be made that the product is recyclable or compostable where these types of programs exist. (Biodegradable claims may need outline for compostability)**

      2.) **Larger concern source reduction**
      ex. use less packaging material

   b.) **Ozone friendly**

      1.) **aerosols**

2. **Solid Waste Strategy**

   Are multifaceted and complex ...
   The concern is that packaging be environmentally friendly.

   Probably the best alternative include:
   Sending food wastes to compost
   using paper and plastic for fuel

3. **The Bottom Line**

   Recycling adds to costs to any waste management program... even when sales of recyclables are backed into disposal fees.

   The benefit is a safer environment for future generations.