The National Cleaner Production Center - Macedonia

CP Assessment Report

Company: **Bonum Plus DOOEL**

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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

Bonum Plus is established in 1992 as a trading food company. The first location of the company was in North - East region of Macedonia, located in the municipality of Kriva Palanka. The biggest increase in trading activities was achieved at 1997, when they became a major supplier of mushrooms to the domestic market. Soon after that, in 1998, they start up activities for vegetable processing and they began with export of their own vegetable products. Development processes in the company, mainly focused on vegetable processing as one of the most favor production branches in Macedonia, have been initial point for general changes in the company's production and planning processes. At 2005, the production process and the whole plant was moved to the present site in

Dragomance, in agricultural area, nearby Kumanovo region, with approximately 50,000 m2 area, which is almost 5,000 m2 under roof. In buildings which were previously used as shoe production factory "Cik" Kumanovo. The size of the facility allows good layout and planning of processing activities. Also, the new technology implemented in and the organization of the production process at the new plant, are one of the main criteria points to include this company among the best in the food processing industry in Macedonia.

The company which is rapidly developing its business interests in the vegetable processing industry is 100% in private ownership. The owner of the company is highly educated person in economy, who successfully carried out both the management and production process activities. Currently, the number of employees is over a hundred, with high educated and qualified technical staff.

- **Activities, Main production, Products**

Bonum Plus is export oriented, medium sized company, with almost 95% export of their production capacities. The company has already established successful export relationship with many foreign companies in the region and EU.

Processes of vegetables include washing, sorting, removing seeds, chopping, grinding, baking/roasting, peeling, and packaging and pasteurization. Products include mushrooms and traditional pepper-based products such as ajvar. The processing operations are done on the bases of traditional home recipes and the ingredients are fresh crops from the region, or imported materials such as tomato sauce or already processed (cleaned and chopped) mushrooms. Peppers are also roasted, manually skinned, sliced and chopped. All other ingredients (carrots, eggplants, tomatoes) are also prepared according to the recipe for each separate product. Ajvar from fresh red paprika is not roasted, only sliced and chopped and later cooked.

Other main Bonum Plus products are: Ajver (roast red paprika, eggplant, oil and salt), Roasted Red Paprika (red paprika, water, vinegar and salt), Roasted Red Paprika in Garlic Marinate (paprika, water, vinegar, salt, garlic and vegetable oil), Lutenica, Summer Vegetable Stew (all of these products are with similar ingredients and produced through the process of roasting, skinning, chopping and sometimes cooking) and Salads (paprika, green tomato, cabbage, cucumber, carrot, vinegar and salt).

Mushrooms are processed throughout the year, imported from China or produced locally. Imported mushrooms are washed and packed while local mushrooms are washed, sliced and packed in glass or plastic containers with different sizes.

- **Plans for production expansion, investments, new equipment**

Some of the planned activates have been already realized by support of AgBiz programme and their contribution to the company's vision for future development. The results of the project could be improvement and increase of the productivity and final output of processed vegetables by ISO 22 000 Standard Implementation. Also, some activities have been undertaken in the frame of AgBiz have been directed towards increasing the visibility and better shelf positioning of Bonum plus products in the regional and EU markets.

On the other side, the owner of the company plans to spread out the production process with an additional mineral water production facility in the near future.

Bonum Plus, as the owner claims, plans to decrease the consumption of LPG, getting in consideration continues increase of prices of LPG in the world, by implementation of new technologies for energy/heat production. Some plans for use of renewable sources - solar thermal collectors could be an alternative and additional heat supplier system to the facility.

The company plans to reduce the water consumption also, by introducing reuse and reduce

of water in some production processes. The plans are not elaborated in a proper form yet, so the additional efforts in this direction are planed to be made with a help of relevant national experts or companies.

- Implemented standards, awards, certificates, permissions

ISO 22000 is already implemented, highly supported by AgBiz Programme.
The company is currently in the process of application for IPPC (Integrated Pollution Prevention and Control system) permit.

Bonum Plus has received all the necessary permits in transfer to a new plant.

- construction permit
- fire safety permit
- HACCP certificate
- an inspection certificate for the proper storage and use of propane gas in large quantities.

Bonum Plus has been successfully presented on a several domestic, regional and International Food and Agriculture Fairs, whereas the company received a special awards and certificates for quality and healthy products.

