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Activity report IV 2005

Mission of FHBB and Food Experts to Guatemala 11.10. to 21.10.2005

Enclosure 1

Mission report:

Mission of Christian Buser (FHBB) and Food Experts to Guatemala 11.10. to 21.10.2005

Generalities

Name, First name	Mrs. Florence Clerc (FC)	Paul Hunziker (PH)	Christian Buser (ChB)
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Overall objectives	Build up capacity of the local Cleaner Production consultants and the participating companies in the food sector, as well as support of the NCPC in the IDB-project.		
Main tasks	1. Company visits ▪ On-site walk-through and data collection in seven companies, who embarked for the IDB-project. ▪ Discussions of possible measures for improving the present production scheme 2. Training of CP consultants and company representatives: ▪ Dairy technologies in small/medium scale production sites (milk, ice cream and cheese production) – state of the art techniques and experiences made in Europe ▪ Water preparation, handling and water saving potentials, Effluent handling and treatment systems ▪ Energy aspects in dairies ▪ Important aspects about product and raw material storage ▪ Cleaning processes, CIP-systems ▪ Disinfection and hygiene – principals of reducing risks ▪ Implementation of Quality Assurance- and HACCP systems The TOR with detailed agenda for the mission is attached in Annex 1.		
Dates (beginning / end)	12.10. to 20.10.2005		
Nb of worked days / Nb of travel days	6.5 workdays in Guatemala (4 days company visits, 2 days training, 0.5 days discussion at NCPC), 2 days travel		

Summary of contacts with local partners and activities realised

Date, time	Person(s) met	Subjects discussed
Wednesday 12.10.2005	César Vallejo Bolaños, Maria-Amalia Porta ChB, FC, PH	**Initial meeting at NCPC (8:00 to 10:00):** ▪ Status of IDB-project and ongoing In-plant Assessments (IPA): 12 companies and 17 consultants were contracted for the project. Companies pay approx. USD 300.- for the full IPA and training program and the consultants pay approx. 280.- USD. The list of the companies and CP-tem-members is attached in Annex 2. So far all the company representatives and national consultants participated during the energy efficiency training in August, the training about ISO 14000 in September and in a one day training module about CP-concepts and methodologies on Tuesday, 11th of October 2005. All companies were visited quickly before they were contracted by the NCPC. Basic QuickScan reports about the visits were written (these reports were sent to FHBB prior to the mission). Because of the extensive and long procedures of the IDB-project administration, it was not possible to start the practical conduction of the IPAs before this module; i.e. no draft IPA-reports were available. ▪ Organisation of the company visits: It was decided to use the company visits to collect all necessary information for writing the Quick Scan reports, the company description and the process description. The food experts (FC, PH) and ChB shall watch out for inefficiencies, possibilities for improvements with regard to material and energy consumptions and for possible lacks in hygienic conditions. The visits shall comprise of short introduction meetings, then extensive walk-throughs (in two groups, since one group of consultants shall conduct the QuickScan interview first) followed by extensive de-briefing meetings in plenum. ▪ Short discussion about training module 5 and necessary preparation works
	César Vallejo Bolaños ChB, FC, PH	**Visit Agropecuaria Las Margaritas S.A. (11:00 to 17:30):** ▪ CP-team: Arturo Iturbide (General Manager), Maria de los Angeles López (Gerente desarollo organisativo), Patricia Girón (Gerente de producción), Francisco González, Mildred Carmina López, Jorge Ocheita (national consultants) ▪ ChB, FC, PH and Jorge Ocheita conducted an extensive walk through all production and storage areas (11:00 to 14:30). ▪ César Vallejo Bolaños, Francisco González, and Mildred Carmina López conducted first an interview with company representatives to collect general information about the company and made then the tour through the production site. ▪ Wrap up meeting (15:45 to 17:15) During the meeting the most important observations of the national and international consultants were discussed in plenum.

Date, time	Person(s) met	Subjects discussed
		▪ The general manager is very open to new ideas and is highly committed to Cleaner Production. However ChB felt that he does not take decisions very quickly, i.e. to convince Mr. Iturbide to implement certain options may require special efforts and calculations from the national consultants or from the NCPC. ▪ As highest CP saving potential the pasteurisation process should be observed more in detail and the introduction of a plate heat exchanger (instead of heating with propane) should be evaluated. For more details see Annex 3.
Thursday, 13.10.2005	César Vallejo Bolaños ChB, FC, PH	**Visit Industria Procesadora de Lácteos S.A. – INPROLACSA (9:00 to 17:30):** ▪ CP-team: Erwin Cordero (Production Manager), Claudia Salguero (Responsible for *quality control*), *Diana Sánchez, Sonia Sollis (national consultants)*, Erich Brand (national consultant, not present during the company visit) Further Mr. Erwin Lopes (Operations manager), Mrs. Janette Velasquez (Administrative manager) were present during the whole day. ▪ Introduction meeting (9:00 to 9:45) ▪ Company visits (9:45 to 13:30): One team (César Vallejo Bolaños, Diana Sánchez) conducted the interview first before they visited the production site. The second team (ChB, FC, PH, Sonia Sollis) conducted an extensive walk-through all production and side processes. ▪ Wrap up meeting (14:45 to 17:30): The observations of the national and international consultants were discussed in detail. The company representatives are very open minded towards new ideas and discussed the observations with high interest. The enthusiasm of the company representatives towards improvements bears the risk, that the savings of measures which may be implemented quickly by the company will not be monitored (no baseline data). This should be kept in mind by the NCPC (e.g. follow up with the company on a regular basis even during the assessment and asking, what has been introduced so far). For more details see Annex 4.

Date, time	Person(s) met	Subjects discussed
Friday, 14.10.2005	César Vallejo Bolaños FC, PH	**Visit La Cuna de Queso (10:30 to 17:00):** ▪ CP-team: José Rodolfo González Melgar (Gerente General), José Carlos López Garcia (Gerente de producción), Ana Luisa de Arocha (national consultant), Erich Brand (national consultant, not present during company visit) ▪ Ana Luisa de Arocha conducted an interview in the car on the way to the company (while waiting in traffic jam) with José Rodolfo González Melgar to collect general information about the company (10.30 – 12.00). ▪ César Vallea Bollanes, FC, PH and Ana Luisa de Arocha conducted an extensive walk through all production area with José Rodolfo González Melgar and José Carlos López Garcia (12.00 – 14.00) ▪ Wrap-up meeting (15.15 – 16.45): During the meeting the most important findings of the international consultants were discussed with the company representatives. La Cuna del Queso first needs to implement Good Manufacturing Practices in the production. A main improvement would be to increase the cold storage capacity in order to allow products to cool down in the factory and not later (transport, shop), this would improve the cooling efficiency. For more details see Annex 5.

Date, time	Person(s) met	Subjects discussed
Friday, 14.10.2005	Luis Muñoz ChB	**Visit Industrias Rick's S.A. (9:00 to 15:00):** ▪ CP-team: Byron Alquijay Letran (General Manager), Floridalma Reyes (Production Manager), Pablo Secaida (Responsible for packaging section), Carlos Gódinez, Luis López, Sonia Sollis (national consultants) ▪ Introductory meeting (9:15 – 9:45) ▪ Quick tour through the production and the storage areas jointly with persons of the CP-team (9:45 – 10:15) ▪ Company visits (10:15 to 12:00): In-depth visit of the production site (Luis Muñoz, ChB, Carlos Gódinez (part-time), Luis López) Interview with the manager and company visit (Sonia Sollis) ▪ Wrap-up meeting (13:00 to 15:00): The company makes a good impression considering the production flow-scheme (layout), the order and the cleanness. However all oil-sludge, organic solids (banana skins, potato peels etc.) and other solid wastes like packaging material are all disposed off through the municipal garbage; i.e. there is a considerable potential to introduce a waste management system. Considering the biggest saving potentials the heating system or the efficiency of the frying burners should be observed in detail. With the presence of the general manager during the whole meeting the employees were not very open in mentioning week points in their production. The national consultants should therefore discuss such issues directly with the employees during company visits. All in all ChB had the impression, that the company is interested in improving, but does not have a lot of experiences. For more details see Annex 6.
Monday, 17.10.2005	César Vallejo Bolaños ChB, FC, PH	**CP training module 5 – Cleaner Technologies and Techniques, sector specific training / day 1:** Details see chapter below
Tuesday, 18.10.2005	César Vallejo Bolaños ChB, FC, PH	**CP training module 5 – Cleaner Technologies and Techniques, *sector specific training / day 2:*** Details see chapter below

Date, time	Person(s) met	Subjects discussed
Wednesday 19.10.2005	Maria-Amalia Porta FC, PH	**Visit SULA-Guatemala (9:00 to 17:00):** ▪ CP-team: Patricia Funes (jefe de control de calidad), Oscar Castellanos (jefe de mantenimento), Victor Asturias (gerente de operaciones), Khevin Rosal, Diana Sánchez, Ioannen Pérez (national consultants) ▪ Company visits (9:00 to 16:00, with 01.30 lunch break): One team (Khevin Rosal, Ioannen Pérez) conducted the interview first before they visited the production site. The second team (Maria-Amalia Porta, FC, PH, Diana Sánchez) conducted an extensive walk-through all production and side processes. ▪ Wrap-up meeting (16.00 – 17.00) The observations of the national and international consultants were discussed in detail. The company representatives are very open minded towards new ideas and show enthusiasm of towards improvements. This company is very new and the employees are thankful to become new ideas and inputs to improve the quality and environmental aspects. For more details see Annex 7
Wednesday 19.10.2005	César Vallejo Bolaños, Luis Muñoz ChB	**Visit Tostaduría de Café Sol (8:15 to 12:00):** ▪ CP-team: Miguel Guirola (General Manager), Francisco González, Natalia Figueroa (national consultants) ▪ Introductory meeting (8:15 – 8:45), Interview about general data about enterprise ▪ Walk-through the production and the storage areas jointly with all persons present (8:45 – 10:00) ▪ Wrap up meeting (10:00 – 11:45): The general manager shows very high interest in CP in order to improve the efficiency of the process. Despite the size of the company some CP potentials were identified: Energy efficiency of the toaster, change of energy source, e.g. from fuel wood to propane in order to improve product quality, some good-housekeeping aspects. For more details see Annex 8.

Date, time	Person(s) met	Subjects discussed
Wednesday 19.10.2005	César Vallejo Bolaños, Luis Muñoz ChB	**Visit Montesol (13:00 to 18:00):** ▪ CP-team: Deidy Valladares (Production Manager), Arturo Hidalgo ("Representante legal"), Raúl Aguilar, Jorge Ocheita, Alexander Carroll (national consultants). ▪ Introductory meeting (13:00 – 14:00), Interview about general data about the enterprise. ▪ Extensive walk-through the production and storage area, including utilities production (boiler, compressed air, fresh water treatment) and waste water treatment section, jointly with all persons present (14:00 – 16:30). ▪ *Wrap up meeting (16:00 – 17:45):* The company is only 5 years old and makes a clean and well organised impression. Commitment of the management for CP / improving the efficiency is high. Thus, Mr. Victor M. Suarez, General Manager (owner?) of the company participated on the wrap-up meeting. The CP potentials found are quite high and are expected in the water flows (reduction of water consumption in the manual treatment section of the palmitos, recycling the cooling water from the sterilization, cleaning processes). Another aspect with quite high CP potential is the energy consumption (steam consumption in sterilization, heat recovery form the sterilizer, steam tunnel, boiler-efficiency). The electrical energy consumption is also quite high as the bill showed. Thus the use of high pressure compressed air in the sterilisation as well as the ventilation system in the production hall should be questioned and avoided. Conclusion: a perfect company for CP and a very good exercise for the national consultants. For more details see Annex 9.

Date, time	Person(s) met	Subjects discussed
Thursday, 20.10.2005	César Vallejo Bolaños, Maria-Amalia Porta ChB, FC, PH	**Wrap-up meeting at NCPC, Camara de Industria (8:00 to 11:00):** ▪ Discussion about the company visits, the main findings and open points to be done by FHBB, NCPC or FC/PH (see list of follow up in Annex 10) ▪ Mission report: quick explanation of the report. It shall be short and activity based and brief reports about each company visited (approx. 2 pages) will be done by ChB, FC and PH latest by November 12th. ▪ Training evaluation: ChB presented the evaluation, which was in general very good (see above and respective Annex). FC got feedbacks independently from two company representatives: they confirmed that during the training several points to be improved in their own company were identified. This was in both cases only possible because two persons from the same company were present in the training. They started to discuss certain aspects presented during the training and thus found already certain CP-options. It is therefore advisable always to invite more than one person from the same company in order to give them the possibility to reflect the lessons learnt. Another feedback from the two experts was the timing: they found it of advantage to do trainings after certain company visits, thus they had time to get acquainted with the local situation and could adapt the training accordingly. ▪ Recommendation of FC for the industry with regard to hygiene and quality control: Three of the visited four dairy companies are recommended first to implement Good Manufacturing Practices (as the Gutemalan law will require in two years). It makes for them no sense to start the implementation of a HACCP, system before the good practices are implemented. Only SULA de Guatemala would be on a level, where HACCP system could be introduced. However since this company is presently changing its operation practices because of its investments in new equipment a respective HACCP system should be only introduced after finishing the reorganisation. ▪ Problems encountered and possible solutions (see below) ▪ Exchange of all files and photos taken among NCPC, FHBB and SHL

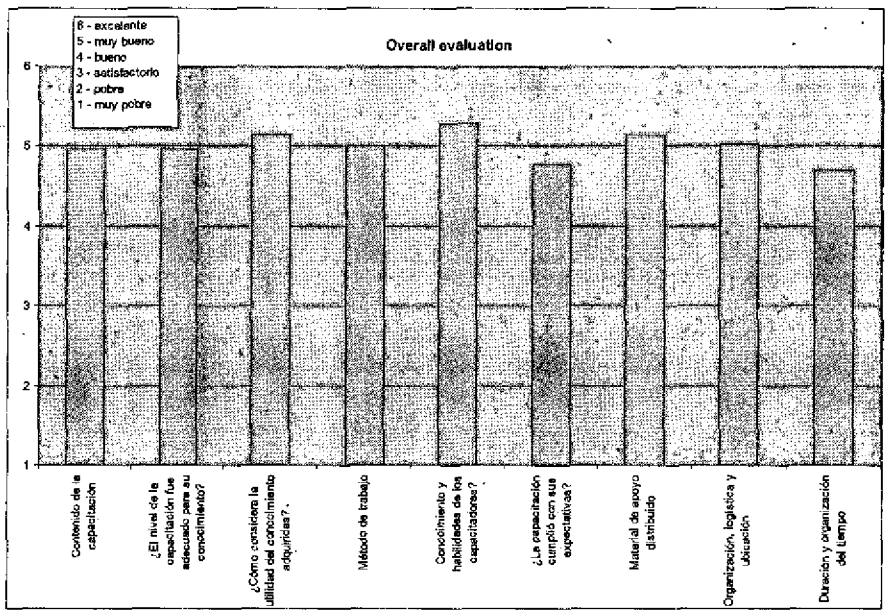
Description of the CP training module 5:
Cleaner Technologies and Techniques, sector specific training

