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Organic Potato Processing Status, Problem and Potentials in the Netherlands: A Review

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Article Info	ABSTRACT
Key Words:	<p>Potatoes into various consumer products have developed very rapidly as the industrial processing increased during the past years in different countries of the world. The organic farmers of the European countries are producing organic potato for the industry. Organic potato raw materials for industrial processing have become a new source of income for them and the demand is increasing. The transition of organic food against the conventionally processed and marketed products is steadily increasing in the Netherlands. Thus, this review is prepared to formulate guidelines for increasing organic processing with the following key parameters such as to identify the limitation with organic processing compared to the conventional, to interpret the quality characteristics of raw materials, to find out the problems and solutions of organic potato processing and to analyze the effect of external and internal factors of organic processing by SWOT analysis. The processing of organic potato is a complex process and it requires various quality standards from raw material to end product. It requires several efficient processing steps, tools and associated techniques. The organic French fry production up to 10% might be feasible, if quality raw potatoes become available, improved techniques are applied for processing, and the processor able to establish an efficient processing chain for the whole process. However, adequate storage condition, integrated waste management and bio-degradable packaging are required to sustain the organic processing. The organic French fry producers need to be motivated continually and they should work together for profitability and expansion of the processing sector. It is also required to convince the processors, people behind the industry and marketing to develop a more efficient organic potato processing chain. This might ensure the availability of organic potatoes for the industries, and processed products will be easily available to the consumer. Thus, we might achieve 10% increase of organic processing by 2022.</p>
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I. Introduction

Potato crop (*Solanum tuberosum* L.) is considered as one of the demanded crop for its agronomic value and economic return in the organic farming systems (Thorsten, 2007a). Potatoes into various consumer products have developed very rapidly as the industrial processing increased during the past years in different countries of the world. Globally about 10% of potato converted into consumer products such as French fries and potato chips or as other consumer processed products. The organic farmers of the European countries are producing organic potato for the industry. Organic potato raw materials for industrial processing have become a new source of income for them and the demand is increasing (Sylvander and Le Floc'h-Wadel, 2000). However, the processed forms are mainly used in the Europe and North America where the daily one two thirds of potato consumption is as the processed forms (Keijbets, 2008). About 180000 hectares of land are used for the cultivation of potatoes in the Netherlands. The major product categories include: a) consumer potatoes for fresh consumption and processing industries, b) potatoes for the starch industry and c) seed potato (NPCF, 2012).

The transition of organic food against the conventionally processed and marketed products is steadily increasing. The consumer movement to organic product is positive as the consumers perceive organic products as safer, more nutritious and produced under sustainable and ethical context (Doyle, 2006). The health problems (diabetic, heart disease, overweight and obesity) that are occurred by conventional foods might be the key driver for new product development such as organic foods that are safe for health (Keijbert, 2008). The organic products need to be easily accessible and affordable to the consumer so that it will create new consumer groups. Organic foods are good source of income for the processors, and still a great export market to exploit. To cope with the demand, the volume of organic product is needed to increase greatly. Moreover, organic products involve a sustainable system which creates harmony with the society and the environment. Considering the greater economic return and rising consumer acceptance, the production of organic food needs to increase by 10% within the next 10 years. This review is prepared to formulate guidelines for increasing organic processing with the following focuses: (a) to identify the limitation with organic processing compared to the conventional; (b) To interpret the quality characteristics of raw materials destined for processing and to summarize the method of French fry production; (c) To find out the problems and solutions of organic potato processing, and (d) to analyze the effect of external and internal factors of organic processing by SWOT analysis and required innovations for expansion of the processing industry.

II. Materials and Method

This review is about processing of organic potato in the Netherland. It is prepared with the help of primary and secondary sources such as books, reports/reading materials, publications, articles found in the Wageningen University library, the Netherlands. Information is also collected from internet sources; the sources are included duly in the reference section. To discuss the processing of organic potato more comprehensively, relevant subjects, lectures on organic farming systems, field tours under master of organic agriculture course also remain helpful for preparing the review. Nevertheless, comments and suggestion from the course instructor was always very helpful. Common procedure and qualifications required for raw materials, processing method of organic potato are reviewed, especially French fry, and also focused on the problems and solution of processing industry. The required innovations for successful organic potato processing are also discussed and the SWOT analysis is made for the identification of strength and weakness, and opportunity and threat for processing industry.