Material Flow Analysis

- Processes, process diagram

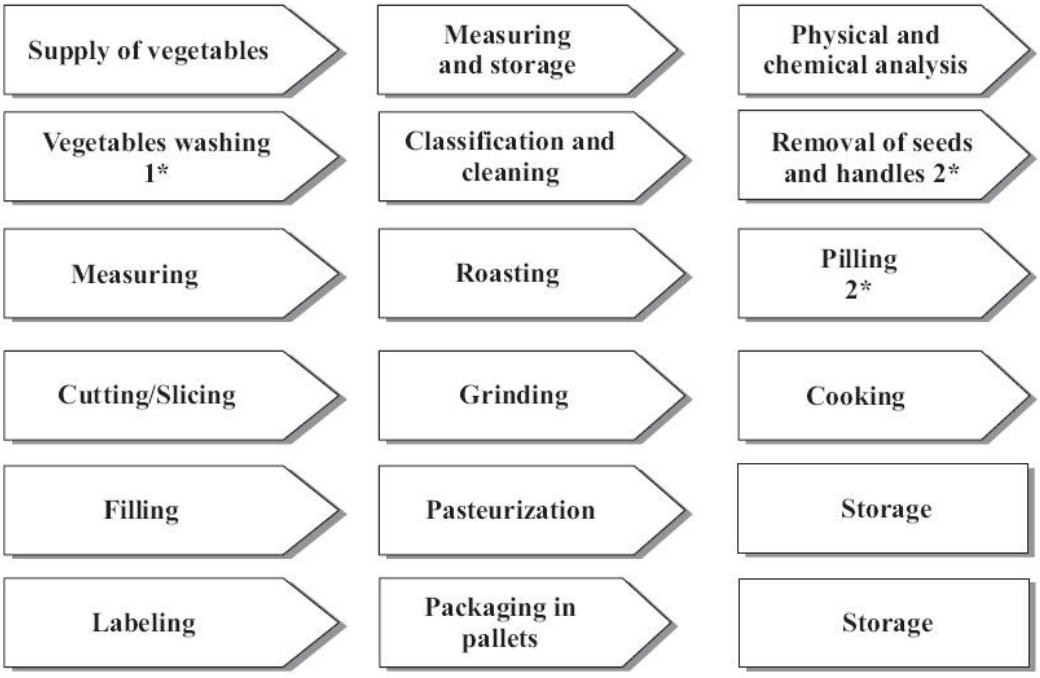

Fig. 1 production process of Ajvar

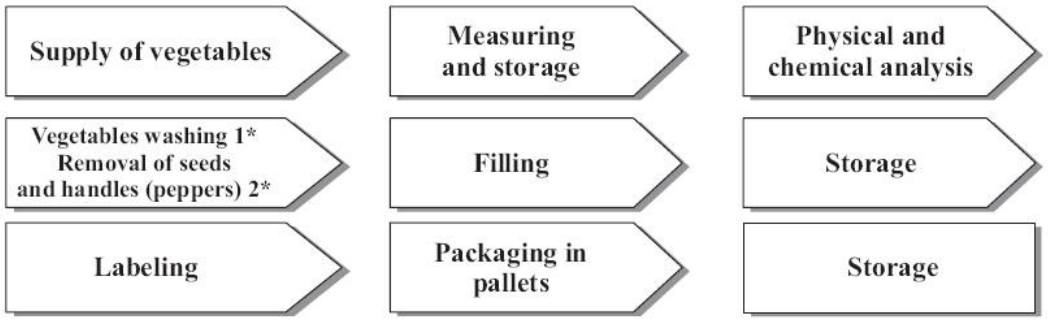

Fig. 2 Production process of Mushrooms and peppers

- 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.

The storage of raw materials is mainly on daily basis, so the special storage places are used mainly for mushrooms and some other vegetables or additives which are used in the processing process. The need for special storage area as refrigerator systems for vegetables is currently increasing, especially when the vegetable market supply is varying from season to season.

The quality control of the final products is carried out in the own Laboratory of the company, only some general parameters considering the quality control and the detailed analysis are carried out by the relevant governmental institutions. All this procedures are necessary for export of sustainable high quality final products at European markets.

- Raw and waste materials, management of waste materials

The storage area of final products is well organized, according to EU standards, and the transportation in the storage area is electrically powered. There are some large storage areas for final products, organized according to storage regulations (temperature, humidity, light). Basic raw materials (vegetables) are packed in returnable containers (boxes) and recycling bags.

The main fuel used in the production process is LPG, which is stored in three special storage tanks with capacity of 20t LPG, regularly settled, isolated and inspected for all of the necessary procedures for safety storage have to be undertaken.

