The National Cleaner Production Center - Macedonia

CP Assessment Report

Company: **DENTINA DOOEL, Strumica**

Contact: **Mr. Trajce Karadakoski**
Tel.: +389 (0) 34 334400
E-mail: mabi_trade@mt.net.mk
Internet: www.mabi-trade.com

Location: **Gradsko, Baldovci (Strumica Municipality)**

Assessment conducted by:
Snezana Cundeva, Margarita Ginovska (NCPC-MK)

Site visit: **21/10/2008**

Assessment methodology

Cleaner Production (CP) is defined as the continuous application of an integrated preventive environmental strategy to process, products and services to increase the overall efficiency and to reduce risks to humans and environment. A CP project follows a certain methodology and consists of the following elements: data collection, analysis of the collected data, option generation, feasibility analysis, implementation, controlling and continuation. This report follows the UNIDO CP assessment methodology but it is based on one company visit. Therefore the report should be assumed as basic CP assessment report.

Company profile

- Brief history, Ownership, Number of employees

DENTINA DOOEL was established in 1993 as a private enterprise under the name Inter Astoria. In 2000, Inter Astoria began to invest in fruit and vegetable processing, and began exporting pepper products in 2001. The name was changed to Dentine in 2004. Today DENTINA DOOEL exports vegetables in glass jars, cans as well as fresh vegetables. Processes include washing, sorting, removing seeds, chopping, grinding, baking/roasting, peeling, packaging and pasteurization.
The number of permanent employees is 15 people. During the summer processing season lot of seasonal employees are hired. In winter period the plant operates with decreased capacity and only with the permanent employees.

- Activities, Main production, Products

The principal DENTINA DOOEL products include chili peppers, gherkins, roasted and bleached red pepper, mixed salad, beet root, ajvar, djuvec and fresh vegetables. Processing operations are done on the bases of traditional home recipes.
Fresh peppers and vegetables (cabbage, tomato, eggplant, carrots, and cucumber) are processed at the plant from mid-August through October. Peppers are washed, seeds removed, roasted, peeled and packed into glass jars that are pasteurized. Some peppers are packed into barrels for packaging during the rest of the year. Other vegetables are washed, processed and combined with peppers to make ajvar. Other products include roasted peppers, chili peppers, bleached red peppers, mixed salad, beet root, djuvec and gherkins. Beet root is packed in metal cans.
The total production is more than 700 tones of processed vegetables. All products are exported to Slovenia, Croatia, Austria etc.

- Plans for production expansion, investments, new equipment

The plans for production expansion are on the basis step-by –step.
Therefore, in 2007, DENTINA DOOEL purchased a new fully automated boiler plant and burner. The owner claims that the boiler is environmentally friendly. The boiler has been designed and installed in a custom configuration that meets the needs of the plant. The boiler has been fine tuned by the installers to meet the steam generation and distribution system requirements unique to the plant in the most efficient manner. At the same time the emissions were measured and it was found that they are bellowing legal limits.
Condensate return is not yet measured and controlled. In near future monitoring and control of the condensate return will be performed.
DENTINA DOOEL experiences insufficiencies of water during the peak production season so in the coming period they plan to build extra boreholes pumped by the company's privately owned on-site pumping station.
The company is planning to install end of pipe waste water treatment. Currently they are looking for the most appropriate provider.

- Implemented standards, awards, certificates, permissions

DENTINA DOOEL implements and applies HACCP safety, ISO 9001:2000 management system, has adopted quality politics, EUREP GAP certificate (please see http://www.mabi-trade.com/images). DENTINA DOOEL also holds a construction permit, a fire safety permit, an inspection certificate for the proper storage.

Material Flow Analysis

- Processes, process diagram

Processing operations are done on the bases of traditional home recipes. The production process is organized in several steps depending on the product. Fresh peppers and vegetables (cabbage, tomato, eggplant, carrots, and cucumber) are processed at the plant from mid-August through October. Peppers are **washed, seeds removed, roasted, peeled** and **packed** into glass jars that are pasteurized. Some peppers are packed into barrels for packaging during the rest of the year. Other vegetables are washed, processed and combined with peppers to make ajvar. Ajvar production process includes **roasting, skinning, chopping, cooking** and **packaging** into glass jars that are pasteurized. Other products include roasted peppers, chili peppers, bleached red peppers, mixed salad, beet root, djuvec and gherkins.
The process flow diagram for the main products is shown in the figure bellow.