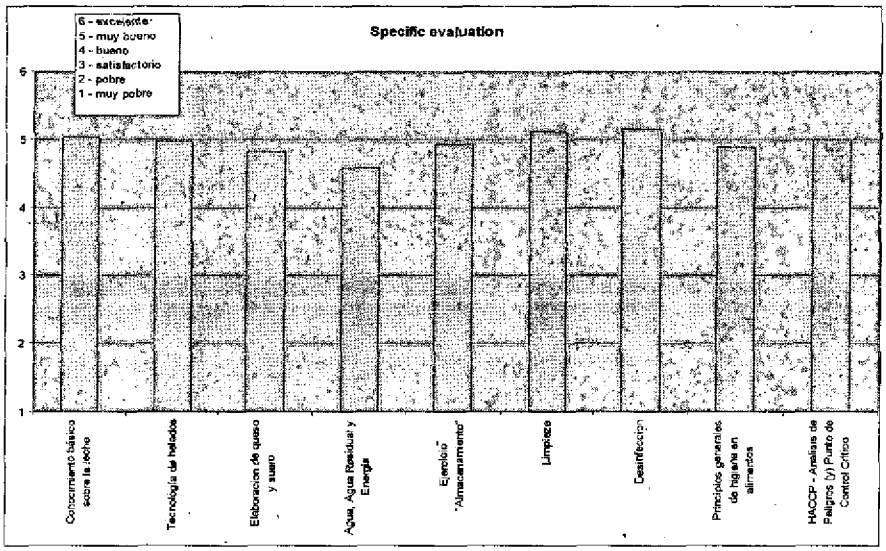
Location of the seminar	Seminar room no. 315 at Universidad Rafael Landívar, Guatemala City
Nb of participants	First training day: totally 30 participants of which 18 persons from Industries, 11 national consultants and the BID-coordinator César Vallejo Bolaños. 5 Persons attended only the afternoon session. Second training day: totally 36 participants of which 22 representatives of companies, 10 national consultants full day, 3 national consultants only in the afternoon and the BID-coordinator César Vallejo Bolaños. In total 67 full person-days training were conducted. See list of participants in Annex 11.
Profile(s) of the participants	The companies were represented by technicians, which are working in the CP-teams, all familiar with their production section (mainly general or production managers or similar). The consultants are senior and junior experts in environmental consulting and/or pollution prevention. They are working in private environmental consulting companies in Guatemala, as freelancer or in the University and enrolled for the training program in order to become BID-Instructor. Part of them were collaborating with the NCPC previously.
Aims of the activity (seminar) and themes developed	The BID-project does foresee for this year to build-up twelve instructors, which will be trainers for consultants and company representatives for the IPAs to be conducted in the next two years. The training program for these BID instructors and the company representatives includes 10 modules of classroom training and in parallel the practical conduction of an IPA in the 12 companies assigned for the project this year. This training represented the module 5 with the aim to instruct the participants about "Cleaner Technologies in the Food Sector". It took two days classroom training and aimed mainly at specific theoretical inputs on Best Available Techniques and experiences made in Europe in the *dairy industry*. Apart from sector specific topics also important aspects regarding *food-safety* and *hygiene*, *cleaning* and *HACCP* in the food sector had to be covered. The detailed Agenda of the training module 5 is attached in Annex 12.
Organisation	The workshop facilities with respective infrastructure and coffee breaks were organised in a professional and satisfactory manner by the NCPC at the Universidad Rafael Landívar. However the training course was scheduled until 18:00 the new classes entered the room both days already at 17:45. This created stress and quite abrupt endings of the training-days. It is therefore advisable to discuss this issue with the University and to plan enough time at the end of the workshops in the future. Most of the slides had been translated into Spanish language by FHBB prior to the mission. They were presented by Paul Hunziker in Spanish, while Florence Clerc was answering the questions of the participants (mostly in Spanish or translated by Paul Hunziker). The participants, who brought an empty CD-ROM received all training material, the templates for the QuickScan and the IPA report, the EcoInspector as well as sector specific CP-background material prepared by FHBB in electronic form. The companies, which were visited the last week by the experts also received the pictures taken during the visits.

Receptivity / motivation of the participants

The participants showed interest in the topics and asked several clarification questions, which leaded to interesting discussions about technologies, experiences made in Europe, about Good Manufacturing Practices, HACCP and Hygiene.

The 2 figures below show participant satisfaction with the Workshop.





Even though the training was designed for national consultants most of the participants (also the one from the industries) considered the training as valuable. Especially the topics about hygiene, cleaning, Good Manufacturing Practices and HACCP was specially mentioned mostly in the evaluation sheets.

Two participants were expecting more from the training (expectations met "poor") and one of them did not like the content of most of the topics presented. In order to not raise too high expectations, it is thus recommendable, if the NCPC would inform potential participants in more detail before future modules will start (e.g. sending the participants the agenda and a description of the course offered by e-mail).

The detailed evaluation, including remarks made by participants is attached in Annex 13.

Detailed description of the activity

Day 1 (Monday 17 October 2005)

The Workshop was opened by César Vallejo, Coordinator of the IDB project. He introduced the Agenda of the two days and – together with ChB, the experts FC and PH. ChB explained, why the focus today will be on dairy-technologies: There are no general food experts, covering all possible sectors available. Since there are many dairies participating in the IDB project, FHBB organised experts from this sector. However the next training day will focus more on general aspects regarding cleaning procedures, hygiene, Good Manufacturing Practices etc., so these topics will be important for all companies.

During the first two hours the theoretical basics about the composition and chemistry of milk were presented (milk composition, milk properties, fats, proteins, milk sugar, factors influencing the composition of the milk, etc.).

This was followed by a lesson about ice cream technologies. On the example of ice cream production, also the pasteurisation and homogenisation steps were discussed (these steps are also applied during other milk processing operations, like market milk production, cheese production, etc.).

During approx. 2 hours cheese manufacturing technologies on the example of Swiss cheese were presented in detail. This included the discussion about whey, its possible use as animal feed, whey drink production and membrane technologies for concentrating the whey.

In contrary to the official agenda, the group-work about storage and Codex-Alimentarius chapter 4.4.8 was done before the coffee break (to prevent that the participants leave before finishing their group-tasks). The participants had to find risk-points, potential hazards or in-compliances to the Codex for several situations in storage. A good group-dynamic was observed and all groups could finish their works on-time. The presentation of the results was planned for the second training-day.

Last input of the day was focused on water preparation, water quality standards, waste water and possible treatment methods.

Day 2 (Tuesday 18 October 2005)

The day was opened by Cesar Vallejo, leading briefly through the daily program. Aim of the second training day was to present general aspects of safety and hygiene, cleaning and the implementation of HACCP system in food companies.

FC gave first a quick overview about common food safety management tools and quality control systems. This was followed by a detailed discussion / presentation about cleaning processes: factors, which affect the cleaning efficiency, different types of cleaning agents, manual and automatic cleaning systems, CIP etc. In the same manner PH then introduced basic concepts and means about disinfection. Both topics are basics for good manufacturing practices and should be considered by the CP-teams to be checked in their companies.

Before lunch PH and FC invited all participants to a tasting session for Swiss cheese.

Detailed description of the activity

In the afternoon basic considerations about hygiene in food companies were introduced. This presentation comprised background theory about microbiology in food industry and bacterial growth, hygiene rules for buildings, personnel hygiene as well as hygiene in the production area. These good manufacturing practices are pre-conditions of a company to introduce a HACCP-system (Hazard Analysis and Critical Control Points), the next topic covered during the training. The presentation included the basic procedures / methodology to be followed by a company for the implementation a HACCP. All steps were explained on a practical example discussed in the plenum.

César Vallejo Bollanos and ChB presented the next steps and milestones to be taken by the CP-teams for their IPAs (see figure below). This was followed by an evaluation of the workshop and a very quick closing at 5:45 pm.

Equipos de Producción más Limpia

Cronograma de actividades

Fase Implementación de Producción más Limpia

Actividades	Fecha de entrega
Quick Scan - Entrevista - Visita	12-oct al 11 de nov
EcoInspector	12-oct al 11 de nov
Reporte de quick scan - formato	11. Nov
Capitulo 2 al 4 del Formato de evaluación en planta de P+L	25. Nov
Capitulo 5 Formato de evaluación en planta de P+L	16. Dez
Capacitación Generación y evaluación de opciones	Jan 06
Capitulo 6 al 7 del Formato de evaluación en planta de P+L	Mrz 06
Reunión con expertos del Centro	Mrz 06
Capitulo 9, 10, 11, 12 y 1 del Formato de evaluación en planta de P+L	Apr 06
Reporte final y hoja técnica	Mai 06

Report of encountered problem(s) and solutions brought

Description of the Problem	Identified solution(s)
The CP teams did not start their IPA before the mission, thus the teams did not prepare reports with respective flow analysis and options identified. FHBB has not been informed clearly about this fact prior the mission.	It was decided that the planned company visits shall be used as Quick Scans for the CP-teams. The local consultants shall collect the necessary information to be able to prepare the Quick Scan reports (including filling out the EcoInpsector). The experts and FHBB were therefore not able to discuss with the CP-teams the evaluation of possible options. It was decided that the contribution of the experts in the project now shall be to discuss the CP-potentials and CP-options identified as well as to give inputs about improving the hygienic conditions.
ChB had the feeling that the CP-teams were not aware, about what they should do within the frame of their IPA-project (even though they were told by the NCPC during the training before the mission)	A draft list of milestones and deadlines for the ongoing IPAs was prepared jointly with the project coordinator and was presented during the training (see Annex 14). ChB recommended the project coordinator to revise the training concept and adapt it to the new situation. Especially the chronogram for the next modules, milestones and activities to be done by the trainees should be distributed to the participants as soon as possible.
Some national consultants did not show enthusiasm or big effort during the company visits. One consultant did not show up during two company visits.	NCPC was reminded to have a close look at the performance of the consultants during the IPAs and to communicate it to them as soon as certain problems occur. Tight coaching and checking mechanism for the CP-teams should be implemented by the NCPC accordingly.
Two participants were expecting more from the training (expectations met "poor"), even if the companies and national consultants were informed by the NCPC in a letter about content and timing of module 5.	In future it is thus recommended, to inform the potential participants more detailed before the trainings in order to avoid over-expectations. E.g. the detailed agenda of the training, a description of the content and the main target group could be sent in advance.

Recommendations for the sustainability and for maintaining the long-term benefit of the obtained results

Intensive coaching and checking the consultants during the ongoing IPA will be very important in order to gain good reports and satisfactory results. Tasks about next steps to be done with respective milestones have to be communicated clearly and should be checked by the NCPC regularly. The workload for these coaching activities should not be under-estimated by the NCPC. It is therefore recommended to split the works among several experts of the NCPC. For ChB it is not clear, if FHBB will have enough means next year to check the quality of the final reports and to give a respective feedback (five draft reports, including only the material and energy flow analysis will be reviewed by the end of the year as defined in the concept-paper of the training). This task should also be taken by the CP experts of the NCPC.

Regarding the training activities and respective communication, it is recommended to revise the concept according to the new situation and distribute it among the participants.

In order to force the CP-teams to finish their tasks on time it is further recommended to let the teams present their results of the ongoing IPAs during the next training (module about option generation) and maybe at the end of the project during e.g. a half-day certification ceremony.

List of annexed reports and other documents (programme, list of participants, distributed material, etc.)

No	Title / Description	Hard copy	Electronic
01	TOR for dairy experts and Agenda of the Mission		X
02	List of companies and respective CP-teams participating in the first year of the BID project		X
03	Report about company visit: Las Margaritas		X
04	Report about company visit: Improlacsa		X
05	Report about company visit: La Cuna de Queso		X
06	Report about company visit: Industrias Ricks		X
07	Report about company visit: Sula de Guatemala		X
08	Report about company visit: Tostaduría de Café Sol		X
09	Report about company visit: Motesol		X
10	Follow up mission 10-2005		X
11	List of participants during training module 5		X
12	Agenda of training module 5		X
13	Training evaluation by participants for module 5		X
14	Next steps and milestones for the CP-teams		X

Place, Date Muttenz, Zollikofen, November 2005

Signature

Florence Clerc, Research Associate SHL	Paul Hunziker, Project manager Leplan AG	Christian Buser, Research Associate FHBB

University of Applied Sciences Basel
FHBB | Faculty Industry | Institute of Environmental Technology

Terms of Reference for Expert Mission to Guatemala

Cleaner Technologies and Techniques in food manufacturing companies

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Dates	11.10. to 21.10.2005	
Place	Guatemala City	
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	National Cleaner Production Centre Guatemala (NCPC): Centro Nacional de Produccion mas Limpia Guatemala Camara de Industria de Guatemala, Ruta 6, 9-21, Zona 4, Piso 12, Guatemala City Ms. María Amalia Porta – Director of NCPC phone ++52 2 334 4848 or 2 331 9191 e-mail: cgpl@cgpl.org.gt URL: http://www.cgpl.org.gt/	
Overall objectives	Build up capacity of the local Cleaner Production consultants in the food sector, as well as support of the NCPC in the IDB-project.	
Nb. of days	2 days	Training
	4 days	Company visits
	0.5 day	Mission wrap up with management of NCPC and definition of follow up actions (for CP-teams and Expert)
	2 days	Travel
	3.5 days	Reporting and follow up

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Specific objectives of the mission

The modular training program for IDB-consultants consists of classroom training and coached field works: each consultant is conducting together with representatives from the companies a CP In-Plant-Assessment (IPA). Within this project the mission has the two following specific objectives:

Training of local consultants (2 days):
The Module 4 "Cleaner Technologies in the food sector" takes two days classroom training and aims mainly at specific theoretical inputs on Best Available Techniques and experiences made in Europe in the dairy industry. Apart from sector specific topics also important side aspects regarding Food-Safety and Quality Assurance in the food sector shall be covered.

Company visits and review of ongoing IPA:
The mission will complement the on-going in-plant assessments (IPAs) in four companies and therefore it also aims at reviewing already identified possible measures and consulting the NCPC staff about the feasibility of them (advantages - disadvantages of the measures, discussion and recommendations related to the calculation of economic and environmental feasibility). The goal is to identify the most feasible solutions (for the farms and for the environment), which will be recommended for the implementation in the farms.

Main tasks

1. Preparation of the mission:
   - Reading background material (QuickScan and IPA draft reports)
   - Preparation to possible questions of the NCPC related to the three IPAs
   - Preparation of Slides and background information to be presented to the course participants
2. Conduction of the mission:

   2.1 Company visits:
   - On-site walk-through and data collection in four companies.
   - Discussions of possible measures for improving the situation, including the evaluation of necessary investment costs and economic as well as environmental benefits of the identified measures (in collaboration with the staff of the NCPC).
   - Discussion and consulting about the already identified measures and its implementation.
   - Information about providers of technologies regarding the implementation of the measures and best available/suitable techniques/technologies, if not available in El Salvador.