There are not dangerous or toxic raw materials used in the production process. There is an occasional use of detergents and domestic cleaning products, but they are bought in small quantities and used immediately. The company use oils and fats in the production process in a small quantities and the owner purchase only the special high quality fats for food industry. Therefore, some special storage area for these materials is not determined.

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

Bonum plus is relatively a big consumer of clean drinking water used in technological process. The plant relies on water provided from ground wells, mostly supplied by one of the three available wells with capacity of 30 l/s, pumped by the company's on-site pumping station. This water is regularly tested by the Republic Department of Health Protection.

The biggest quantities of water are used in the process of washing the vegetables, blanching packaging, pasteurization and cleaning the floors and equipment.

Since water is pumped from own ground wells there was a little concern given to its expenditure in the past. The new legislation in Republic of Macedonia considering the water usage is more strictly defined for usage of ground well waters and more intention has to be paid to this issue.

There are some measures have been implemented for reuse of waste water in the production process, mainly incorporated in the new technological lines settled at a new plant three years ago. However, the owner claims that some activities for decreasing of actual water usage by reduction and reuse are of waste water, are going to be carried out in the future.

The only wastewater treatment system at the site is a concrete sedimentation tank originally installed for the old shoe manufacturing plant. Bonum Plus uses much more water for vegetable processing compared to shoe manufacturing. The effluent from the tank goes into the groundwater rather than the nearby river. According to the environmental authorities, several inspections have been conducted at Bonum Plus and insufficiencies identified with treatment and discharge of process wastewater. Bonum Plus has been ordered to eliminate this kind of pollution.

Energy Management

The energy management as one of the most important CP options is the main issues in the company has to be considered. Bonum Plus is relatively not a big energy consumer, so it could be expected that there is no need for further special measures to decrease the energy demand. Just on the contrary of that, the owner explained that achieving only small percentage of profit in this type of food processing industries, which is about 15%, could be significantly increased with small energy, material or any kind of savings. That is why, as the owner claims that have special awareness and monitoring of energy consumption expressed not in absolute values, but per unit of product. The energy costs in total product prices participated with different percentage in different production processes, i.e. different types of final products. As an example, the energy consumption for production of djuvec is 22 kW per 1000 cans of products.

The consumption of propane gas (LPG) takes the largest proportion of energy use in the production facility. This type of energy fuel is mainly used in the process of grinding, baking/roasting, peeling, packaging and pasteurization.

The pasteurization process is done by hot water which is supplied in 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.

Electrical energy takes a smaller part of energy consumption in total, used in lightening, heating of the halls, cooling process after the pasteurization, for some electrical devices, electrical forklifts, etc.

Although the general condition of the energy equipment and installations in Bonum Plus 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).

Environmental Performance of the Company

Bonum Plus has already implemented some of the standards for environmental protection and pollution prevention. Also, the good hygienic habits and continues training for the employees working in the food industry, is performed.

Food processing industry, i.e. the company for vegetable processing belongs to those types of industries with low level environmental impact. However, some activities for raw and waste materials management have to be settled.

There are very few emissions as result of the process. The area where emissions occur is appropriately ventilated. Waste water emission occurs, the measurements of BODs and other physic-chemical parameters have to be permanently done. Some improvements in this direction could be realized in the future, especially to cover the problem on the regional level.

The company hires relevant persons/companies to conduct environmental assessment for different purposes. The application for IPPC permit for adjustment with operational plan is prepared by environmental consultant company.

Waste materials handling

There are no special requirements performed in waste material handling. The reason is the small amount of waste that originates from this production facility. There is small use of salt, acids or other chemical inputs in their process. Vegetable washing produces some solid waste (soil, vegetable pieces, etc.). These vegetable wastes are collected partially and used as animal food.

Water leaving the production line goes through a concrete sedimentation tank originally installed for the old shoe manufacturing plant. The effect of discharging wastewater into surface soil is unknown since the water sedimentation system is very old and has to be upgrade in certain waste water system. However, water that is discharged at present has a low potential for environmental harm since it is basically clean water with trace amounts of vegetable matter.

There is not completely implemented reuse process of waste water, and some activities are going to be carried out in this direction.

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 site and continuously 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 behavior of the employees is stimulated.