III. Results and Discussion

Organic verse conventional processing

The potato yield per hectare is almost half (46%) and the quality of potato is not good of the organic potatoes compared to conventionally produced potato (Tresnik, 2007). The use of organic potatoes in the potato processing industry is minimal because it poses low yield. It also lacks the processing

qualities which lead to very high raw material cost and inferior quality products. For the processing industry, continuous supply of tubers is a very important factor but until now only few organic potato growers in the Netherlands. The internal and external quality of potato plays an important role to determine the suitability of potatoes for the processing industry (NPCF, 2010). Only varieties that meet special quality standards can be processed further. For the processing industry, raw material for French fry should be larger in size, while those for crisps should be of medium size, and the same tuber size in the raw potato stock is another difficult criterion to get in the organic potatoes. On the other hand, during storage different types of infection, diseases and sprouting may occur. But potatoes are not allowed to be treated with chemicals in the organic system. Furthermore, customers are very particular about quality and outer appearance of products but organic potato at times not look that much better to satisfy the consumer. To overcome the limitations a comprehensive guideline is required for raw material qualities, efficient processing, and waste management and for necessary innovations.

Frozen Product and Processing of Frozen Potato in the Netherland

French fries are the most popular potato product in many countries because of their pleasant taste and texture. During 2011, French fry production in the Netherlands was 3.5 million tons (Potatopro, 2012a). There are five industries in the Netherlands which transform potatoes into frozen French fries. The industries are namely, Avico B.V. (largest in Netherland and one of the leading suppliers and brands in potato products in Europe), Bergia Frites B.V., Farm Frites, Lamb Weston Meijer and Oerlemans Foods Nederland B.V. Among the industries only the 'Oerlemans Foods Nederland B.V.' offers organic French fry products (Potatopro, 2012b). It is necessary to establish more than one specialized industry in organic potato processing. However, the potato processing industry has high quality standards in terms of the raw materials and for the processing (Thorsten, 2007b). Thus, an efficient method is required to process organic potato.

Processing of Frozen Potato (French fry)

The processing of organic potato for French fry involves quality raw materials, processing equipment and expertise of different levels, health standards, suitable packing and efficient marketing and many more which play role. The potato raw stock should have adequate qualities regarding dry matter content, reducing sugar, size and shape, injury and internal infection etc. Quality raw material is the first requirement before the processing to start. Thus, the qualities of potato will be discussed and then the processing method will be summarized.

Quality characteristics during processing: The processing industry of the French fries sets strict criteria for tuber length, color, fat content, reducing sugar and dry matter content. Thus, the French fries flakes eventually meet well-defined standards (Keijbets, 2008). The potatoes that will be used for the processing industry should have the following characteristics:

- High content of dry matter
- Low content of reducing sugars (affect the final color of French fry)
- Low glycoalkaloids content
- Appropriate content of phenolic compounds
- Adequate size and shape of tubers, and
- Minimum or no injuries and defects, and internal infection (hollow heart)

The processing efficiency and the quality of the finished product benefit from high dry matter content. Potatoes with a dry matter content of 20 - 24% are preferred. The frying color is determined to a large extent by the reducing sugar contenting the potatoes. For the French fry industry, the standard of reducing sugar is less than 0.5% of the fresh weight. However, size, shape and shallow eyes are important with regard to the appearance of the product and the influence on wastage during peeling. Rough handling of the potatoes during harvesting and transportation causes internal bruising. The internal tissue cells crack and brown stains are formed in the tuber which is an impediment to processing. Internal defects such as hollow or black heart are also undesirable. One of the most important problems the industry often has to deal with is black spot. This blue to grayish-black discoloration in the tubers is more inclined to occur during transport and grading (NPCF, 2012).

Methods of French fry processing: The methods involved during processing are described and the whole process is shown in a flow chart. The processing of potato in industry is summarized using the literature sources that are provided by Magno, 2001, NPCF, 2012 and OFFP, 2012.