   2.2 Training: the training module will take two days and shall cover the following aspects:
   - Dairy technologies in small/medium scale production sites (milk, ice cream and cheese production) – state of the art techniques and experiences made in Europe
   - Water preparation, handling and water saving potentials, Effluent handling and treatment systems
   - Energy aspects in dairies
   - Important aspects about product and raw material storage
   - Cleaning processes, CIP-systems
   - Disinfection and hygiene – principals of reducing risks
   - Implementation of Quality Assurance- and HACCP systems

Main tasks	2.3 Debriefing of NCPC-staff: ▪ Presentation of the findings from the company visits ▪ Discussion about the CP options under consideration of cost-savings/investments, technical and environmental aspects ▪ Recommendations to the CP-teams for next steps (implementation of the measures) 3. Debriefing of FHBB and Reporting: ▪ Debriefing of FHBB in Switzerland within one week after the mission, if not present during the mission. 4. Mission reports as specified below
Expected results	After the mission the staff of the NCPC shall: ▪ have an overview (and be documented) about applied Best Available Techniques (BAT) in small and medium sized enterprises of the dairy sector ▪ know the technical strengths and weaknesses of the BAT and their environmental and economic advantages ▪ get the necessary contact information about suppliers of technologies and/or techniques in Switzerland and/or OECD-countries, if not available in Central America. ▪ be advised about the most interesting measures for implementing in the four visited companies (regarding to economic savings, environmental benefits, technical and organisational issues) and know, what actions shall be taken to implement the most feasible options identified. After the mission, the management of the NCPC shall know about the results achieved and lessons learnt. The NCPC shall be documented with respective slides, contact and background information about more sustainable dairies.
Reporting	A *brief mission report shall be prepared (according to the respective template to be* provided by FHBB) summarising the main experiences gained and giving recommendations for the next steps to be carried out (follow-up list). Additionally a separate report shall be written for each company visited. These shall include the main observations of the expert, the lists about saving potentials and the recommended follow up actions to be done by the CP teams as well as respective contacts with suppliers of technologies. A short summary report about the main findings of the mission, the CP potentials found in the companies etc. shall be made as a draft (maximum 2 pages) for publishing in a local scientific magazine. Copies of documents, which were handed over to the NCPC, shall be provided to FHBB (either in electronic or in printed form). The reports shall be sent to FHBB latest until November 12th 2005.
Language	English with oral translation into Spanish for company visits and training and mission report in English
Background information	Quick Scan reports and background information (first part of IPA-reports) about of the four companies to be visited (to be provided by the NCPC until September 17th 2005) List of questions of the CP-teams for the expert (to be provided by the NCPC until September 17th 2005). The questions shall be related to the ongoing IPAs.

27.06.2005, rev 03 - 15.10.2005 / bch

Annex 1 – Agenda of Mission

Date	Activities	Durat.	Participants	Remarks
11.10.2005	Journey to Guatemala		Christian Buser	Arr.: 19:11 by AA2195
Wednesday 12.10.2005	Initial meeting	2 hour	Experts, Christian Buser Maria-Amalia Porta (Director of NCPC) César Valejo (IDB-coordinator)	NCPC: please inform the Hotel-reception, what time we shall start work at Camara Photocopy of participants folders to be organised by NCPC (César Valejo)
	Company visit 1: **Agropecuaria Las Margaritas** including wrap up of the visit	6 hours	Experts, Christian Buser César Valejo, CP-team	
Thursday 13.10.2005	Company visit 2: **INPROLACSA** including wrap up of the visit	1 day	Experts Christian Buser César Valejo, CP-team	
Friday 14.10.2005	Company visit 3: **La cuna del queso** including wrap up of the visit	1 day	Experts, César Valejo , CP-team	
	Company visit 4: **Industrias Rick's (snacks)** including wrap up of the visit	1 day	Christian Buser Luis Muñoz, CP-team	In parallel to company visit of the Experts
Saturday / Sunday 15./16.10. 05	Final preparations for training		Experts	If necessary NCPC for final preparation of the training

Date	Activities	Durat.	Participants	Remarks
Monday 17.10.2005	Training: **CP and Food Industry part I** **BAT in dairies:** ▪ Milk knowledge[1] (2 hours) ▪ Ice Cream technologies[1] (1.5 h) ▪ Cheese manufacturing and whey problems[1] (2.5 hours) ▪ Water, waste water and energy aspects[2] (1.5 hour) ▪ Storage – exercise[2] (1 hour)	1 day	Experts, Christian Buser IDB consultants, company *representatives*	8.5 hours lecture, 2 x 15 min coffee break, so it will be a 9-hour day (e.g. 8:30 to 12:30 and 13:30 to 18:00)
Tuesday 18.10.2005	Training: **CP and Food Industry part II:** ▪ Storage exercise – presentation (0.5 hour) ▪ Cleaning[1] (1 hour) ▪ Disinfection[1] (2 hours) ▪ Hygiene[1] (1 hours) ▪ HACCP-systems[1] (4 hours)	1 day	Experts, Christian Buser IDB consultants, company representatives	8.5 hours lecture, 2 x 15 min coffee break, so it will be a 9-hour day (e.g. 8:30 to 12:30 and 13:30 to 18:00)
Wednesday 19.10.2005	Company visit 5: **SULA Guatemala** including wrap up of the visit	1 day	Experts Maria-Amalia Porta	
	Company visit 6: **Tostaduria de café El Sol** including wrap up of the visit	0.5 days	Christian Buser César Valejo, Luis Muñoz CP-team	
	Company visit 7: ***Montesol (canned goods)*** including wrap up of the visit	0.5 days		
Thursday 20.10.2005	Discussion with expert Definition of follow up Mission wrap up	0.5 days	Experts Christian Buser Maria-Amalia Porta César Valejo	Experts will leave Guatemala City in the afternoon
	Reserve, Reporting	0.5 days	Christian Buser	
21.10.2005	Journey to Switzerland		Christian Buser	Dept.: 8:00am by AA 2196

[1] Presentation in Spanish
[2] Presentation in English

Equipos de Producción más Limpia (Oct. 2005)

Agropecuaria Las Margaritas, S. A. Actividad: Lacteos Kilometro 14.5 Interior carretera al pacifico finca El Paraiso Villa Nueva.			Referencias: después de la bajada de Villalobos, es la ARECA y una pasarela, seguir recto, se pasa una entrada a una colonia y después se encuentra una pendiente de terracería angosta. 4 Km hacia adentro. Portón de tubos rojos.	
1	Arturo Iturbide	Gerente General	6633-9077	aiturbide@haas.com.gt
2	María de Los Angeles López	Gerente de desarrollo organizativo	6633-9077	mlopez@haas.com.gt
3	Patricia Girón	Gerente de producción	6633-9077	
4	Francisco González	Consultor asignado	5817-6142	franjagol@yahoo.com
5	Mildred Carmina López	Consultor asignado	5700-9529	mildredcarmina@yahoo.com
6	Jorge Ocheita	Consultor asignado	5413-1630	ocheita@intelnet.net.gt

Alimentos Campestres, S. A. Actividad: Frutas Deshidratadas Carretera a Canalitos, 21-96 z. 17, Lomas del Norte			Después de metronorte a mano derecha, casi auxiliar, llego a dos puentecitos, paso la linea del tren, entro como hacia lomas del norte, llego hacia estación de policía de Lomas del Norte y ahí empieza la carretera que va a canalitos, a 150 m. de estación de la policía, entrada de tierra, avanzar 100 metros.	
1	Carlos Raúl Montes	Gerente General	2258-5609 2258-5610	
2	Ana Victoria Rodriguez	Consultor asignado	5413-5954	avrodriguez@cgpl.org.gt
3	Luisa Fernanda Barrientos	Consultor asignado	5412-4438	fqblab@intelnet.net.gt

CECARSA Actividad: Rastro de Cerdos Dirección: 8 Av. 20-00 zona 17			Referencias: 20 m antes de la entrada a Mariscal Zabala, por Metronorte	
1	Octavio López	Gerente General	2258-1773	cecarsa2001@yahoo.com.mx
2	Guillermo Solórzano	Asesor de calidad	2258-1773	guillermo56@itelgua.com
3	Jorge Mario Taracena	Gerente de producción	2258-1773	taracena_jorge@yahoo.com
4	Luisa Fernanda Barrientos	Consultor asignado	5412-4438	fqblab@intelnet.net.gt
5	Natalia Figueroa	Consultor asignado	5708-2008	nfigueroa@enpalsa.com

Conservas y Congelados Ya Esta, S. A. Actividad: Conservas y congelados 5ta. Calle 12-59 z. 2 La Escuadrilla, Mixco.			Calzada Roosevelt, Colonias que están en frente del Centro Español Al fondo, enfrente de el campo de fútbol	
1	*Hugo Gudiel*	*Gerente de producción*	*2439-2622, 2439-2574*	hugo.gudiel@cocoguate.com
2	Otto Dubón	Gerente financiero	2439-2622, 2439-2574	otto.duvon@cocoguate.com
3	Pablo Secaida		2439-2622, 2439-2574	
3	Luis López	Consultor asignado	5550-4923	iglurs@hotmail.com
4	Raúl Aguilar	Consultor asignado	5309-7599	ragullar@itelgua.com
5	Alexander Carroll	Consultor asignado	5593-2597	carrollal@itelgua.com

Industrias Rick's, S. A. Actividad: Snacks Calzada Mateo flores 14-32 zona 3 de mixco			A la altura del Centro Español, parte de atrás.	
1	Byron Alquijay	Gerente General	2437-5000	info1@snacksricks.com
2	Floridalma Reyes	Gerente de producción	2437-5000	freyes@snacksricks.com
3	Pablo Secaida	Encargado de empaque	2437-5000	psecaida@snacksricks.com
4	Luis López	Consultor asignado	5550-4923	iglurs@hotmail.com
5	Carlos Gódinez	Consultor asignado	5201-1615	cvgodinez@hotmail.com
6	Sonia Solis	Consultor asignado	5652-4787	ssolis@cgpl.org.gt

INPROLACSA Actividad: Lacteos 8 Av. 7-89, zona 2, San José Villa nueva			Después de la bajada de Villa Lobos, encuentro una subida, hay una pasarela en medio de dos gasolineras, ahí cruzo a mano derecha, guiarse por los rotulos de colonia Mirador del Valle antes de la *colonia está inprolacsa, portón de malla*	
1	Erwin Cordero	Gerente de producción	6629-9333	ecordero@inprolacsa.com
2	Claudia Salguero	Encargada de control de calidad	6629-9333	csalguero@inprolacsa.com
3	Erich Brand	Consultor asignado	5978-4735	ebrand@etsa-guatemala.com
4	Diana Sánchez	Consultor asignado	5206-3428	dianasl82@yahoo.com
5	Sonia Solis	Consultor asignado	5652-4787	ssolis@cgpl.org.gt

La cuna del queso Actividad: Lacteos Carretera Principal de Taxisco, Km 105			Calle principal del pueblo	
1	José Rodolfo González Melgar	Gerente General	2437-2907 7874-9435	lactasa@intelnet.net.gt
2	José Carlos López García	Gerente de producción	2437-2907 7874-9435	
3	Erich Brand	Consultor asignado	5978-4735	ebrand@etsa-guatemala.com
4	Ana Luisa de Arocha	Consultor asignado	5704-2123	wichamontes@turbonett.com

Las Delicias de Guatemala, S. A. Actividad: Dulces Típicos Av. Icapie 29-64 zona 13			Después de DHL	
1	Marisol de Hortón	Gerente General	2338-7134	lasdeliciasdeguatemalasa@hotmail.com
2	Juan José Salazar	Gerente de producción	2338-7134	
3	Rosa María de Lima		2338-7134	
4	Esteban Piedra Santa	Consultor asignado	5216-6333	eps@dinamicabioambiental@lab.com
5	Ana Luisa de Arocha	Consultor asignado	5704-2123	wichamontes@turbonett.com
6	Mildred Carmina López	Consultor asignado	5700-9529	mildredcarmina@yahoo.com

Equipos de Producción más Limpia (Oct. 2005)

Montesol	Actividad: Productos Enlatados			Antes de llegar al Hiper Paiz de Villa Nueva esta el cruce a Bárcenas, se pasan dos residenciales Altos I y Altos II, despues encuentro arboles grandes de la escuela de agricultura y en frente hay un portón de mayo, hay una garita sin seguridad, como a 5 m. pralon verde.
Km 1.3 carretera a Bárcenas, Villa Nueva				
1	Arturo Hidalgo	Representante legal	2377-2000 6679-7977-9	deidyvalladares@tutopia.com
2	Deidy Valladares	Gerente de producción	2377-2000 6679-7977-9	
3	Raúl Aguilar	Consultor asignado	5309-7599	raguilar@itelgua.com
4	Jorge Ochelta	Consultor asignado	5413-1630	ocheita@intelnet.net.gt
5	Alexander Carroll	Consultor asignado	5593-2597	carrollal@itelgua.com

SULA-Guatemala	Actividad: Lacteos			Después de la Toyota, esta la texaco y hay un retorno, inmediatamente después del retorno a mano derecha portones azules
km 25.5 carretera a El Salvador				
1	Oscar Castellanos	Jefe de Mantenimiento	6620-9696	oscarz@itelgua.com
2	Patricia Funes	Jefe de Control de Calidad	6620-9696	patriciafunes@gmail.com
3	Khevin Rosal	Consultor asignado	5918-0317	k2k2@galileo.edu.com
4	Diana Sánchez	Consultor asignado	5206-3428	dianasl82@yahoo.com
5	Ioannen Pérez	Consultor asignado	5500-0771	ioannen@yahoo.com

Tostaduría de Café Sol	Actividad: Tostaduría de Café			
12 Av. "A" 4-37, zona 2				
1	Miguel Guirola	Gerente General	2254-2614	miguirola@itelgua.com
2	Alejandro Sánchez	Asesor	2254-2614	
3	Francisco González	Consultor asignado	5817-6142	franjagol@yahoo.com
4	Ioannen Pérez	Consultor asignado	5500-0771	ioannen@yahoo.com
5	Natalia Figueroa	Consultor asignado	5708-2008	nfigueroa@enpalsa.com

XELAPAN	Actividad: Panadería Y Pastelería			
9 Av. 11-82 zona 1 Ciudad, Salida Almolonga				
1	Orlando Guzman	Encargado de proyectos	7763-0759 7761-6762	orlandog@xelapan.com
2	Eddy Sosa Ramírez	Gerente de producción	7763-0759 7761-6762	secretaria@xelapan.com
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3	Ana Luisa de Arrocha	5704-2123	2476-7785		
4	Ana Victoria Rodriguez	5413-5954	2331-9191		2339-0264
5	Carlos Godinez	5201-1615	2435-0674		
6	Diana Carolina Sanchez	5206-3428			
7	Erich Brand Gálvaz	5978-4735		2331-1576	
8	Esteban Piedra Santa	5216-6333	2474-0723		
9	Francisco Gonzales	5817-6142			
10	Ioannen Francisco Perez	5500-0771		2286-6665	
11	Jaime Rosales	6634-7146			
12	Javier del Cid	5562-9868			
13	Jorge Eduardo Ocheita Rivas	5413-1630	2476-2700		
14	Khevin Rolando Rosal	5918-0317		2289-0672	
15	Luis Lopez	5550-4923			
16	Luis Raul Aguilar	5309-7599	2360-6227		
17	Luisa Fernanda Barrientos	5412-4438	2258-5611		
18	Mildred Carmina López Oriza	5700-9529		6635-4273	
19	Natalia Figueroa	5708-2008			
20	Sonia Magaly Solis	5652-4787	2331-9191		2339-0264
21	William Flores			2477-5561	
22	Cesar Vallejo Bolaños	5521-8283	2331-9191		2339-0264

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Schweizerische Hochschule
für Landwirtschaft

Visit of Las Margaritas SA

Km 14.5 Interior carretera al pacifico finca el Paradiso Villa Nueva, Guatemala
12.10.2005 (11.00 – 17.30)

Participants:

SHL:	Florence Clerc, Paul Hunziker
FHBB:	Christian Buser
NCPC:	César Vallejo Bolaños
Las Margaritas:	Arturo Iturbide (General Manager) Maria de los Angeles López (Gerente desarollo organisativo) Patricia Girón (Gerente de producción)
National consultants:	*Francisco González, Mildred Carmina López, Jorge Ocheita*

Activities:

- Florence Clerc, Paul Hunziker, Christian Buser and Jorge Ocheita conducted an extensive walk through all production and storage areas (11:00 to 14:30).
- César Vallejo Bolaños, Francisco González, and Mildred Carmina López conducted first an interview with company representatives to collect general information about the company and made then the tour through the production site.
- Wrap up meeting (15:45 to 17:15)
  During the meeting the most important observations of the national and international consultants were discussed in plenum. The general manager appears to be very interested in improving the quality and environmental aspects of the company. He knows about good manufacturing practices (GMP) and some of them have already been defined in the factory but not always applied. The follow-up of the GMP is very important.