The owner of the company and director in the same is committed towards implementation good housekeeping measures as a daily practice in the company. He has a clear vision that by low cost or no/cost measures a big achievements could be done in energy and material (water) savings, for example: better insulation of the equipment which is enabling in the same moment a heat recovery in some part, return/reuse of rinsing and cooling water already implemented in some steps of production process, filtration of organic waste and sewage from the vegetables during processing, etc

- Partnership with other stakeholders

The owner of the company has a good management skills and high qualified knowledge in trading and production businesses, so his relation and partnership with stakeholders is on a high level. 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

Bonum Plus actively participated during the CP assessment. Some of the recommendations and discussion during the site visit identify the cleaner production measures and the possibility for implementation in some processing units.

During the cleaner production assessment at the end of the high season for drying vegetables, some activities recommended to the general manager of the company identify no cost and low cost opportunities to reduce water usage and wastewater pollution. There are several opportunities that are recommended to further improve production standards, efficiency and environmental sustainability; however, the company has already made a concerted effort to better itself in these areas. In particular, the additional tank incorporated next to the tunnel pasteurizator could be one of the most effective measures for water and energy savings during the cooling process, after pasteurisation of the final products.

- Water

As a big water consumer, the company needs to have special concern for water savings, by reducing usage of clean water and reducing the emissions of waste water as a pre-emptive step before Macedonian water regulation comes into force. Therefore, several measures as well know CP opportunities, could be undertaken:

- Installation of additional tank next to the pasteurization, for cooling the water, which is going to lift up the hot water, cooling and flow out the cold water used in cooling process, after pasteurization,

- reuse water from the second stage washing by allowing this relatively clean water to be returned into the first washing stage. This would save water and reduce wastewater outputs.

- The water savings in a cleaning process by substituting high pressure floor cleaning with dry cleanup techniques.

: - install water meters on all main water supply distribution lines; monitor water use and record water consumption; use a closed system for cleaning operations; use low-volume/high-pressure washers for cleaning, and optimize the work of compressed air system.

- Staff education and training in water efficiency will form an important step in water saving.

- Waste and emissions minimization

The boiler house is fully automated and eco efficient. To reduce further the air emissions Bonum Plus should consider the use of natural gas, even there is the cost effective analysis for connection to the natural gas pipe system that shows a negative results for direct implementation.

Bonum Plus could make some efforts in reducing the liquid and solid wastes from the production process, and implementation of some technologies for reuse, reduce and recycle in the same process. The efforts have to be directed mainly in reduction of water emissions, some organic wastes from production process and emissions from packaging process.

- 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 Bonum Plus 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.

It is recommendable for such type of companies located at the southeast part of Europe, with lot of sunny days per year, to get in consideration possibility of installing thermal solar systems. Solar thermal collectors could be used for improvement the heat supplying system, which could be used directly in the production process. Also, some measures for implementation of concentrated heat systems, partially focused in some area of production lines, are some of the CP options that have been discussed during the visit of the company. The owner of the company is committed to reduce the energy consumption and to improve the image of the company by usage of green energy and introduce of environmental friendly measures.

Concluding Remarks and Recommendations

Bonum Plus is one the well known SM enterprises in Republic of Macedonia, with 15 years tradition in food processing industry. The company becomes a medium innovative company with clear vision for production expansion. The owner of the company is proactive oriented towards economical and technological growth of the company, considering the importance of implementation of the new - environmentally friendly technologies, which will increase the profit and decrease the negative environmental impact of the whole production process.

The owner and the management of the company have a clear vision for the concept of Cleaner Production. They are already implementing some standard CP options and they are committed to implement more CP principles in the near future. The plan is to improve the good house keeping practices, and to minimize water and energy consumption.

During the CP assessment process, the owner of Bonum Plus, Mr. Momcilo Ivanovski and The technical manager and assistant Mrs. Natalija Cvetkovska (all being members of the management team) participated in all the phases of the company assessment.

The goals and the aims of the cleaner production have been explained by the national experts (NE) from the National Cleaner Production Center (NCPC) during the CP assessment process in Bonum Plus. The general manager and technical assistant are well educated in business and engineering frame, with some basic knowledge of cleaner production principals. During the visit of the company they showed interest to learn more and to cooperate. An example of their awareness of the CP principals is fact that they have been already involved in AgBiz programme, to incorporate ISO 22000 as a general tool for continuously monitoring of the production process and its environmental impact in different step. The feasibility study for certain CP activities have to be prepared in the short term period. A detailed CP analysis, with comprehensive materials flow, energy management and environmental performance analysis was recommended. Also further cooperation with the NCPC was recommended. By introduce of some activities arising from the CP options as a tool to achieve material and energy savings, the company could improve the efficiency, the profit and the image among the stakeholders.

Skopje, 24.12.2008

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Annex

Photo documentation