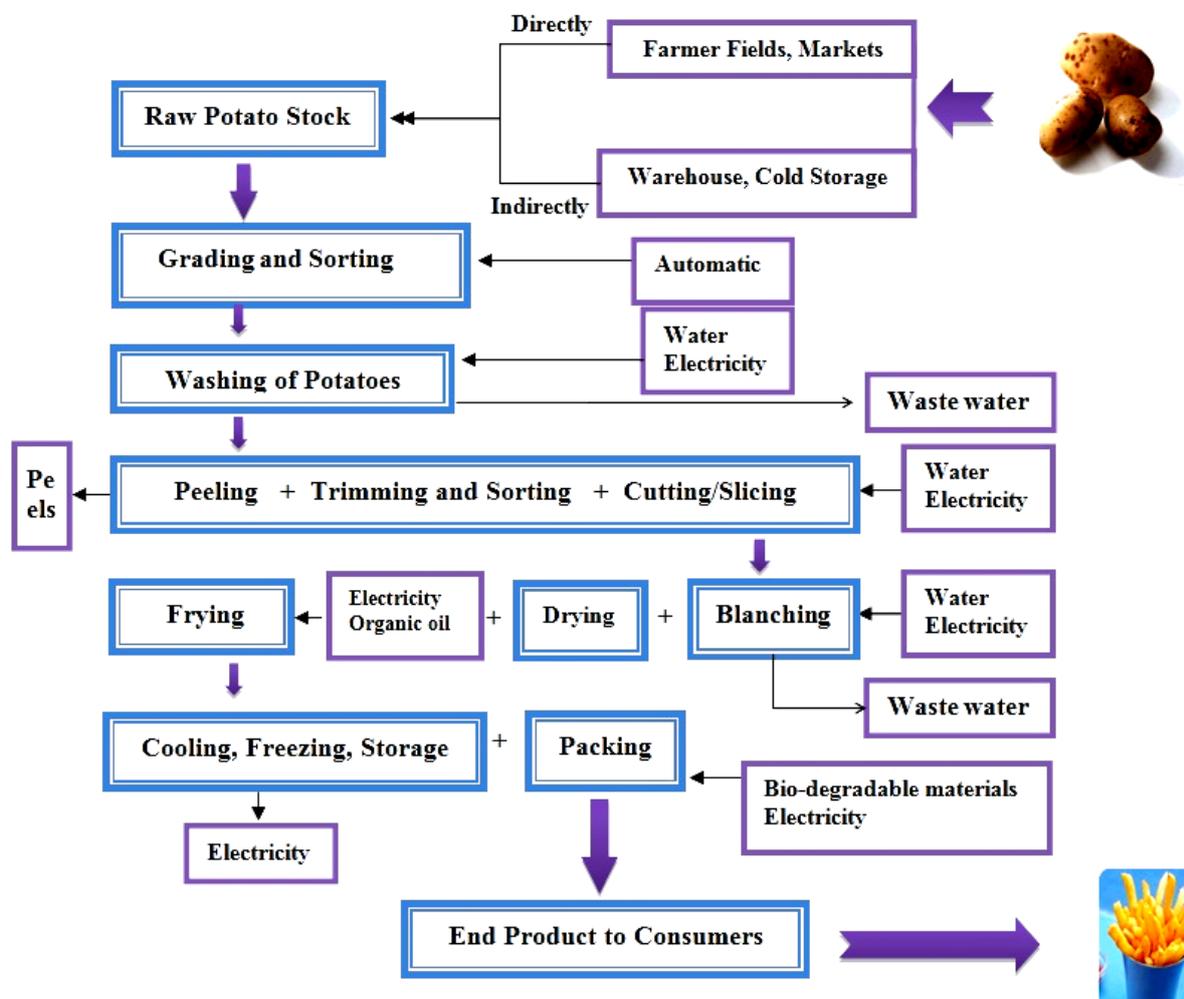


Figure 1. 'Flow diagram of French fry processing' with inputs and outputs resulting end product