Company:

Las Margaritas is a medium-size family owned dairy, which mainly produces fresh cheese and joghurt, but which also produces fluid millk; some desserts and orange juice.

The main raw material used are the milk from the farm next door for the cheese production (about 8.000 – 10.000 L / week) as well as milk powder coming from New Zealand for the joghurt production (5 tons / month).The production is about 5.000 kg joghurt / week and 700 kg cheese / week. Fresh cheese and joghurt together make about 75% of sales.

The company employs 37 workers, which are 6 for administration, 17 for production and 14 for distribution.

Results:

- Milk receiving area. The milk is open at this stage, so that there is a high risk of product contamination with foreign bodies, this area being outside of the factory.
- The incoming milk temperature should be checked (mix of morning and evening milk).

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- Warehouse. The temperature in the warehouse is very high (35-40°). Some pallets are directly put next to the wall. Some boxes are on the floor. The doors are correctly closed but the ceiling has some holes in which pest (mainly insects) could come through. The products should not be put directly on the floor and the warehouse should be organised in a way that the boxes are not directly next to the wall (pest control, cleaning, First-in First out).
- The pest control monitoring system is available outside and inside the factory. It is outsourced and controlled 2x/month. Remember that this is a monitoring system and not a guarantee against pest intrusion.
- Some pins are used in the distribution area. These should not be used in a food company (risk of foreign bodies). In order to replace pins, big coloured magnets could be used.
- Cold room. The organisation of the cold rooms should be improved. The idea to split cold storage for final products and intermediate products is good but should be better applied. The floor is dirty. Plastic curtains are available. Some eggs boxes are directly on the floor. Empty plastic boxes are stored in the cold room to prevent from theft. But the products should have priority for cold storage in order to have enough room for good organisation (FIFO, nothing stored directly on the floor or next to the wall). Another system should be found for boxes. The organisation of the cold rooms should be improved and organised so that no contamination could occurs. This principle should also be applied outside the cold room, where paper garbage and yoghurt containers are being stored side by side.
- Some containers are labelled with a sticker on the lid. The labelling should be on the container and not on the lid only, so that when the lid is removed, the labelling still remains. A clear identification of the products is missing and should be implemented so that products can be clearly identified at any time.
- Some lights are not protected against breakage, which is a risk for foreign bodies in the products.
- The electric insect trap should be emptied more often and placed outside the production.
- The orange peels are directly on the floor of the orange peel garbage. Putting the peels in containers would be easier for handling and cleaning. Important is that the garbage container clearly differs from the food containers used in the production to avoid contamination.
- It is recommended to have a self-inspection tour of the production. This could be done with the help of a form, which lists the places to be checked as well as new findings observed during the inspection. Ideally, production, quality and management representatives should take part in the inspection. The inspection should lead to a short report as well as list of improvements, specific tasks and decision to be taken (what, when, who).
- Not all hand washing facilities are adapted. Sometimes paper is missing, sometimes soap is missing or only cold water is available. The hand washing facilities should have a sensor in order to flow water without touching anything by hand. The hand washing procedure should be available next to each hand washing station (ideally with pictures).
- Changing rooms. Shower and toilets are available. Painting material as well as chemicals stored in the changing rooms should be removed and stored in an appropriate place. The floor of the changing room is dirty. A cleaning plan should be implemented for all cleaning tasks in the company. The cleaning plan clearly defines all cleaning actions (chemical used, method of cleaning, equipment, frequency of cleaning, etc). This would allow to better manage the cleaning and therefore to have a better cleaning of the production.
- The production zones are not clearly defined and identified. Zones should be defined according to the level of risk and the type of activity occurring. It's important to check the product, personnel and equipment flows going in and out of the different zones to optimize them and avoid contamination. There are specific hygiene rules for each zone. E.g. the milk receiving area, which is high-risk zone because the product is open, should not be outside the building. E.g. the doors to the production area remain always open, which allows pests and other contaminants to enter to the high-risk production zone.

- The clothing policy is not clearly implemented. By the yoghurt filling some workers are wearing a mask some other not. For each activity, respectively for each zone, a specific clothing rule has to be defined and applied. The maintenance of the working clothes has to be defined too, in order to avoid contamination (fabric is sometimes falling apart).
- The access to the production room could be sanitized to be easier to clean and to avoid dust being carried with personal as they enter to the production zone. A clean floor would also allow reducing the risk of pest contamination.
- The production floor is broken and in bad shape, which doesn't allow proper cleaning. The walls are not designed to be easily cleaned.
- Milk is pasteurised at 65°c for 30 min. to make cheese and at 85°C for 10 min. to make yoghurt. The milk is heated in a double jacketed tank with natural gas burner under the tank. The milk temperature is measured in the middle of the tank. Then the milk is cooled down with a plate heat exchanger with chilled water to reach the processing temperature (cheese 37°C, yoghurt 42°C). In the case of yoghurt, milk is then inoculated and fermented in aluminium can in a water bath (outside) until the final pH is reached.
  The efficiency of the heating process should be improved.
  An easy way to improve the heat transfer is to stir the milk in the tank while heating it. This easy to implement measure will lead to energy savings. The consumption of gas is very high (15.000 $ /year). The milk should be preheated through a plate heat exchanger to reduce the time needed to achieve the pasteurizing temperature and to reduce energy consumption. Water used for yoghurt should also be preheated (directly from the boiler).
- The temperature of the production area can be very high (can reach 42°C). The heat losses of the propane heating are heating the production area, which. 4 ventilators are extracting air from the production. It would also be good to use the natural extractors in order to allow the production area to cool down and to remove humidity at night. These extraction tower need to have a fine protective grid / web to protect from contamination.
- Some powder bags stored in the laboratory are not closed properly. Each food has to be packaged so that it is closed and thus protected from contamination.
- The formula management (modifying, creating,...) is made by the General Manager and the preparation of the ingredients (wheighting,...) is made by the production manager. This should garantee that no unwanted changes occur in the product formula.
- Food packaging is used for purposes other than food packaging. It's not allowed to use food packaging, even though with old design, even though with distinctive labelling, for other purposes than for food use. This helps to prevent the risk of contamination.
- Some analyses are made in the company to check the quality of milk (pH, acidity, fat content, microbiology). The microbiological analyses of water are outsourced and done once a month.
- More attention should be paid to the risk of product contamination with foreign bodies (painting falling off in production area, plastic boxes broken, tape, strings, etc). Everything which is not necessary for the production task should not be kept in the production, and the production tools should be stored appropriately
- Cleaning equipment used outside the production should be clearly distinguished from that used in production zones (e.g. different colour).
- Whey, as well as orange peels, is used for animal feeding. Food for animals should be regarded and treated as food for humans. Whey should be better stored in appropriate containers and regularly fetched to ensure it's quality as food for pigs and to prevent it from becoming an area where insects can develop.
- The water supply network is not very well defined. Piping should be identified clearly. A detailed water supply concept should be established before any big changes in the production are made.
- Hot water piping should be isolated to reduce energy losses and unnecessary warming of the Production

- All big energy consumers should be equipped with hour-meters to monitor maintenance and indirectly energy consumption. This will help to predict maintenance needs and monitor improvements in energy consumption.
- Water consumption should also be monitored even if costs are presently not significant.

Follow-up:

Task	Responsible	Date
Finish EcoInspector and write QuickScan report	CP Team	11.11.2005
Finish IPA-report until chapter 5, send draft to NCPC	CP Team	16.12.2005
Read CP documents about dairy production	CP Team	16.12.2005
Find out how much would cost a plate heat exchanger for pasteurisation, who could supply it and what would be the savings (how could these be calculated/estimated?).	SHL	16.12.2005
Check if there are alternatives to chlorine disinfection, what are the advantages / disadvantages as well as what are costs (higher / lower?).	SHL	16.12.2005
Give feed-back about the IPA report	NCPC	14.01.2006
Give feed-back about the IPA report (if forwarded by the NCPC to FHBB until 16.12.2005)	FHBB	07.01.2006

30.11.2005 / FC-PH

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Visit of Inprolacsa

8 av. 7-89, zona 2, San José Villa nueva, Guatemala
13.10.2005 (09.00 – 17.00)

Participants:

SHL:	Florence Clerc, Paul Hunziker
FHBB:	Christian Buser
NCPC:	César Vallejo Bolaños
Improlacsa:	Virgilio Cordon (general manager)
	Erwin Cordero (production manager) Claudia Salguero (chief quality control) Erwin Lopez (operations manager) Janette Velasquez (administrative manager)
National consultants:	Diana Sánchez, Sonia Solis

Activities:

- Introduction meeting (9:00 to 9:45)
- Company visits (9:45 to 13:30):
  One team (César Vallejo Bolaños, Diana Sánchez) conducted the interview first before they visited the production site.
  The second team (Christian Buser, Florence Clerc, Paul Hunziker, Sonia Sollis) conducted an extensive walk-through all production and side processes.
- Wrap up meeting (14:45 to 17:30):
  The observations of the national and international consultants were discussed in detail. The company representatives are very open minded towards new ideas and discussed the observations with high interest.

Company:

Inprolacsa is a company with 2 important product groups: the juices and the dairy products.

The juices are usually produced from 07.00 – 16.00. By the time of the visit the orange juice line wasn't working. Inprolacsa is mainly producing orange juice but also lime juice as well as other juices. The juices are sold under the brand Ravinal (Ravinal is a village but orange don't only come from this village anymore!). The company transforms about 1 million oranges / month, which come from Guatemala between October and February and from other countries like Hondurras from March to September. Inprolacsa also produces orange, which are ready to be pressed in the supermarket with a special equipment to get fresh orange juice.

The other part of the production is producing dairies 24/24 a day. The dairy products are made out of milk powder from New Zealand because it's easier to work with powder (less quality variability than with fresh milk). Dairy products are mainly mix for sundae-shake for restaurants as well as portion sauces. Some honey specialities (maple honey, flavoured honey) are also produced in the dairy part of the company.

Inprolacsa employs 110 workers, and 30 of them are working in the production.

Results:

- Clothing policy. Visitors are wearing an adequate coat and hair protection. Visitors should be asked to wash hands and to remove jewellery before entering the production area. Workers have adequate clothing. The maintenance of clothing should be improved; some protecting coats are not in good shape and are falling apart (risk of contamination with foreign bodies). Some workers are wearing a watch. Some of the workers in the dairy production are wearing a mask, others not.
- Orange peels. A big quantity of orange peels (20 t/day) is left over from the production (1kg orange gives 500 g orange juice and 500 g orange peel). Some projects are being studied to use peels as compost, as food for cattle or for the production of methane.
- The lighting should be protected to avoid foreign bodies (glass) to contaminate products in case of breakage. Some of them are protected with a grid, which will not prevent pieces of glass from falling on products, raw material or open packaging.
- The production doors are open making it possible for pests and contaminants to enter the production area. The air curtains, which are supposed to prevent this from happening, need to be further studied to confirm their actual utility. A closed door is more useful than an air curtain.
- Warehouse. Some boxes are directly stored next to the wall. There should always be some space between the wall and stored goods (pest control, cleaning, FIFO management).
- Chemicals are stored directly next to food products and near a high-traffic zone. Chemicals should be clearly separated from other products and well protected in a closed area to avoid the possibility of accidental spilling.
- The floor of the warehouse is not in very good shape and is therefore difficult to clean. The wooden pallets are tolerated in the food industry as long as they are clean and free of broken pieces. They should be regularly checked, repaired if necessary or eliminated when no longer repairable.
- Some white bottles were dusty. A packaging storage area should be considered as part of the food production area and should respond to high standards in hygiene. It should only be accessible to persons working in this area. Packaging which is unsuitable for production should immediately be eliminated.
- A pest control system is available but should be improved. Not many traps are available, production doors are always open and a cockroach was seen in the extracting room.
- Traps are a monitoring tool and not a guarantee against all types of pest intrusion.
- Orange washing. Oranges are first mechanically washed in water with fungicide to remove soil. The second step is a bath in water with chlorine (100-200 ppm). The oranges are then sorted out according to their size. They will either be put in boxes to be pressed in the factory or packaged in bags to be sent to supermarkets where they will be fresh pressed. Are oranges staying long enough in the first step to make the use of a fungicide useful? Do all oranges need to be treated against fungus or is it only oranges being sent to the supermarkets, which need to be treated? These questions need to be studied in detail.
- Hand washing facilities are well designed. Their effectiveness depends on the responsibility level of each worker and on a good follow-up of soap and paper dispensers! e.g. no paper was available by the mix preparation zone, no paper or disinfectant were available in the women's changing room. The hand washing procedure should be available next to every hand washing station. Hand washing facilities are missing in the pressing and filtering zones, which are high-risk zones.
- One important rule in GMP is to avoid contamination with foreign bodies. These should be better controlled in the factory. e.g. strings are sometimes used to fix equipment in high-risk zones, rust from the orange washing machine may end up in the juice.
- The high-risk zone is clearly delimited. Workers are specially equipped. The floor is easy to clean, which is not the case of walls. The equipment present in this area is strictly the one

being used for production. This excellent policy should also be applied to other production areas.