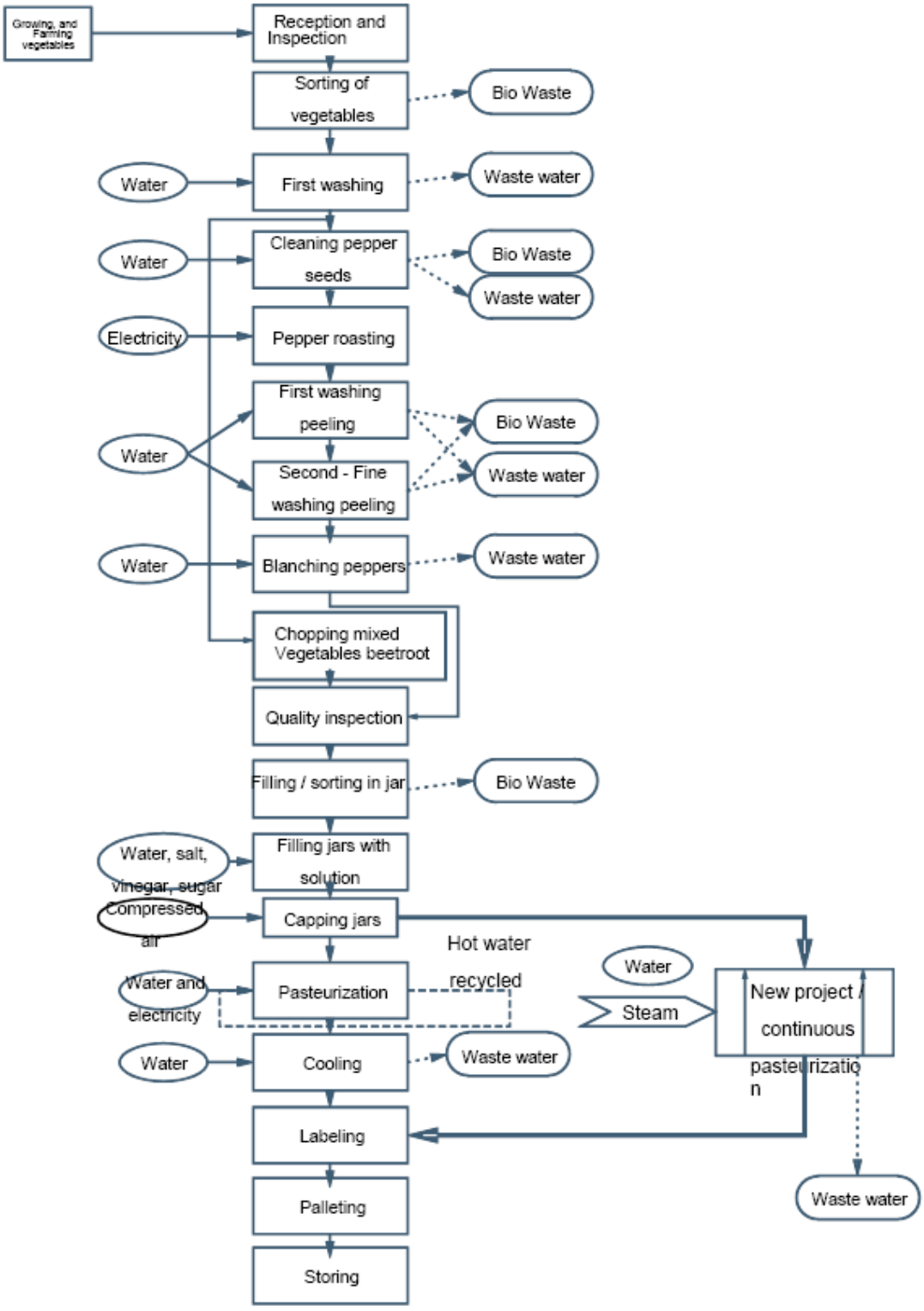

Figure 1 - Production process in DENTINA DOOEL

- Materials handling

All raw materials are visually tested for quality before being accepted from suppliers. The transferring activities follow proper procedure and are well documented. Practically there is no raw material with expired date since the supply of raw materials is on daily basis. Every material needed in production process (such as crates, palettes, packages, glass and containers) is inspected for damage before being accepted.

- Raw and waste materials, management of waste materials

There is a storage area for raw materials. According to the owner there are no hazardous raw materials according the requirements of HACCP and ISO standards. Disinfection detergents with biodegradable compounds are bought in small quantities and are immediately used. The concentrated acetic acid is properly signed, stored and handled.