Potatoes come either directly or indirectly from the organic farms or from rather large warehouses or from organic growers. The raw potato stock is the first input and inputs like electricity and petrol is used at various stages. The potatoes are checked for solids content to determine water vs. non-water, grades for the spud quality and sugar content. Initial visual inspection and grading is done. Afterwards, the excessive dirt's from potatoes are removed through washing by water, only water is used for washing as input and the output is waste water. Then potatoes are dropped into peeling machines. Three different peeling methods are practiced, i.e., a) abrasion peeling, b) steam peeling and c) lye peeling (Lawrence *et al.*, 2004). Steam method is one of the common techniques in the French fry industry where a lot of tubers are put into a rather large and pressurized tank. The potato skin is said to fly off. The potatoes are sprayed soon with high-power water jets to remove the remaining peels. After the peeling operation potato peel wastes as output at this stage. The potatoes might also require trimming in which each potato is picked up by an operator and examined for defects. During this process, the potatoes may also be sorted for desired size to ensure the quality of the final product. Then the potatoes undergo to the slicing machine which generally consisted of two sets of knives either rotating or fixed. One set of knives is used two slices the potato to the desired thickness and another set of knives cut the slices into strips. Then blanching and drying is done. Blanching is a processing step whereby potatoes are heated with steam or water for 2 to 3 min. At this stage, waste water from blanching as output. Blanching prolongs the storage life of frozen fries. It also ensures color uniformity

after frying (Bruno and champ, 2012; Moreira *et al.*, 1995). Drying the surface of the potato strips before frying reduces the fat uptake in French fries. . Drying causes a 'skin' to form on the surface of the potato strip. Thus reduces vapor transport through the surface layer (Lamberg *et al.*, 1990). Then frying is done with organic oils. French fries are frozen in two ways- cryogenically (rapid freezing) or mechanically (slow freezing) (Bruno and champ, 2012). Kock *et al.* (1995) compared the above freezing methods for quality of French fries. Packaging is usually accomplished by automatic machines. The packages are usually weighed individually and adjusted for exact weight. The French fries are bagged, and end product shipped out to their final destinations for the consumer.

Problems during processing of potato

Storage: For continuous supply of tubers to processing industries, adequate storage conditions are important. Maintenance of optimum conditions for temperature, ventilation and humidity are highly required. The major problems are sprout growth, reducing sugar accumulation and rotting.

Potato processing wastes (peels, waste water): Processing waste from potato plants is generated as a result of screening, grading, peeling, trimming, slicing, blanching and disintegration processes. It is one of the great problems facing the processing industry and it continually threatens the environment and expansion of this sector. It has become great concern to the potato industries in Europe. An integrated and environmentally friendly solution yet to be found and is under investigation. A single solution might not be possible. The major wastes of potato industry are potato starch waste, waste water and potato peel wastes (Arapoglou *et al.*, 2009). Potato peels are the main by-product in the processing of French fries. Peeling operation contributes the main organic load in the potato processing waste. Approximately, 2 MT/year of potato peels is produced from potato processing as by products. The waste is also mixed with other animal feed so that the dry matter content of the mixture remains adequate (Lawrence *et al.*, 2004).

Packaging material: The traditional types of packaging material are harmful to our environment. A lot of packaging materials are made from polyethylene and polypropylene. These are not always biodegradable and require a lot of time and special conditions to become degradable to nature (Richard, 2012).

Improvement strategies to overcome problems of potato processing

Storage conditions: Storage conditions are required to be maintained adequately. The storage conditions that should be maintained are shown below:

- ✓ losses caused by evaporation, respiration, sprouting, infection by micro-organisms (fungi and bacteria) and insects are kept at a minimum
- ✓ tubers are brought up to or kept on the right physiological stage
- ✓ the chemical composition of the tubers is maintained at or brought up to the desired quality (Potato Explorer, 2012).

Furthermore, during storage proper ventilation should be maintained because it prevents weight loss and consequently an increased susceptibility to black spot. The preferable relative humidity is $\geq 92\%$. Artificial air humidification is done during ventilation. If storage temperatures maintained between 3 - 5°C fungal or bacterial infections are less. For the French fries, store potatoes between 6 - 7°C temperatures (Keijbets, 2008).