- For some products, the pulp is reintroduced in the juice. This needs to be done carefully to avoid introducing foreign bodies with the pulp. This pulp could eventually be separated from eventual foreign bodies by flotation.
- Some best before labels are stuck on the wall. Labels should be either used on products or disposed of as garbage. Labels can be misused accidentally or intentionally, thus leading to risks for food safety.
- Freshly extracted unpasteurized juice (puro) is cooled down in double jacketed tanks before being bottled. This is a sensitive step. Sometimes the product is entering the cold room without having been properly cooled down. It is sometimes being sent off for distribution without achieving the necessary 5°C temperature. The cooling process between extraction and filling should be improved. One possibility would be a tube-in-tube heat exchanger before the pump.
- The pump used between extraction and holding tanks is not working properly. A centrifugal pump needs a minimum backpressure and a constant flow to work properly. In our case the pump was unnecessarily "whipping" the juice, as a mixer would do. This leads to premature wear of the pump and unnecessary heating and oxidation of the juice (centrifugal pumps are cooled down mainly by the fluid being pumped, when the flow is too small, the fluid will heat up). A better-adapted pump should be looked for.
- Production flow of juice between extraction and pasteurizing areas may be improved with a *fix stainless steel piping (needs CIP) or with a mobile stainless steel tank which can be* stored in the cold room when necessary and transported to the pasteurizing area. Filling could be done on a filling line in the filling area.
- The different zones need to be clearly defined and optimized to avoid cross contamination. The company has enough space to optimize the flows (personal flow, product flow, equipment flow) going through the zones. E.g. by the dairy zone, one door is equipped with hand washing facilities and feet disinfection bath, but most of the workers enter the dairy *zone through the "backdoor", which doesn't have these hygiene facilities.*
- In the mix preparation zone (dairy), the different powder ingredients are prepared in transparent plastic bags. The bags are not clearly identified either on the bag, or by a label stuck on the bags. All products and raw materials should be clearly identified at any time of the production process. The bags could be from another colour (e.g. blue) so that in case a piece of bag falls in the product, it could be identified and removed.
- The cold room in the dairy production is supposed to only contain short-term storage. But some of the products were there since a few days. Some products were blocked by the quality control. The honey-strawberry portions aren't labelled with the best before date. All products should be labelled with the production date or the best before date at any time to guarantee the traceability of the products.
- Laboratory. Various analyses are made in the laboratory such as microbiological analysis (total germ count, coliforme, e.coli, s. aureus) and chemical analysis (fat, total solid, density, acidity, Brix). Some analysis results on the control sheets are not corresponding to the target values. E.g. the target value of the fat content (?) of sundae mix is 4.88-5.13, and the analysed fat content is 6%. If the analysis method doesn't allow getting values with the precision of the target value, the target value should be adapted. If the analysed value doesn't match with the target value, there should be a corrective action and/or an explanation for it. Some microbiological analyses were not done although a target value was available. This should be explained, or the target value should be removed if the analysis is not required anymore. All data, which differ from the target value, should be commented.
- It is recommended to have a self-inspection tour of the production. This could be done with the help of a form, which lists the places to be checked as well as new findings observed during the inspection. Ideally, production, quality and management representatives should take part in the inspection. The inspection should lead to a short report as well as list of improvements, specific tasks and decision to be taken (what, when, who).

- Monitoring production. It would be interesting to start monitoring the main production data (energy, water, waste, rejected product volume, produced volume). This data could be available for the employees so that they can be more aware of the quality and environmental issues.
- Some food packaging is used for purposes other than food packaging (for example in the workshop). It's not allowed to use food packaging, even though with old design, even though with distinctive labelling for other purposes than for food use. This helps to prevent the risk of contamination.
- Steam piping should always be isolated (security of personnel and energy savings). This includes both steam and condensate piping.
- Steam pressure should be adapted to the actual temperature needs. When steam pressure is higher than necessary, the feeding pump consumes more electricity and the energy losses (heat) on the steam boiler and piping are higher.
- Water used in ice-cream mix and other water-based products may be preheated on a plate heat exchanger. This will substantially reduce time and energy consumption in the pasteurizing process.
- The main water supply of the whole factory depends on one single pump. If this pump breaks down the whole production will be stopped. To make maintenance easier and to ensure production safety a second identical pump should be installed (don't forget the stop-valves and the check-valves to isolate and repair each pump independently).
- All big energy consumers should be equipped with hour-meters to monitor maintenance and indirectly energy consumption. This will help to predict maintenance needs and monitor improvements in energy consumption.
- Water consumption should also be monitored even if costs are presently not significant.

Follow-up:

Task	Responsible	Date
Finish EcoInspector and write QuickScan report	CP Team	11.11.2005
Finish IPA-report until chapter 5, send draft to NCPC	CP Team	16.12.2005
Read CP documents about dairy production	CP Team	16.12.2005
Send the information (e.g. scanned sheet) about the specification sheet of fungizide used now (incl. Indication of active composition) to Florence Clerc	NCPC	28.10.2005
Find out if air curtains are real efficient measures against pest control, or are they only additional consumers of energy.	SHL	16.12.2005
Find out if the disinfection step with fungicides for oranges, which are processed, could be skipped and if there are alternatives (e.g. irradiation) available.	SHL	16.12.2005
Draft a system, how the water could be pre-heated in order to reduce heating-time in the double jacket. How could the savings be estimated?	SHL	16.12.2005
Check the application and monitor the fungicide concentration in the baths and even in the juice.	CP-team	16.12.2005
Measure the boiler efficiency (air- diesel -ratio).	NCPC	16.12.2005
Give feed-back about the IPA report	NCPC	14.01.2006
Give feed-back about the IPA report (if forwarded by the NCPC to FHBB until 16.12.2005)	FHBB	07.01.2006

30.11.2005 / FC-PH

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Visit of La Cuna del Queso

Km 105, Carretera Principal de Taxisco, Guatemala
14.10.2005 (10.30 – 17.00)

Participants:

SHL:	Florence Clerc, Paul Hunziker
NCPC:	César Vallejo Bolaños
La Cuna del Queso:	José Rodolfo González Melgar (Gerente General) José Carlos López Garcia (Gerente de producción)
National consultants:	Ana Luisa de Arocha, Erich Brand (not present during company visit)

Activities:

- Ana Luisa de Arocha conducted an interview in the car on the way to the company (while *waiting in traffic jam) with José Rodolfo González Melgar to collect general information about* the company (10:30 – 12.00)
- César Vallejo Bolaños, Florence Clerc, Paul Hunziker and Ana Luisa de Arocha conducted an *extensive walk through all production area, with José Rodolfo González Melgar and José* Carlos López Garcia (12.00 – 14.00)
- Wrap-up meeting (15.15 – 16.45).
  During the meeting the most important findings of the international consultants were discussed with the company representatives.

Company:

La Cuna del Queso is a medium-size dairy, which mainly produces traditional cheese (different types of raw milk cheeses) but also produces cream and butter.

The company has its own distribution system: they have about 50 shops mainly in southeastern Guatemala, where they directly sell the products to the final consumers. The brand La Cuna del Queso is well known because of the shops and its leader function as a traditional cheese making factory in this area of the country.

La Cuna del Queso employs about 30 workers in the production areas and about 100 in the administration, including the sales personnelworking in the shops.

The company has two production sites in Taxisco: the main one where the cheese production, dry storage rooms, and whey distriution are located and the other one where the administration, cold rooms and the cream packaging area. The distance between these 2 sites is about 200m.

The work in the company is still done very much manually. There is very little machinery available. The workers have a traditional know-how. The products are made according to tradition and work is well organized.

Results:

Some Good Manufacturing Practices rules are not followed in the company. There is a good potential for improvement for hygiene regarding GMP's.

Plant hygiene

- Workers are drinking water and soda drinks in the production zone. Drinking and eating is not allowed in a production area.
- A clear splitting of zones should be done with clear hygiene rules for each zone. The production zones are organised according to the type of products made (fresh cheese – cooked cheese). Other factors need to be considered to implement a hygiene zone concept like personnel flow, product flow, hygiene rules, ... Both production sites need to be considered to optimize the production hygiene.
- The production zone has no closed doors. This is a risk for contamination and for pest. The plastic curtains are not protecting against pests (incl. insects) and contaminations and are therefore not used to replace normal doors.
- No pest control system is available.
- Lighting in the production zone has no glass protection.
- Additional cold rooms would be necessary in order to have enough space to cool down the products before they leave the factory. The products need to be cooled down in the cold room and then maintained cold in the truck during transport and in the window fridge in the shops. The trucks and the fridge in the shop are not designed to cool down the products but only to maintain them cold. This would give products a longer shelflife and reduce the volume of products returned because of quality problems.
- Some walls are dirty. Some floors are dirty e.g. dry storage room.
- Good water drainage in the production area because the floor has a slight slope.

Production hygiene

- Products are made out of raw milk. Some products are therefore very sensitive and a high level of hygiene is necessary to avoid microbiological contamination.
- Wood tables and wood spatulas are used in the production area. Wood should not be used in contact with food product because of the risk of microbiological and physical contamination of the product.
- Plastic bowls are used in different cheese production steps. Plastic bowls should be avoided because they are very difficult to clean and disinfect due to the scratches.
- Stainless steel bowls and working surfaces is recommended. This is very important in the area where fresh chees is produced (raw milk).
- The pots used to cook the whey are not stainless steel.
- The table in the fridge is not possible to clean and disinfect because of the rough surface.
- Some products are not covered. All food products (cheeses, final products, milk, whey,...) should have packaging that protect them from contaminations at any time. E.g. melted cheese cooling down in the cuvette in the production room, final products in the cold room.
- Some products are not labelled and don't have any date. All product should be labelled and dated in order to maintain the traceability at any time.
- A milk container is used for soap. No food packaging, even though clearly identified, should be used for non-food material like chemicals to avoid contamination.
- The same milk containers are used to collect milk in the farm, to bring raw milk in the factory as well as to contain whey. The same situation happens with bowls which are used for curd and for cheese after melting. There should be a clear splitting of storage equipment according to their use in order to avoid contamination from raw material to final product.

- Containers coming from the farm as well as personnel who are handling these containers should stay out of the production area. These containers should have a different colour than those used in the production area
- The work in the production room is well oganised. The production is cleared from everything which is not necessary. There are some very good organisation concepts: one bowl color per worker, one T-shirt per day of the week, ...
- The dry storage rooms are not fullfilling the standards. Some boxes are directly on the floor. Some bags are stored outside of the storage rooms. Some non-food material, which are not belonging to a food storage (like furniture) as well as trash, are stored there. Some bags are stored open.
- During the filling of cream the products were maintained at room temperature for a long time. Products should be brought in the cooling room regularly in order to prevent them from staying too long at room temperature.
- The storage in the cold rooms is not acceptable. The products which come back from the shops should NOT be stored together with the final products ready to be sold. Products coming back from the shops have to be destroyed and not be stored near freshly produced cheese and cream. These are high contaminants, which could be dangerous for human health.

Personal hygiene

- There is no hand washing facilities at the entrance of the factory. All personal as well as visitors entering the factory should wash hands.
- There is not allways running water. Paper is missing by the hand washing facility in the toilets. Water is missing in the men's toilets. There are no proper changing rooms or shower facilities.
- The hand washing procedure should be available next to each hand washing station (ideally with pictures).
- The production workers have adequate and clean working cloths (boots, hair cover, plastic protection cloth, overcoat). The T-shirt are named with the day of the week and are changed daily.

General information

- A lot of energy is being wasted through the way pots are being heated on an open flame. Improvements should be brought to reduce energy waste and the costs related to this waste.
- All big energy consumers should be equipped with hour-meters to monitor maintenance and indirectly energy consumption. This will help to predict maintenance needs and monitor improvements in energy consumption.
- Water consumption should also be monitored even if costs are presently not significant.

Follow-up:

Task	Responsible	Date
Finish EcoInspector and write QuickScan report	CP Team	11.11.2005
Finish IPA-report until chapter 5, send draft to NCPC	CP Team	16.12.2005
Read CP documents about dairy production	CP Team	16.12.2005
Give feed-back about the IPA report	NCPC	14.01.2006

30.11.2005 / FC-PH

Visit of Industrias Rick's S.A.

Calzada Mateo Flores 14-32 Zona 3, Mixco, Guatemala, 14.10.2005 (9:00 to 15:00)

Participants:

FHBB:	Christian Buser
NCPC:	Luis Muñoz
Ind. Rick's:	Byron Alquijay Letran (General Manager), Floridalma Reyes (Production Manager), Pablo Secaida (Responsible for packaging section)
National consultants:	Carlos Gódinez (part-time), Luis López, Sonia Sollis

Activities:

- Introductory meeting (9:15 – 9:45)
- Quick tour through the production and the storage areas with all persons present (9:45 – 10:15)
- Extensive company visits (10:15 to 12:00):
  → In-depth visit of the production site (Luis Muñoz, Christian Buser, Carlos Gódinez (part-time), Luis López
  → Interview with the manager and company visit (Sonia Sollis) in order to collect all necessary data for the QuickScan report
- Wrap-up meeting (13:00 to 15:00)

Company:

Industrias Rick's ia a family owned company founded 25 years ago. It produces fried and extruded snacks: plantanillas (banana-chips, 20% of sales), potato chips (10%), chicharron (porc-skin-type chips made from imported pellets, 10%), natchos (made from baked maize-tortillas, 10%), yuccas (5%) and extruded products made from imported grain-mixtures. Approx 20% of the products are exported to Central America but also to the USA. Approx. 50% (in terms of cost) of the raw material is imported (spices, grain-mixture for extrusion, pellets).

The company employs approx. 65 persons and operates in one shift, 7 days a week. Two years ago it moved to a new production premises and installed its machinery according to a logical and layout. Production steps include:

- Reception of raw material with daily storage
- Kitchen area including the following operations:
  - Peeling (potatoes by a rotary drum peeler, bananas and yuccas are peeled manually)
  - Cutting (semi-manually for potatoes, manually for potatoes and yucca)
  - Washing (potatoes), in big buckets, 3 times water change (3 steps)
  - Frying (5 frying lines), manually operated by 2 or 3 persons (last step washing of potatoes or cutting tortillas and feeding the items to the pans – frying – salting/spice application and

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intermediary packing). Fryers are propane heated (direct-combustion), exhaust air is collected more or less and led over the roof, no air-flow control

- Extruder (brand new extrusion machine, 2 to 3 persons required, mainly for collecting the products), including filling of the grain-mixture – extrusion and cutting – conveying to oven – rotating oven (propane heated) – rotating drum for spice application – collecting of products.
- Packaging (3 semi-automatic bag-packaging machines, each need 2 to 3 persons each – 5 manual packaging stations), further collection in cardboard boxes
- Storage and dispatch
- side processes: warehouse for final products, storage for plastic packaging material, storage for cardboard-boxes, storage for pellets, grains and spices, compressor

There is no waste management system installed (all solid waste is picked up by a private waste collector, paid by the company), this includes oils-sludge from the frying pans, organic waste as potato peels or banana skins, plastic or cardboard from the raw materials.

Water is brought by tank-cars and bears a certain cost, but one of the main point of concern are the increased cost for propane (60% increase during the last month[1]).