There is a large storage area for final products organized according to storage regulations (temperature, humidity, light). Only electrical vehicles are used in the storage areas. Basic raw materials (vegetables) are packed in returnable containers (boxes) and recycling bags. DENTINA DOOEL segregates its wastes as much as possible. Plastic packaging bags, paper and foils are given for recycling, and organic waste is given to the local farmers. The rest of the waste materials are disposed on the municipal land field.

- Water in the technology processes, waste water treatment/management

DENTINA DOOEL is relatively large consumer of water. The water is provided from boreholes pumped by the company's privately owned on-site pumping station. Water used in the production process is tested by the Department of Health Protection and is of high quality (except that it is hard). Water is used in product washing, peeling, blanching, pasteurizing, cooling and cleaning of floors and equipment. Since ground (pumped) water is a non-metered, noncapital commodity, little concern has been given to its expenditure. The pump has a capacity to provide 13 litres/ second, however, exact water use is not metered. Due to large water needs in processing season DENTINA DOOEL experienced insufficiencies of water during the last months (peak season). Therefore in the coming period they plan to build extra boreholes.
The company has only the settling traps at the end of floor drain channels with out any further treatment of the waste water. Very little of the whole water capacity is reused or recycled (only at pasteurization site and at re-cooling of jars and tins). The company is planning to install end of pipe waste water treatment. Currently they are looking for the most appropriate provider.

Energy Management

Due to the character of the technology processes, various forms of energy are used: steam, hot water, electricity and compressed gases. According to the estimations, depending on the type of product, energy participates with 10-20 % in the final price of the products.
Electricity costs are around 300 Euros/ month in the peak working season and 70 Euros/ month in the off-season. Major sources include the water pump, gherkins calibrator and lighting. The water pump only operates for about 3-4 hrs / day during the working season, so this is not largest component of the electricity costs. Electrical energy participates with 6-7% in the final prize of the product.

The company has its own boiler room with two steam boiler units installed. The new one is with capacity of 1 t/h and mostly operating at 6 bar steam pressure. The produced steam is used completely for technology purposes. The steam cycle is not closed completely yet.

The fuel used in the boilers is petrol. There is a fuel tank of 4 tones capacity in the vicinity of the boiler room. According to the environmental inspection measurements, as well as according to the estimations, the emissions to the air coming from the boiler room stack are bellowing legal limits.

A steam/hot water heat exchanger with appropriate capacity is installed in the boiler room and connected to the heating system of the company. The heating of the offices in winter period is resolved with local heating units and some small electrical heaters.

The overall state of the energy equipment, including pipelines, is satisfactory. The equipment is well maintained and the operation efficiency is quite well, although there are possibilities for improvement (steam return).

LPG is used in the furnaces for pepper roasting.

The pasteurization in the process is done with hot water. There are two pasteurization tanks. The heat contained in the rejected water from the first pasteurization tank is reused to pre-heat water in the second pasteurization tank.

Although the general condition of the energy equipment and installations in DENTINA DOOEL is quite satisfactory, there is a space for further improvement, with some measures for energy saving and better energy efficiency. CP options would generally consist of improving the process control, reduced heat losses, and improved heat recovery (condensate return). For eventual improvement of the energy efficiency of the furnaces, additional, more detailed assessment is necessary.

Environmental Performance of the Company

DENTINA DOOEL has an environmental policy that is settled on a clearly visible position on several places in the plant. Besides these there are posters in the plant showing good hygienic habits and good operating practice (please see Annex)

DENTINA was several times inspected by the Environmental Inspector and there were no violation of current Legal Requirements and there are no fines or penalties given to the company.

Current Operating Practices

- Good operating practices

The owner claims that there are formal personnel training programs on raw material handling, spill prevention, proper storage techniques, and waste handling procedures. Records are kept for each waste, documenting sources of origin and eventual disposal.

The operators are provided with detailed operating manuals or instructions sets. Evidence is made on the material input/output/waste balance on daily basis. All operator job functions are well defined. Management is permanently on the site and supervising the process. Company doesn't have specific goals for waste minimization but they are trying to minimize every waste and they are aware of direct loss of materials. There are stimulant measures for the employees that are clearly set on wall posters.

- Good housekeeping

The work environment is almost clean. The vegetables in the sub-processes are covered and protected from insects with plastic curtains on the doors. Spillage is moved occasionally. The floors

are cleaned by brooms and water under pressure. The walkways are free of containers. The good housekeeping behaviour of the employees is stimulated.