Sprout inhibitors during storage: During storage, sprout formation is minimal at temperatures of 3-4°C. Although it is suggested that potatoes for the processing industry should be stored at higher temperatures to limit the formation of reducing sugars. Carvone, i.e., a component of caraway seed, might be used as a sprout inhibitor. It has a positive effect on controlling various storage diseases and it even kills slugs (Keijbets, 2008). This is almost the only solution to avoid sprout in organic agriculture. The alternatives for chemical sprout suppressants are essential oils and H₂O₂ for sprouting inhibition.

Potato peels management: Peels management is important during the processing of potato. Potato peels provide a good source of dietary fibre (40 gm dietary fibre/100 gm dry matter depending on variety and peeling method) especially when processed with lye peeling technique. Furthermore, potato peels were used to make acceptable muffin and also found to prolong muffin shelf-life. Filter cake and dry potato peels are used as a good carbohydrate source for cattle feeding. The carbohydrate rich potato waste might be converted to protein for additional nutrients for animal feeds. Furthermore, potato processing waste can be used as soil conditioner; the solid waste is applied to agricultural land as disposal medium. Potato waste has also tested as substrates for organic material production such as for the production of acetone, butanol and ethanol by fermentation technique (Lawrence *et al.*, 2004).

Potato processing wastes water management

Use of processing waste water: Processing wastes discharge large volumes of waste water. The waste water characterized by high chemical oxygen demand (COD), large amounts of suspended solids and various inorganic constituents including nitrogen and phosphorus. Application of waste water to agricultural land might be useful for the promotion of crop growth, conservation of water and nutrients, economic treatment of waste waters and decrease the pollution load on surface water supplies (Smith, 2012). However, Potato processing waste water was found to be effective in promoting corn growth compare to commercial ammonium nitrate fertilizer. This reduces the pollution levels in municipal waterways.

Treatment of waste water: For reduction of waste water, in-plant treatments such as minimization of solid discharge into the waste stream, improvement of peeling operation, reduction of floor spillage and reduction of water used in the process, could be adopted. Furthermore, various treatment subsystem or treatment units can be applied for treatment, i.e., a) in-plant (conservation, reuse, process control and revisions which will reduce waste flow and load), b) pretreatment (screening), c) primary treatment (sedimentation, flotation, earthen pond), d) equalization (buffering tank for constant flow and concentration), e) neutralization (conditioning tank for P^H and temperature correction), f) secondary treatment (natural system such as irrigation land treatment) (Lawrence *et al.*, 2004).

However, the utilization of potato processing wastes is still under research. They might be used as renewable resources and potential energy sources. Efficient technologies are required to achieve these goals. The utilization of processing wastes would have a positive impact on favoring the expansion of processing industry further.

Organic oil for frying: Organic sunflower oil produced from organic potato by one certified company in the Netherlands, namely, Zor (Zaalandse Olieraffinadrij), should be used for frying. It is suggested to use organic oil to fry the French fries to prevent health risk and pollution as well as maintenance of quality standards of organic French fry (Organic products of ZOR, 2012).

Biodegradable packaging material: The use of biodegradable packaging material is necessary from environmental context and health. This type of packaging materials could be produced from potatoes (Richard, 2012). Processing industry wastes can be converted into biodegradable packaging materials. This is advantageous from an environmental point of view and wastes utilization. These could reduce the use of conventional plastics. Thus, it might be the solution of packaging materials of French fries.

Intervention and adoption in organic potato processing

The supply of organic potato continuously for the processing industry, it requires efficient cultivars and necessary agronomic intervention to ensure the high quality tubers. Organic French fry processors require innovations related to processing techniques and equipment's, handling, storage and quality standards. The organic French fry producers could be benefited by the implementation and establishment of the following matters:

Govt. or NGO's could provide assistance (product purchase, installation of industry, processing equipment, organic oils, natural additives etc.) to organic potato processor. This will encourage the conventional French fry producers to adopt organic processing.

Institutional help to the farmers for building storage house could reduce a significant amount product loss, and it will ensure the supply of quality potato for the industrial processors.

The French fry producers need to be motivated for organic processing by profitability. Additionally, the products of conventional processing are not always safe for human health, society and the environment.

Technical assistance needs to be provided to the organic potato processors. New interventions, research findings etc. are needed to be disseminated to the processors through publication, orientation and trainings. Efficient extension channels for the processors need to develop. Thus, the organic processors will start adopting innovations shortly.