Results:

The following observations were made:

- High propane consumption (high cost) due to inefficient burner system (uncontrolled air, manual temperature control, frying-pan efficiency regarding product-through-put? uncovered frying pans during down-times, wet potatoes entering the pans), is propane consumption monitored?
- Handling of water is probably not optimal (potato-peeling and washing, cleaning processes[2]?), no monitoring system[2]
- No solid waste management system, plastics and cardboard wastes are not recycled or used, organic wastes not used as animal foodstuff
- Oil / grease wastes sent to municipal garbage, sources of wastes and where the oils and greases are consumed is unclear
- Electrical energy consumption of compressors not monitored (e.g. by installing hours-counters)
- Losses of spices and oils during salting processes are possible
- Waste water streams: fat traps (not observed during the visit) should be checked on their efficiency, separation of solids before entering the waste water channels could be improved (reduction of sludge production)
- Workers health, industrial safety and food risks control:
  - Compressor inside the production hall creates unnecessary noise (higher walls, noise absorbers?)
  - Hand washers should have actuators by elbows, knees or optical sensor for water opening
  - Waste heat from extrusion machine should be led outside of production building
  - Collection of the products from the extrusion machine could be simplified (e.g. by putting big-baskets with big bags instead of manual holding collecting bag (not very ergonomic)

[1] before one gallon propane was costing Q 9.50, now Q 14.50, monthly consumption is approx. 2'200 gallons
[2] not observed

- No smoke detectors and no (or not enough) fire fighting equipment in the warehouses
- No pest control (?)

All in all the company makes a good impression considering the production flow-scheme (layout), the order and the cleanness. Considering the observations made it is recommended that the CP-team focuses specifically on the below mentioned issues. This will most probably cover the mayor CP potentials of the company:

- Peeling and cleaning processes of potatoes, bananas and yuccas
- Cleaning processes of the equipment, especially the frying pans (and respective sludge removal and oil –replacements)
- Oil- balance (how much oil inputs? how much oil ends in the product? how much becomes waste? how much will be in the fat traps?) – make a cause analysis for waste oils
- Water balance – make a cause analysis for waste water / water use and waste water production
- Propane balance (including measuring waste heat losses in the stacks; respectively air-excess)
- Solid waste balance (in brief: how much organic waste is produced per year? how much plastic and waste cardboard? how much oil-wastes?) and calculate the cost of these wastes

Considering the size of the company it is not recommended to focus only on one specific production area.

Follow up

Task	Responsible	Date[3]
Finish EcoInspector and QuickScan report	CP Team	11.11.2005
Finish IPA-report until chapter 5, send draft to NCPC	CP Team	16.12.2005
Read CP documents about snack food production	CP Team	16.12.2005
Give feed-back about the IPA report	NCPC	14.01.2006
Measuring the CO_2-Air ratio and exhaust temperature at the chimneys of the frying pans, estimating the amount of energy lost through the chimney	NCPC	16.12.2005
Check possibilities of reducing energy consumption at the propane-burners, e.g. by reducing the diameter of the chimney (any risks, problems, any other possibilities to improve efficiency?)	FHBB	12.11.2005
Give feed-back about the IPA report (if forwarded by the NCPC to FHBB until 16.12.2005)	FHBB	7.01.2006

16.10.2005 / bch

[3] these deadlines are recommendations of FHBB, they should be discussed and agreed with the CP-team

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Visit of SULA

Km 25.5 Carretera a El Salvador, Guatemala
19.10.2005 (09.00 – 17.00)

Participants:

SHL:	Florence Clerc, Paul Hunziker
NCPC:	Maria-Amalia Porta
SULA:	Patricia Funes (jefe de control de calidad) Oscar Castellanos (jefe de mantenimento) Victor Asturias (gerente de operaciones)
National consultants:	Khevin Rosal, Diana Sánchez, Ioannen Pérez

Activities:

- Company visits (9:00 to 16:00, with 01.30 lunch break):
  One team (Khevin Rosal, Ioannen Pérez) conducted the interview first before they joined the visit to the production site. The second team (Maria-Amalia Porta, Florence Clerc, Paul Hunziker, Diana Sánchez) conducted an extensive walk-through of all production and side processes.
- Wrap-up meeting (16.00 – 17.00)
  The observations of the national and international consultants were discussed in detail. The company representatives are very open minded towards new ideas and show enthusiasm towards improvement proposal in production, quality and environmental aspects.

Company:

SULA production is new in Guatemala. Drinking milk production started in April 2005. The personnel of the company are new too. SULA is a big dairy group based in Honduras. It provides support to this factory by sending experts. The company is a modern dairy, which transforms 45'000 L cow milk / week (only 25'000 L at low season) into milk drinks. The drink milk products are UHT products, which have a shelf life of 3 months at room temperature.

The milk comes from 8 suppliers.

The company is building new facilities like cold room, storage room, a new milk receiving area. By the time of the visit not all these changes were finished but the planned improvements were presented and were generally evaluated as good.

The quality system is well implemented. SULA has 2 quality laboratory (one only for milk controls *and the other one mainly for final products controls including physico-chemical and microbiological* analyses). Many good manufacturing practices aspects are already implemented or will be implemented soon, a few improvements can still be done but won't need major investments. Important is to continuously improve and maintain the good manufacturing practices at all times. SULA has enough potential to start implementing HACCP to consolidate its food safety system.

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Results:

- SULA has a good quality system for the incoming milk quality. The milk is analysed in the milk receiving laboratory (temperature, pH, °SH, peroxidase test, alcohol test but also quick determination of water content, total solid, fat content, protein content and density). The milk is also analysed microbiologically. Milk is paid according to quality (bonus paid for good microbiological quality, temperature >8°C milk not accepted, milk temperature 5-8°C milk price lower, milk <5°C good).
- SULA gives support to the farms in order to improve hygiene and milk quality. The goal is to visit each supplier once a month (announced or unannounced) to check the hygiene practices at the farm. The cleaning solution to wash milking equipment and container is provided by SULA at good price. An alternative would be that the farmers can wash their milk cans and milk tanks at SULA using provided water and facilities (common practice in Switzerland). This would allow to directly clean the containers using the best equipment available. and reduce the risk of microbiological problems.
- A dry storage and a new cold storage room as well as a frozen storage room are under construction.
- The raw milk tank should be better insulated in order to save cooling energy.
- The personnel are wearing adequate working cloths. New hand washing facilities with sensor (no need to use hands to get water) are ready to be installed. Soap, disinfectant and paper need to be present at any time by all hand washing facilities. A procedure should be available (ideally with pictures) by each hand washing procedure. The feet disinfection baths are too small so that personal can pass through without having disinfected their feet.
- Visitors: The identity of the visitors is checked before they enter the company. They have to wear coat and hair cover to enter the production area. The visitors should wash hands before entering the production zone and remove jewellery and chewing gum.
- The lighting is not always protected against breakage (physical contamination, foreign bodies).
- Raw material storage. Some boxes and bags as well as the balance are stored directly on the floor. Some plastic around packaging material is dirty. The balance, which is an expensive measuring instrument, should be set on a table and the container of flavourings and colourings, which are expensive ingredients, could be organised on a shelve. This would make the work of the person who is weighting theses ingredients much easier.
- In the mixing area, where the dry ingredients are added to the liquid ingredients, there should be a grid in order to avoid that pieces of equipment could fall into the mixing pump and cause physical contamination of the product (foreign body) or damage the equipment.
- Dry storage. Walls, floor and ceiling are clean. The bags are too close to the wall, although a line is delimiting the right distance between storage and wall, and the storage is not organised in a way, which allows the FIFO rule (first in – first out) to be applied.
- Pest control. A pest control monitoring system is implemented. The traps should be identified with a number and located on a plant map. The traps are labelled to have poison, although they don't contain poison. The labelling should be adapted to reflect the actual situation. Poison containing traps are not allowed inside the food production area, only mechanical traps, which are checked very regularly are allowed inside the production.
- A CIP system is available for cleaning the equipment. The acidic and basic solutions are changed weekly. This is an important saving potential (water saving, chemicals saving) for SULA. The CIP cleaning solutions don't need to be changed that often. They only have to be refilled in order to keep the right pH, respectively the right acid or base concentration in the solution.
- Products are filled by one of the 4 Tetrabrik machines. The packaging material is disinfected with water peroxide. Each product has a code, which allows to guarantee the traceability. It would be interesting to better know the losses of packaging material that occurs during the production trials. During the visit, as the machine was started, there was a lot of wasted packaging material.

- The quality of final products is analysed before the products are released to the market. The products are analysed for pH, °SH, fat content, density, sensorial properties and microbiology as well as tested in quarantine for 7 days by 35°C.
- Changing rooms are clean and shower, toilets and hand washing facilities are available. In the women changing room new lockers should be set in order to allow the personnel to change clothes according to the personal clothing policy (e.g. changing cloth for lunch).
- Self-inspection. A self-inspection could be done regularly trough the company. The Quality assurance manager, maintenance manager, production manager as well as the general manager should take part at the inspection and according to a check list, go though the whole company to check good manufacturing practices, to find improvement possibilities and to better know the company. The checklist should be done in a way that new ideas could be put in and that task list could be generated out of the checklist (what, who, when).
- Monitoring water consumption. It would be interesting to start monitoring the water consumption per product. This data could be available for the employees so that they can be more aware of the water consumption issues. Other quality or environmental data could be shown to the employees as well, like % of waste product, % spared products, etc.
- Animal feed. Some products, which are not reaching the quality standards to be sold, are unpacked and shortly stored before being used as pig food. The personnel who are preparing this animal food is different and doesn't come into production.
- The cleaning of the plastic boxes, which have been in this animal food area, will have to come back to the production room. This material flow has to be optimised to avoid contamination. The same comment goes for plastic boxes coming back from distribution. The cleaning of these boxes should be done on a cleaning line to reduce water consumption and time. Clean boxes should be stored in a clean and dry place.
- The wastewater management is currently being improved.
- Steam pressure should be adapted to the actual temperature needs. When steam pressure is higher than necessary, the feeding pump consumes more electricity and the energy losses (heat) on the steam boiler and piping are higher.
- Water used in ice-cream mix and other water-based products may be preheated on a plate heat exchanger. This will substantially reduce time and energy consumption in the pasteurizing process.
- The main water supply of the whole factory depends on one single pump. If this pump breaks down the whole production will be stopped. To make maintenance easier and to ensure production safety a second identical pump should be installed (don't forget the stop-valves and the check-valves to isolate and repair each pump independently).
- All big energy consumers should be equipped with hour-meters to monitor maintenance and indirectly energy consumption. This will help to predict maintenance needs and monitor improvements in energy consumption.
- Water consumption should also be monitored even if costs are presently not significant.

Follow-up:

Task	Responsible	Date
Finish EcoInspector and write QuickScan report	CP Team	11.11.2005
Finish IPA-report until chapter 5, send draft to NCPC	CP Team	16.12.2005
Read CP documents about dairy production	CP Team	16.12.2005
Give recommendation, how to check the CIP-procedures (focussing on changing the program) as well as give literature-reference to have background material about CIP.	SHL	16.12.2005
Provide information about water treatment and water quality control for steam (in french)	SHL	16.12.2005
Sketch, how to calculate the savings from pressure reduction in steam boiler	SHL	16.12.2005
Give feed-back about the IPA report	NCPC	14.01.2006

30.11.2005 / FC-PH

University of Applied Sciences Basel
FHBB
Faculty
Industry
Institute of Environmental Technology

Visit of Tostaduría de Café Sol

12 Av. "A" 4-37, zona 2, Guatemala City, 19.10.2005 (8:00 to 11:45)

Participants:

FHBB:	Christian Buser
NCPC:	César Valleja Bollanes, Luis Moñoz
Café Sol:	Miguel Guirola (General Manager)
National consultants:	Natalia Figueroa, Francisco González

Activities:

- Introductory meeting (8:15 – 8:45) - Interview with Mr. Guirola to collect general data about enterprise
- Company visit (8:45 to 10:00):
  Walk-through production and storage area with all participants
- Wrap up meeting (10:00 – 11:30)

Company:

Café Sol is a small family owned company, which produces a coffee type powder containing approx. 60% cereals (wheat, barley) and 40% coffee.

95% of the products are sold in the rural area of Verapaz and Izabal for indigenous population, only approx. 5% are sold in Guatemala City on the markets. Competition is high. Raw materials (raw coffee beans, cereals) are all bought from the local market.

The daily production output is approx. 1'200 packets with 25 portions of 25 grams (sold at 10 QZ), or similar, whereas the peak consumption increases during winter time.

Café Sol employs 4 workers during low production and up to 10 persons during peak season, 1 administrator and 2 sales persons beside the general manager. Operation is done during one shift (8:00 to 17:00) on 5.5 days a week.

The company mainly consists of the toasting and the filling section. Production steps include:

- Raw material feed (separately toasting of each ingredient), 125 lbs per batch (manually)
- Pneumatic transportation and separation of light weight particles by cyclone
- Rotating toaster, feed by flue gases form burner (135 to 200°C, 20 to 25 min for wheat, 15 to 18 min for coffee)
- Burner operated with wood-chips, no air control, flue gases led through the toasting drum and are separated from volatile particles by cyclone before leaving over the roof
- Cooling of toasted products (8 min), suction air is separated by cyclone from particles, if necessary tap-water is sprayed on the product to reduce cooling time
- Cereals are scanned through metal detector
- Intermediary packaging in bags
- Weighing the different ingredients according to recipe and mixing toasted coffee beans and cereal in a rotating drum

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- Grinding, collecting in plastic buckets
- Packaging (2 semi-automatic packaging machines) in poly propylene bags (portions) and further into paper bags (weight control manually)

Results:

The following observations have been made:

- Mixed storage (fuel wood / raw material / toasted products): no clear storage order, no pest control, storage on piles (not on shelves).
- Furnace: insufficient air-control, stack gases are directly contacting the product (→ risk of changing tastes, depending on smoke-intensity), insufficient temperature control in the toasting drum
- Unsuitable or even dangerous electrical energy safety, no or unsuitable insulation
- Unsuitable ventilation in the toasting section, leaks in the flue gas system, thus smoke inside production room
- The ground product is stored in open plastic buckets on the stair between toasting and filling section → risk that parts fall into the product (e.g. metals)
- Raw material (coffee, grain) bring a lot of dirt, dust, soil → investigating on possible checking procedure or pre-sorting / pre-sieving
- Amount of transparent roofs could be increased
- No fire detectors, not enough fire extinguishers in the production and warehouse area

Mr. Guirola shows very high interest in CP in order to improve the efficiency of the production. Despite the size of the company some CP potentials have been identified: Energy efficiency of the toaster, change of energy source, e.g. from fuel wood to propane in order to improve quality. Considering the size of the company it is not recommended to focus only on one specific production area.

Follow up

Task	Responsible	Date
Finish EcoInspector and write QuickScan report	CP Team	11.11.2005
Finish IPA-report until chapter 5, send draft to NCPC	CP Team	16.12.2005
Read CP documents about coffee toasting	CP Team	16.12.2005
Research about suppliers of propane burners with respective temperature controllers	CP Team	16.12.2005
Give feed-back about the IPA report	NCPC	14.01.2006
Measure CO_2-Air ratio and exhaust temperature in the stack gases of the boiler, estimating the amount of energy lost through the chimney	NCPC	30.11.2005
Send information about coffe toasters to César	FHBB	16.12.2005
Give feed-back about the IPA report (if forwarded by the NCPC to FHBB until 16.12.2005)	FHBB	7.01.2006

21.10.2005 / bch

Visit of Distibuidora de Alimantos Montesol S.A.