- Partnership with other stakeholders

All of the supply of raw material and production is planned ahead according to signed agreements with suppliers which are scheduled by quantity, day and hours of delivery. The recyclable waste is taken away by the responsible enterprises. Pepper and vegetable organic solid waste is given to farmers for animal feed.

Identification of CP Opportunities

- Technology processes improvement

The major concern in near future should be the project for condensate return. Reusing hot condensate in the boiler saves energy, reduces the need for treated boiler feed water, and reclaims water at up to 100°C of sensible heat.

- Water

Water is used in different stages of the production process (vegetable washing, vegetable peeling before and after roasting, floors washing, CIP…). Based on observations of vegetable processing plants during October, water usage seems to be large. Water savings have to be one of the main issues get in consideration, because there are many possibilities in different production processes in DENTINA DOOEL for return, reuse of water, or to eliminate the water leakages and spills. This is especially important, not only from environmental point of view, but also because DENTINA DOOEL is already facing problems of water insufficiency.

Another important issue that should be solved in near future is the construction of waste water treatment plant (WWTP).

- Waste and emissions minimization

Currently DENTINA DOOEL uses oil and LPG for the production processes. The boiler house is fully automated and eco efficient. To reduce further the air emissions DENTINA should consider the use of natural gas.

- Energy saving and energy efficiency measures

The overall condition of the energy equipment and installations in the company is quite well. However, there are possibilities for certain improvement, by implementation of some measures for energy saving and better energy efficiency. CP options would generally consist of regular monitoring and maintenance of the steam and condensate system. For eventual improvement of the energy efficiency of the furnaces, additional, more detailed assessment is necessary.

Most of the measures for improvement of the energy efficiency and energy saving for DENTINA DOOEL belong to the common steam system maintenance activities. The cost of such measures is not high and the approximate pay-back period is usually less than two years.

Concluding Remarks and Recommendations

The owner of DENTINA DOOEL participated in all the phases of the company assessment. DENTINA DOOEL is a company of relatively small size so it was considered that during the visit the owner should be trained. However the company management is aware that training is needed also for the rest of the employees, so the company organizes trainings and also hires outside company/persons to conduct environmental assessment for different purposes (HACCP application, ISO application).

The national experts from the National Cleaner Production Center (NCPC-MK) explained the goals and the aims of the cleaner production. During the audit the owner showed big interest to learn more and to cooperate in the future. He pointed out that he might need a detailed assessment and logistics for the condensate return project. Further cooperation with the NCPC-MK, if needed, was recommended.

Skopje, 22.10.2008

Director of the NCPC-MK

Atanas Kocov

CP experts

1. Snezana Cundeva

2. Margarita Ginovska

Annex

Photo documentation


DenTina


DenTina
ПП У 1/10
УПАТСТВО ЗА ЧИСТЕЊЕ СКРШЕНО СТАКЛО (ПЛАСТИКА / КЕРАМИКА)
1. ВЕДНАШ СТОПИРАЈТЕ ГИ СИТЕ РАБОТНИ АКТИВНОСТИ!
2. ИЗОЛИРАЈ ГО ДЕЛОТ КАДЕ ШТО НАСТАНАЛ ИНЦИДЕНТОТ!
3. СОБЕРИ ГО СКРШЕНОТО СТАКЛО (ПЛАСТИКА / КЕРАМИКА)
4. СОБЕРЕНОТО СТАКЛО ИЗНЕСИ ГО НАДВОР И ФРЛИ ГО ВО КОНТЕЈНЕР ЗА ОТПАД!
5. ПРОВЕРИ ГИ ОБУВКИТЕ И ГАРДЕРОБАТА НА ПЕРСОНАЛОТ КОЈ БИЛ НА МЕСТОТО НА ИНЦИДЕНТОТ!
6. ЗАЧУВАЈ ДЕЛ ОД СКРШЕНИТЕ ПАРЧИЊА!
7. ИЗВРШИ ФИНАЛНА КОНТРОЛА НА МЕСТОТО НА КОЕ НАСТАНАЛ ИНЦИДЕНТОТ!
8. ПОДАТОЦИТЕ ОД ИНЦИДЕНТОТ ЗАПИШИ ГИ ВО ФОРМУЛАР!
Верзија 1 /2005/01/15
ОДОБРИЛ ЗА УПОТРЕБА:
Лидер на HACCP тим


МЕСТО
ЗА
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БИО ОТПАД
ОТПАД СТАКЛО


ACIDO ACETICO
SOL. 80% FOOD GRADE