SWOT Analysis for organic potato processing

The evaluation of organic processing of potato is done through SWOT analysis. Thus, the internal factors (strength and weakness) and external (opportunities and threat) factors which are favorable and unfavorable for the process are taken into consideration to build up the SWOT matrix. Strength and opportunities are considered as factors which will be helpful for the processing industry. While the weakness and threats listed below are considered as factors which might be harmful to the processing industry, unless and until addressed critically or scientifically. However, SWOT analysis might bear some weakness as well, such as the resulting lists usually remain as without prioritization and might be uncritical (Wikipedia, 2012).

SWOT analysis of organic potato processing – Internal Factors

Strength	Weakness
Organic French fries are safe for human health as chemicals are not used.	Higher consumer price than conventional processed products because the production cost is higher.
Organic processing contributes to the ecological and social sustainability.	Availability of natural inputs for processing such as additives, organic oils etc.
Reuse of processing wastes and use bio-degradable packaging material.	Continuous supply of tubers is important but less organic potato growers in the Netherlands now
Organic French fries are valuable source of vitamins, minerals and fibers.	Lack of quality raw stock of potato for processing industry is a great weakness.

SWOT analysis of organic potato processing – External Factors

Opportunities	Threats
Netherlands produces large scale of French fries conventionally; converting those to organic will increase the supply.	Availability of cheap and diversified conventional products in the markets compared to organically processed products.
Organic products can generate higher income for the processor and the industries.	Consumer acceptance and habits to organic product is growing steadily, and we do not know whether consumer going to accept it or not eventually.
Potato wastes could be turned into energy such as biogas, reuse wastes as organic manures.	Potato processing wastes such as peels, waste water are real threats for the environment.
Organic products have a great export market to exploit for greater money flow.	Conventional packing materials such as non-degradable plastic are threat for the environment.

It is evident from SWOT analysis that organic potato processing has several strengths and opportunities which will favor adoption, and few weakness and threats which are constraints to the adoption of

organic processing. Sufficient motivation, efficient processing and adoption of improved techniques will help to attain a 10 % increase of organic processing by the year 2022.

IV. Conclusion

Industrial processing of potato in the Netherlands is increasing in every year but the processing of organic potato is increasing steadily. The processing of organic potato is a complex process and it requires various quality standards from raw material to end product. It requires several efficient processing steps, tools and associated techniques. Organic French fry production up to 10% might be feasible, if quality raw potatoes become available, improved techniques are applied for processing, and the processor able to establish an efficient processing chain for the whole process. However, adequate storage condition, integrated waste management and bio-degradable packaging are required to sustain the organic processing. The organic French fry producers need to be motivated continually and they should work together for profitability and expansion of the processing sector. It is also required to convince the processors, people behind the industry and marketing to develop a more efficient organic potato processing chain. This might ensure the availability of organic potatoes for the industries, and processed products will be easily available to the consumer. Thus, 10% increase of organic processing by 2022 where the total volume is 100.

V. Recommendations

The number of organic potato growers need to increase by motivation and profitability to ensure the supply of organic potato to the processing industry. The quality of potato raw stock is significant. To ensure the quality efficient storage apart from agronomic measure is needed. A technically sound potato processing chain need to develop for good end product from potato processing such as improved techniques and utilization and treatment of potato wastes through integrated management is required to ensure sustainability of the system.

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VII. Reference

- Arapoglou, D., Vlyssides, A., Varzakas, TH., Haidemenaki, K., Malli, V., Marchant, R. and Israilides, C. (2009). Alternate ways for potato industries waste utilization. Proceedings of the 11th international conference on environmental science and technology. Greece, 3-5 September, 2009.
- Bruno De Meulenaer and John Van Camp, (2012). Factors that affect fat uptake during French fries Production. Dept. Food Safety and Food Quality, Ghent University, Research group Food Chemistry and Human Nutrition.
- Doyle M. E., (2006). Natural and Organic Foods: Safety Considerations: A Brief Review of the Literature. Food Research Institute, University of Wisconsin–Madison. (http://fri.wisc.edu/docs/pdf/FRIBrief_NaturalOrgFoods.pdf).
- EC Regulation, (2007). Council Regulation (EC) No 834/2007 of 28 June 2007 'on organic production and labelling of organic products and repealing Regulation (EEC) No 2092/91'. *Official Journal of the European Union*, L 189/1.