Km 1.3 carretera a Barcenas, Villa Nueva, Guatemala, 19.10.2005 (13:00 to 18:00)

Participants:

FHBB:	Christian Buser
NCPC:	César Valleja Bollanes
Montesol:	Victor M. Suarez (General Manager, present during wrap up meeting), Mrs. Deidy Valladares (Production Manager), Arturo Hidalgo ("Representante legal")
National consultants:	Raúl Aguilar, Jorge Ocheita, Alexander Carroll

Activities:

- Introductory meeting (13:00 – 14:00) - Interview with Mrs. Deidy Valladares to collect general data about enterprise
- Company visit (14:00 to 16:30):
  Extensive walk-through the production and storage area, including utilities production (boiler, compressed air, fresh water treatment) and waste water treatment section with all participants, guided by Mrs. Deidy Valladares and Arturo Hidalgo). Only palmitos were produced this afternoon.
- Wrap up meeting (16:00 – 17:45)

Company:

Montesol is a family owned company which produces in order of production volume: canned palmitos (2'100 boxes of 24 cans of 410 g net, 45% of sales), pineapple (5'000 to 10'000 units per day, 30% of sales), tomato paste (from imported concentrate, approx. 10% of sales), tamales, figs, yucca, sausages and mango. 95% of the goods are exported to Mexico, Spain, Portugal, France and El Salvador, the rest (5%) is sold on the local market.

Fresh raw material and cans are bought from the local market, (i.e. palmitos and pineapples are bought from the family owned Agromaya company), while tomato paste is imported from Chile or China and chemicals like citric or ascorbic acids are imported from Europe.

The company employs at its production site (Villa Nueva) 50 to 75 persons, depending on the season (average approx. 60 persons), plus 2 persons for production management, 2 persons for quality control (laboratory) and inspection, 1 person for maintenance. In Guatemala City, Zona 12 the company has its administration and sales office.

The company started its activities in May 2000 in a new production building with new or second hand equipment. The equipment is installed according to a logical layout. Production steps for the palmito production include:

- Reception outside the production hall (palmitos are received on Tuesday and Thursday), intermediary storage on plastic pallets, loading into racks for pre-cooking (manually)

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- Pre-cooking (15 to 20 min. at 90°C in water), 230 to 270 pieces per batch, 36 batches per day, two approx. 1 m^3 containers, steam heated with lids, water change to drain every 6 batches
- Cooling in cold water (two containers, approx 1m^3 volume, water change every 3 batches)
- Loading to conveyor system
- Removing shells, cutting ends (manually, approx. 6 persons)
- Cutting (machine)
- Washing, sorting (acc. to diameter, color) and filling into cans (manually, approx. 10 persons)
- Final weight control (1 person)
- Classification: visual check (1 person)
- Recuperation of palmitos (parts, which have been cut or which are out of standard): production of second quality products: manual cutting, sorting can filling, approx. 8 persons
- Brine filling (manually), 80°C, 2 brine tanks of approx. 1m^3 double jacketed, steam heated
- Steam tunnel (8 minutes, 80°C) to remove air-bubbles
- Can sealing (semi-manually), cleaning in cold water and putting into basket
- Sterilization in one retort, plc controlled: 12 min heating up, 10 to 25 min sterilization at 240°C (depending on product), compressed air inlet to keep pressure and cooling with fresh water, total batch-time approx. 60 min, 6 batches per day, retort not completely filled in order to reduce cooling time
- Packing into cardboard-boxes, classification and labeling the boxes by date and batch of sterilization
- Quarantine 2 weeks: testing the products (physical, chemical, microbiology)
- Storage
- Coding and labeling of cans only after customer order
- Side processes: warehouse for final products, storage for cans and cardboard-boxes in the production hall, steam production (fuel wood or organic compounds fired), compressor (100 psi), waste water sedimentation and enzyme dosing to remove odor, cooling water tanks and air-cooler for sterilizer (not in use), water well and pumping station.

All organic solid waste is given away or sold as animal feed. Palmito-shells are sun-dried and burnt in the boiler together with paper, cardboard and other wastes etc. Office waste and sludge from the sedimentation tanks (pumped 2 times per year) are given away with the municipal waste.

Results:

The following observations have been made:

- Water, electrical energy and fuel wood is not monitored, electrical energy consumption for the compressors could be monitored by hours-counters.
- High water consumption in all sections (e.g. manual preparation of the palmitos and conveyor system: running taps, no water saving taps or flow restrictor, no water recirculation system), pre-cooking and sterilization: all water drained off, no water and/or energy recovery.
- High steam consumption (sterilization: no condensate recovery), no energy recovery of hot waste water from pre-cooking (e.g. to pre-heat water for pre-cooking or for brine preparation).
- Un-logical temperature-curve of the cans after brine feeding (steam tunnel, then cleaning in cold water), steam tunnel seems to be inefficient (leaks and un-suitable insulation), air removal could also be done by vacuum.
- High electrical energy consumption for air ventilation system (push-pull) to create over-pressure in the production hall

- Open waste water channels bear risk of falling (accidents)
- No smoke detectors (?), not enough fire fighting equipment near the cardboard box storage
- Boiler air/fuel-wood ratio not controlled (no variable speed-drive for air fan)
- High compressed air consumption (and high pressure demand) for sterilization?
- No level indicators for the brine tanks, no suitable platform (operators need to get up by ladders → risk of accidents)
- Operators are climbing on piles of boxes with products (for unloading the pile) → risk of accidents
- Fresh water pressure increase pump is constantly starting and stopping during cleaning time: bad adjustment of controller, too small pressure vessel or too tight pressure range.
- Enzyme dosing is done twice per day, should be done continuously (?)
- Dry air cooler for recycling / cooling water from sterilizer may use a lot of energy. Pre- or after cooling with (evaporator) cooling towers may save a lot of energy.

The company makes a clean and well organized and well maintained impression. Commitment of the management for CP / improving the efficiency is very high. Thus, Mr. Victor M. Suarez, General Manager (owner?) of the company participated on the wrap-up meeting.

The CP potentials found are quite high and are mainly expected to be found in the water flows or in the heat energy consumption. The electrical energy consumption is also quite high as the bill showed. It is therefore recommended that the CP-team focus on the following issues:

- Water flow analysis
- Steam flow analysis
- Special attention to the following processes:
  - Sterilization procedures (water and waste water / waste heat)
  - Steam production
  - Possibilities to recover energy from hot water (from pre-cooking)
  - Further observation of cleaning processes and piña production

Considering the size of the company it is not recommended to focus only on one specific production area.

Follow up

Task	Responsible	Date
Finish EcoInspector and write QuickScan report	CP Team	11.11.2005
Finish IPA-report until chapter 5, send draft to NCPC	CP Team	16.12.2005
Read CP documents about canning	CP Team	16.12.2005
Give feed-back about the IPA report	NCPC	14.01.2006
Measure CO_2-Air ratio and exhaust temperature in the stack gases of the boiler, estimating the amount of energy lost through the chimney	NCPC	30.11.2005
Send benchmark figures about energy consumption for sterilizing	FHBB	16.12.2005
Give feed-back about the IPA report (if forwarded by the NCPC to FHBB until 16.12.2005)	FHBB	7.01.2006

21.10.2005 / bch

Follow up Food-Mission October 2005 to Guatemala

20.10.2005

Country	Topic	Responsible	Deadline	Finished
Guatemala	**Industrias Rick's:** check possibilities of reducing energy consumption at the propane-burners, by reducing the diameter of the chimney (any risks, problems, any other possibilities to improve *efficiency?*)	FHBB	12. Nov 05	
Guatemala	**Industrias Rick's:** Measuring the CO2-Air ratio and exhaust temperature at the chimneys of the frying pans, estimating the amount of energy lost through the chimney	NCPC	16. Dez 05	
Guatemala	**Las Margaritas:** --> How much would a plate heat exchanger for pasteurisation cost? Who could supply it? What would be the savings (how could they be calculated/estimated?) --> Are there alternatives to chlorine disinfection? What are the advantages / disadvantages? What are cost (higher / lower?)	SHL	16. Dez 05	
Guatemala	**IMPROLACSA:** --> specification sheet of fungizide used now (incl. Indication of active composition), send the information (e.g. scanned sheet) to Florence Clerc	NCPC	28. Okt 05	
Guatemala	**IMPROLACSA:** --> Are air curtains real efficient measures agains pest control, or are they only additional consumers of energy? --> Could the disinfection step with fungizides for oranges, which are processed be skiped? Would there be alternatives (e.g. irradiation)? --> Draft a system, how the water could be pre-heated in order to reduce heating-time in the double jacket? How could the savings be estimated?	SHL	16. Dez 05	
Guatemala	**IMPROLACSA:** Check the application and monitor the fungicide concentration in the baths and even in the juice.	CP-teams	16. Dez 05	
Guatemala	**IMPROLACSA:** *Measuring the boiler efficiency (air- diesel -ratio)*	NCPC	16. Dez 05	
Guatemala	**Montesol:** Benchmarks about energyconsumption for sterilizing	FHBB	16. Dez 05	
Guatemala	**Montesol:** Measure CO2 / Air ratio in the stack gases of the boiler	NCPC	16. Dez 05	
Guatemala	**Tostaduria El Sol:** send information about coffe toasters to César	FHBB	28. Okt 05	
Guatemala	**Sula:** --> recommendation, how to check the CIP-procedures (focussing on changing the program) --> literature-reference: background material about CIP --> information about water treatment and water quality control for steam (in french) --> sketch, how to calculate the savings from pressure reduction in steam boiler	SHL	16. Dez 05	
Guatemala	**IPA-reports - Improlacsa, Las Margeritas, Montesol, Industria Ricks, Cafe El Sol:** Send intermediary reports to FHBB	FHBB	16. Dez 05	
Guatemala	**IPA-reports - Improlacsa, Las Margeritas, Montesol, Industria Ricks, Cafe El Sol:** Check and feedback of intermediary reports (if reports are sent to FHBB)	FHBB	6. Jan 06	
Guatemala	Summary reports about the main findings of the company visits, the CP potentials and possible options and recommendations for the companies shall be prepared for each company separately (2 to 3 pages, *in english)*	SHL	12. Nov 05	
Guatemala	Revise and finalize mission report, send final version to NCPC (FHBB)	SHL / FHBB	12. Nov 05	
Guatemala	A short summary report about the main findings of the mission, the CP potentials found in the companies shall be made as a draft (maximum 2 pages) for publishing in a local scientific magazine or the homepage of UNIDO. *(in english)*	SHL	16. Dez 05	
Guatemala	**Information about disinfecting / cleaning knifes and small parts in meat-production** send to Jorge Amario (Cecarsa) and to NCPC and FHBB	SHL	16. Dez 05	

IDB-Project training module 5 - Cleaner Technologies and Techniques, sector specific training 17/18.10.2005
List of Participants

No.	Nombre	Institución	Telefono	Correo Electronico	17.10.05	18.10.05
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* Consultor P+L ** Gerente del proyecto IDB *** only half day

18.10.2005 / ChB

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33	Nery Rocael Jimenez	Industrias Rick's S.A.	5317-9862			X
34	Dubaldo Garcia	Industrias Rick's S.A.	5596-2519			X
35	Rosa María de Lima	Las Delicias de Guatemala S.A.	2338-3174			X
36 *	Luis López B.	Consultor	5674-4302	llopezbonilla@gmail.com		X
37 *	Natalia Figueroa	ENPALSA / FEPYME	2473-1365 / 5708-2008	nfigueroa@enpaisa.com		X
38						
39						
40						

Total 17.10.2005: 30 Persons (5 only half day)
11 consultants, 1 NCPC, 18 company representatives

Total 18.10.2005: 36 Persons (3 national consultants half day only)
13 consultants, 1 NCPC, 22 company representatives

* Consultor P+L ** Gerente del proyecto IDB *** only half day

Agenda
PROMOCION DE PRODUCCION MAS LIPIA Y SISTEMAS DE GESTION AMBIENTAL
ATM/ME-8605-GU

Curso: Técnicas y Tecnologías Limpias
Dirigido a instructores/consultores y personal de empresas

Impartido por: Florence Clerc y
Paul Hunziker

Universidad Rafael Landivar
Edificio J, salón 315

Lunes, 17 de octubre de 2005

8:00 – 8:15	Registro de asistentes
8:15 – 10:15	Conocimiento básico sobre la leche
10:15 – 10:30	Refrigerio
10:30 – 12:00	Tecnología de helados
12:00 – 13:00	Elaboración de queso (Parte I)
13:00 – 14:00	Almuerzo
14:00 – 15:30	Elaboración de queso (Parte II) y suero
15:30 – 15:45	Refrigerio
15:45 – 17:15	Agua, agua residual y energía
17:15 – 18:00	Ejercicio "Almacenamiento"
18:00	Fin del día

Martes, 18 de octubre de 2005

8:00 – 8:15	Registro de asistentes
8:15 – 8:45	Presentación Ejercicio "Almacenamiento"
8:45 – 9:45	Limpieza
9: 45 – 10:00	Refrigerio
10:00 – 12:00	Desinfección
12:00 – 13:00	Principios generales de higiene en alimentos
13:00 – 14:00	Almuerzo
14:00 – 15:30	Sistema HACCP (Parte I)
15:30 – 15:45	Refrigerio
15:45 – 18:00	Sistema HACCP (Parte II)
18:00	Fin del día

Evaluation of ratings

Participants	consultant	consultant	consultant			Alex Caroll					Marielos López									Luisa F. Bau		Arturo Hidalgo
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Contenido de la capacitación	5	5	6	5	5	5	6	6	5	5	6	5	6	6	4	5	4	4	3	4	5	6
¿El nivel de la capacitación fue adecuado para su conocimiento?	4	6	6	4	5	5	6	6	4	5	6	5	6	6	4	4	2	4	4	5	5	6
¿Cómo considera la utilidad del conocimiento adquiridas?	5	5	6	5	4	5	6	6		6	5	5	6	6	5	5	5	4	4	6	6	6
Método de trabajo	4	5	5	5	4	6	5	5	6	5	5	5	6	6	6	5	5	4	3	4	6	6
Conocimiento y habilidades de los capacitadores?	4	5	6	5	4	6	6	5	6	5	6	5	6	6	5	5	6	5	4	4	5	6
¿La capacitación cumplió con *sus expectativas*?	4	6	6	5	4	6	6	5	2	6	6	5	6	6	4	5	4	4	2	5	6	6
Material de apoyo distribuido	5	6	6	5	4	6	6	5	6	6	6	5	6	6	6	5	6	4	3	3	5	6
Organización, logística y ubicación	5	5		5	5	6	6	5	6	6	4	6	5	6	5	4	5	5	4	5	4	6
Duración y organización del tiempo	5	6		4	5	5	5	4	6	6	4	5	5	6	4	4	5	4	2	4	6	6
Conocimiento básico sobre la *leche*	5			4	5	6	6	4	6	5	5	5		6	4	4	6	4	4	4	6	6
Tecnología de helados	5	5		4	6	6	6	4	6	5	5	4		6	4	5	2	4	4	5	5	6
Elaboracion de queso y suero	5	5		4	5	6	6	4	6	5	4	5		6	3	5	2	4	4	5	5	6
Agua, Agua Residual y Energia	5	4		4	5	6	5	4	6	4	5	5		6	3	4	2	4	4		5	6
Ejercicio "Almacenamiento"		5		4	5	6	6	4	6	6	5	5	6	6	5	5	2	4	4	5	6	6
Limpieza	5	5		5	5	6	6	5	6	5	5	5	6	6	4	5	2	4	4	5	6	6
Desinfeccion	5	4		5	5	6	6	5	6	5	5		6	6	4	5		4	4	4	6	6
Principios generales de higiene en alimentos	5	6	6	5	5	6	6	6	2	4	5	5	6	6	4	5	3	4	4	5	5	6
HACCP - Analisis de Peligros (y) Punto de Control Critico	5	6	6	5	5	6	6	5	2	5	5	6	6	6	4	5	4	4	4	5	6	6