- EOCC website, (2012). (<http://www.eocc.nu/home/index.php>).
- IFOAM website, (2012). (<http://www.ifoam.org/>).
- Keijbets, M. J. H. (2008). Potato Processing for the Consumers: Challenges. *Potato Research* 51: 271-281.
- Kock, S. D., Minnar, A., Berry, D., & Taylor, J. R. N. (1995). The effect of freezing rate on the quality of cellular and non-cellular par-cooked starchy convenience foods. *Lebensmittelwissenschaft und Technologie* 28: 87-95.
- Lamberg, I., Hallstrom, B., & Olsson, H. (1990). Fat uptake in a potato drying/frying process. *Lebensmittelwissenschaft und Technologie* 23: 295-300.
- Lawrence, Wang, Yung-Tse Hung, Howard, H. (2004). Potato waste water treatment. *Handbook of Industrial and Hazardous wastewater treatment*. 2nd edition. 934-935.
- Magno M. (2001). POTATO: Post-harvest Operations. Edited by AGSI/FAO: Danilo 10. Mejia. Instituto de Desarrollo Agroindustrial (INDDA). (<http://www.lamolina.edu.pe>).
- Moreira, R. G., Palau, J. E., & Sun, X. (1995). Deep-fat frying of tortilla chips – an engineering approach. *Food Technology* 49: 146-150.
- NPCF-Netherlands Potato Consultative Foundation, (2012). On the road to potato processing. (http://www.potato.nl/files/ontheroad_uk.pdf).
- OFFP-The Official French Fry Pages, (2012). (<http://officialfrenchfries.com/docs/production.html>)
- Potato Explorer, Netherlands, (2012). (<http://www.aardappelpagina.nl/explorer/>).
- Potatopro, (2012a). (<http://www.potatopro.com/Newsletters/20111103.htm>).
- Organic products of ZOR, (2012). (<http://www.dezor.com/organic-products.html>).
- Potatopro, (2012b). (<http://www.potatopro.com/Lists/Companies/French%20Fries%20and%20Potato%20Specialties.aspx>).
- Richard, D., (2012). Which packaging Materials are biodegradable? (www.ehow.com/about_5387922_packaging-material-biodegradable.html).
- SKAL Biocontrol Publication, (2009). (<http://www.skal.nl/Portals/0/Nederlands/PDF/OrgProdNL.pdf>).
- SKAL website, (2012). (<http://www.skal.nl/English/tabid/103/language/nl-NL/Default.aspx>).
- Smith, J. H., (2012). Sprinkler irrigation of potato processing waste water for treatment and disposal on land. Soil Scientist, Snake River Conservation Research Center, Kimberly, Idaho. Contribution from the Western Region, Agricultural Research Service, USDA; University of Idaho College of Agriculture Research and Extension Center, Kimberly, cooperating. (<http://eprints.nwisrl.ars.usda.gov/755/1/331.pdf>)
- Sylvander, B. and A. L. Le Floc'h-Wadel, (2000). Consumer demand and production of organics in the EU. *AgBioForum* 3(2&3):97-106. (<http://www.agbioforum.org>).
- Thorsten Haase, (2007a). Organic potatoes for processing: Agronomical measures and their impact upon yield and quality. Dissertation, Universität Kassel, 144, Seiten.
- Thorsten Haase (2007b). The effect of different N and K sources on tuber nutrient uptake, total and graded yield of potatoes (*Solanum tuberosum* L.) for processing. *European Journal of Agronomy* 26, 187-19.
- Tresnik, S. (2007). Revised by: Stephanie Williamson and Sofia Parente. State of the art of Integrated Crop Management & organic systems in Europe, with particular reference to pest management of the art of Integrated Crop Management & organic systems in Europe, with particular reference to pest management. Pesticide Action Network (PAN) Europe. London, United Kingdom. (http://www.pan-europe.info/Resources/Reports/Potato_production_review.pdf)
- Wikipedia, (2012). (http://en.wikipedia.org/wiki/SWOT_analysis).

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