Evaluation of ratings

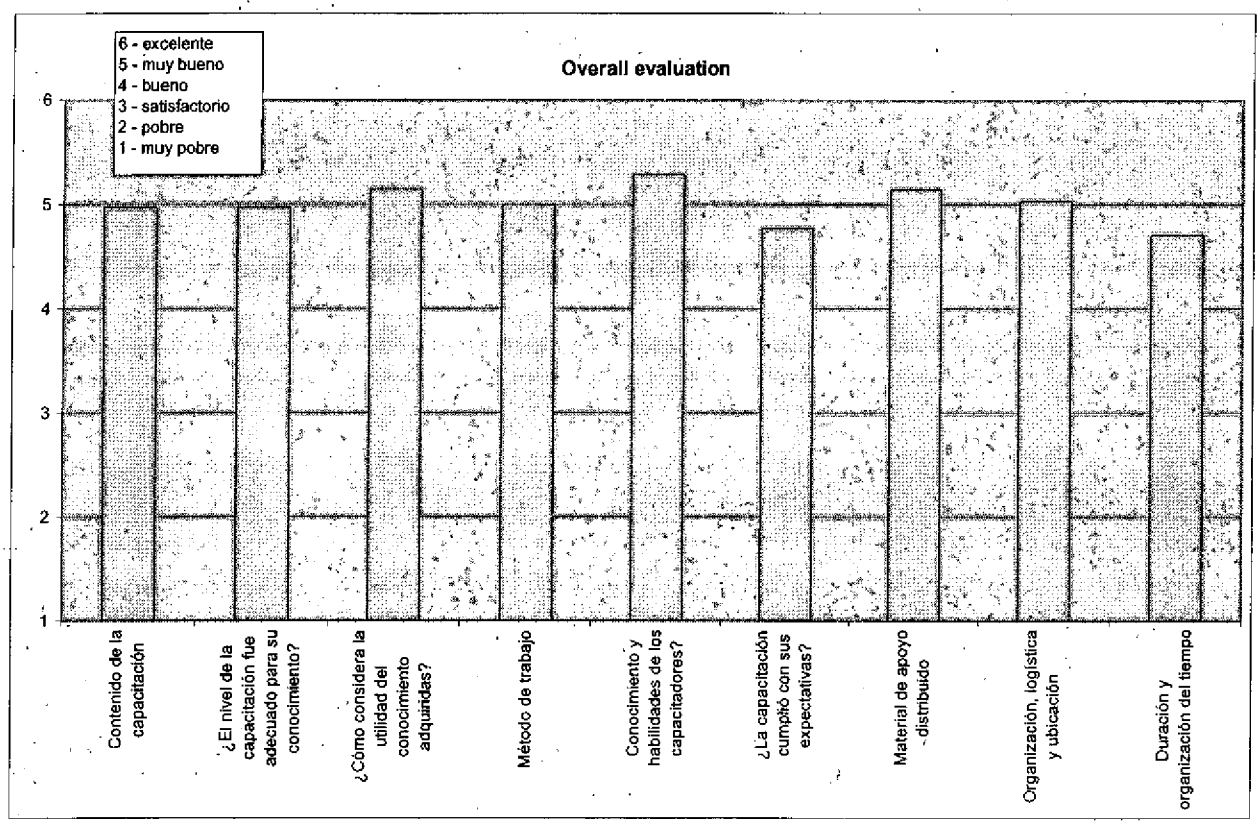
Participants	consultant 1	consultant 2	consultant 3	4	5	Alex Caroll 6	7	8	9	10	Manelos Lopez 11	12	13	14	15	16	17	18	19	Luisa F. Bau. 20	21	Arturo Hidalgo 22
De acuerdo a su opinión, ¿Qué fue lo mejor de la capacitación?		HACCP, el material y el consiamento	El intercambio de conocienamientos y experiencias, planteamiento de formas viables para mejorar BPH		El información en Limpieza, disenfección asi como la seguridad occupacional. Otro punto importante fue el de la explicacion de la sistema del HACCP	Elaboración de helados	La experiencia de los expertos	Técnicas de limpieza e hygiene	El taller de almanaciamento Lo profundo de la Ciencia de la leche y conocir de Florence	Exposición de manera clara y entndible. Material de appoyo (documentos) muy adecuadas	quidados de limpieza, desinfección y HACCAP	el conocíamento de la experiencia de los instructores	La interacción	Determinación de procesos y conceptos básicos		El tema HACCP, limpieza y desinfección				experiencia de los capacitadores	HACCP	La experiencia de los expertos extranjeros
¿Qué puede ser mejorado para la siguiente capacitación?				Los horarios de participación podrian ser solo de la mañana o solo de la tarde	Possiblemente entocan más la capacitación hacia el area practica o ??? para tener una mejor idea de como son los processos realmente	Falto info sobre elaboración de helados artesenales Máseiemplos aplicados de Centroamerica	El salón	Mayor duración en dias y menor en horas x dia	Lo antes expuesto, sobre todo enfoque + general		Horario, tratar que sea en menos tiempo es un pocoagotador	fue excelente	Más casos prácticos, pero de los mismos participantes			todo bien	Bibliografia para profundiar en el tema				Seia interessante correr un video y observar ptos criticos p/aplicar HACCP	

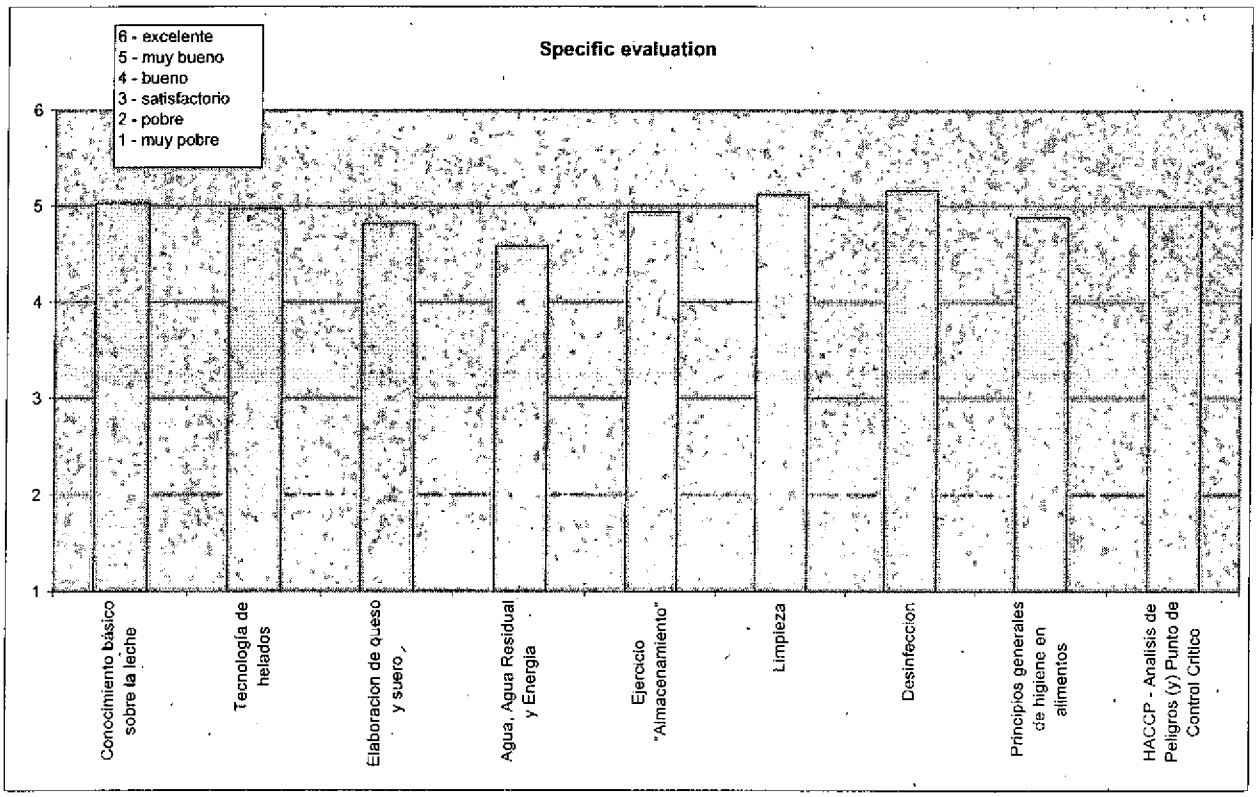
Evaluation of ratings

Participants	23	Ana Luisa 24	25	N.R. 26	Rosa Maria de Lima 27	José Lopez 28	29	P.S.F.A. 30	Juan José Salazar 31	32	Erwin Cordero 33	Claudia Salguera 34	35	Average	Max	Min
Contenido de la capacitación	6	4	4	6	3	5	6	6	5	5	5	4	4	4.97	6	3
¿El nivel de la capacitación fue adecuado para su conocimiento?	6	4	5	6	4	5	6	4	6	6	5	5	4	4.97	6	2
¿Cómo considera la utilidad del conocimiento adquiridas?	6	5	5	5	4	5	4	5	6	5	5	5	4	5.15	6	4
Método de trabajo	6	4	4	5	5	5	5	5	5	6	6	4	4	5.00	6	3
Conocimiento y habilidades de los capacitadores?	6	5	5	6	5	4	6	6	6	6	6	6	3	5.29	6	3
¿La capacitación cumplió con sus expectativas?	6	4	5	3	3	4	3	5	6	6	5	4	4	4.77	6	2
Material de apoyo distribuido	6	6	6	6	4	4	4	4	5	6	5	6	2	5.14	6	2
Organización, logística y ubicación	6	4	5	5	4	5	6	5	6	5	5	4	3	5.03	6	3
Duración y organización del tiempo	6	4	5	6	2	4	5	4	6	5	4	6	2	4.71	6	2
Conocimiento básico sobre la leche	6		5	4	5	4	6	5	5	5	5	6	5	5.03	6	4
Tecnología de helados	6		5	5	5	5	6	5	5	5	5	5	5	4.97	6	2
Elaboracion de queso y suero	6	4	5	6	4	4	5	5	5	5	5	5	5	4.82	6	2
Agua, Agua Residual y Energia	6	4	4	5	5	4		5	5	5	5	4	3	4.58	6	2
Ejercicio "Almacenamiento"	6	5	5	4	6	3		5	6	5	5	4	3	4.94	6	2
Limpieza	6	4	5	6	6	4		6	6	6	5	6	3	5.12	6	2
Desinfeccion	6	4	5	6	6	4		6	6	6	5	6	3	5.16	6	3
Principios generales de higiene en alimentos	6	4	5	3	6	4		5	6	6	5	5	2	4.88	6	2
HACCP - Analisis de Peligros (y) Punto de Control Critico	6	4	5	5	2	5		6	6	6	5	6	2	5.00	6	2

Evaluation of ratings

Participants	23	Ana Luisa 24	25	N R 26	Rosa María de Lima 27	José Lopez 28	29	P.S.F.A. 30	Juan José Salazar 31	32	Erwin Cordero 33	Claudia Salguera 34	35	Average	Max	Min
De acuerdo a su opinión, ¿Qué fue lo mejor de la capacitación?		La experiencia de los capacitadores. Tomar en cuenta temas como BPM y HACCP	La cantidad de información a la que se tiene acceso en un corto tempo		lo mejor fué conocer sobre las BPM a fondo	Lobien resumido de los temas (OK)		????, HACCP	La distribución de material de apoyo y el contenido bien condenzado	En general todo, lo mejor fué El Punto Codex, HAACP, BPM	Lo mejor fue comartir / a experiencia y conocimientos de los expositores, además de los temas presentados	La parte de higiene, limpieza y desinfección. La composicion de la leche y los helados	La experiencia de los capacitadores			
¿Qué puede ser mejorado para la siguiente capacitación?					El horario está muy largo	El horario de la tarde			amplitude de contenidos, es de un mayor tiempo		Entregar casos de estudio o más material de apoyo y videos pero no en PC.	Ampliar un poco mas la imformación con distintos casos de otras empresas				


Overall evaluation
6 - excelente
5 - muy bueno
4 - bueno
3 - satisfactorio
2 - pobre
1 - muy pobre
6
5
4
3
2
1
Contenido de la capacitación
¿El nivel de la capacitación fue adecuado para su conocimiento?
¿Como considera la utilidad del conocimiento adquiridas?
Método de trabajo
Conocimiento y habilidades de los capacitadores?
¿La capacitación cumplió con sus expectativas?
Material de apoyo - distribuido
Organización, logística y ubicación
Duración y organización del tiempo


Specific evaluation
6 - excelente
5 - muy bueno
4 - bueno
3 - satisfactorio
2 - pobre
1 - muy pobre
6
5
4
3
2
1
Conocimiento básico sobre la leche
Tecnología de helados
Elaboracion de queso y suero
Agua, Agua Residual y Energía
Ejercicio "Almacenamiento"
Limpieza
Desinfeccion
Principios generales de higiene en alimentos
HACCP - Analisis de Peligros (y) Punto de Control Critico

Equipos de Producción más Limpia

Cronograma de actividades 2005

Actividades	Fecha de entrega
Quick Scan - Entrevista - Visita	**11 de nov**
EcoInspector	**11 de nov**
Reporte de Quick Scan - formato	**11 de nov**
Capitulo 2 al 4* *(Información de la Evaluación / Descripción de la Empresa)*	**25 de nov**
Capitulo 5* *(Descripción del Proceso de Manufactura y Balance de Materia y Energía)*	**16 de dec**

*** del Formato de Evaluación en Planta de P+L**

Equipos de Producción más Limpia

Cronograma de actividades 2006

Actividades	Fecha de entrega
Capacitación **Generación y Evaluación de Opciones**	**Enero - 06**
Capitulo 6 al 7* *(Generación y Evaluación de las Opciones)*	**Marzo – 06**
Reunión con expertos del Centro	**Marzo – 06**
Capitulo 9, 10, 11, 12 y 1* *(Implementación, Conclusiones y Recomendaciones, Resumen)*	**Abril – 06**
Reporte final y hoja técnica	**Mayo - 06**

*** del Formato de Evaluación en Planta de P+L**

Equipos de Producción más Limpia

Please do not forget:

CP also could mean:

- to improve product quality / hygiene (e.g. implementation of good manufacturing practices)
- to implement a waste management systems
- to improve workers health & safety situation
- to improve cleaning processes (implementation of a cleaning concept)

Read sector specific CP-literature and case studies!

(NCPC can help)