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## CONFORMITY OF FOODSTUFFS MACHINERY TO EU REGULATIONS

**Abstract:** *This paper presents some aspects of foodstuffs machinery. Machinery Directive 2006/42/EC, Annex I define tow parts as: part 1. General essential health and safety requirement applicable to all machinery and part 2.1. The supplementary essential health and safety requirement for foodstuffs machinery. Also, harmonised standards gives more detailes about design, concept, hygiene requirements, verification. As the example, "SOLARIS1" Dryer for fruits, vegetable, medical herbs, spices and mushrooms is presented.*

**Keywords:** Food Quality, Foodstuffs Machinery, Conformity to EU Regulations

### 1. INTRODUCTION

European Requirement for food safety, representative through Directives, Regulations and Standards pose strict requirements in regards of quality, hygiene requirements, content of different substances, control, verification, etc. of food products. Important part in regard to safety is foodstaf processing. Machinery Directive 2006/42/EC, Annex I define, part 1. define General essential health and safety requirement applicable to all machinery and part 2.1. The supplementary essential health and safety requirement for foodstuffs machinery.

In this paper we present saome part of aproach to general food safety, some requirement for foodstuffs machinery, and as the example, "SOLARIS1" Dryer for fruits, vegetable, medical herbs, spices and mushrooms is presented.

### 2. FOODSTUFFS MACHINERY REQUIREMENTS

Foodstuffs have to fulfill two groups of regulations:

- Regulations for foods
- Technical regulations for product/machine which are intended for process of production foods

International and European regulation (Regulation (EC) No 178/2002, Food law etc.[1]) and standards (HACCP, ISO 22000 for food safety management system standards) for food safety is intended to provide security by ensuring that there are no weak links in the food supply chain. By ensuring integrity of food supply chain it helps to minimize the failures in food supply which can be dangerous and cost plenty. Food and feed imported to the EU shall comply with the relevant requirements of food law or conditions recognised by the Community to be at least equivalent with requirements contained therein. The key objectives of this regulation are:

- To produce safty food product every time
- To demonstrate that the process is safty
- In the unfortunate event of presecution it can provide evidence of diligence and

- To provide and promote confidence in the food product.

Technical regulations for machine which are intended for process of production foods also have to fulfill requirement of EU Technical legalization (EU Directives). Machinery Directive 2006/42/EC [2], is one of them. In it and particularly Annex I part 1.4 (Supplementary essential health and safety requirements (MD 2006/42/EC , Annex I, 2.) „Foodstuffs machinery” (MD 2006/42/EC, Annex I, 2.1)) define supplementary requirements for the machinery design for food processing. Some of the requirements are:

- ”(a) materials in contact with, or intended to come into contact with, foodstuffs ... must satisfy the condition ... clean and safe for each use ... disposable.
- (b) all surfaces in contact with foodstuffs ... must:
  - be smooth ...
  - be designed ... to reduce the projections,
  - be easily cleaned and disinfected,
  - ...
- (c) it must be possible for liquids, ... deriving from foodstuffs, ... cleaning ...
- (d) machinery must be designed and constructed in such a way as to prevent any substances or living creatures, in particular insects, from entering, or any organic matter from accumulating in, areas that cannot be cleaned,
- (e) machinery must be designed and constructed in such a way that no ancillary substances hazardous to health, including lubricants used, can come into contact with foodstuffs, ...

#### 2.1.2. Instructions

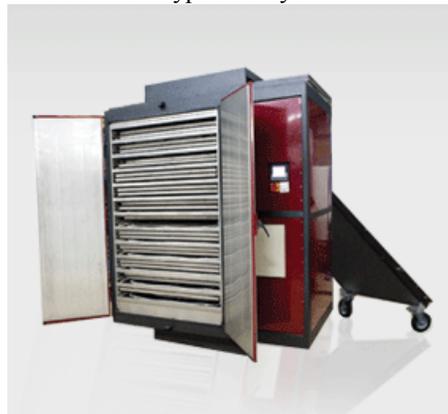
The instruction for foodstuffs ... must indicate recommended products and methods for cleaning, disinfection ...”

In harmonisation with Machinery Directive 2006/42/EC, the standard *EN 1672-2:2005+A1 Food processing*

*machinery – Basic concepts – Part 2: Hygiene requirements* was published covering the Directive requirements and giving the guide to risk assessments and verification. [8]

### 3. SOLARIS 1 DRYER

An innovative technology, fully automated and capable of performing all drying processes according to programmed parameters, giving possibilities of on-site control or over internet and GSM modul, allowing you to control the drying processes from any place in the world. This means that, with this innovative technology, the buyer of dried products gets a guaranteed quality and an insight into a full drying process, as well as the possibility to review all drying processes during the last couple of years, unlike other standard types of dryers.



**Figure 1. Solar and Electric Energy Dryers "ntimTEHNOLOGI"**

This advanced dryer, powered by solar energy, is a product unique in the world. It is designed for drying fruits, vegetables, medicinal herbs, spices and mushrooms. The "SOLARIS 1" dryer is patented in Serbia, and is protected as well by international patents P-2007/0441 and WO/2009/061229 [9,10]. Nine new designs and completely new technical solutions have been implemented in the

”SOLARIS 1” dryer, figure 1.

The dryer is mobile, with installed wheels, and can be handled according to the client’s needs. The process in the dryer is controlled by a microprocessor including 50 different programs and allows an automatic transfer from solar to electric energy and vice versa. Microprocessor chooses the source of energy itself, which means that it uses daylight (sun) as source of energy until it is possible, otherwise it uses electric energy.

The control system gives the possibility of setting parameters for 50 different drying modes. The parts of the plant which contain material to be dried, as well as the components for air distribution, are made entirely of stainless steel conforming to HACCP and ISO food industry production standards (HACCP, ISO 22000; Regulation (EC) No 178/2002, Food law etc.).

This SMART DRYER uses daylight, absorbed by a solar panel, as primary source of energy, and electric energy is used as secondary source of energy.

#### 4. ANALYSIS AND TESTS

In this part we present some opinion of ”SOLARIS 1” dryer food processing [12], and parts of experimental results which show effect of drying process by quality of dried fruits, figure 2 [11].

The basic risk analysis, following harmonised Standards EN ISO 14121, EN ISO 12100, is given in Tble 4.1.

According to the Standard EN 1672-2:2005+A1, the Supplementary essential health and safety requirements (MD 2006/42/EC, Annex I, 2.) „Foodstuffs machinery” (MD 2006/42/EC, Annex I, 2.1), are listed in Tble 4.2.

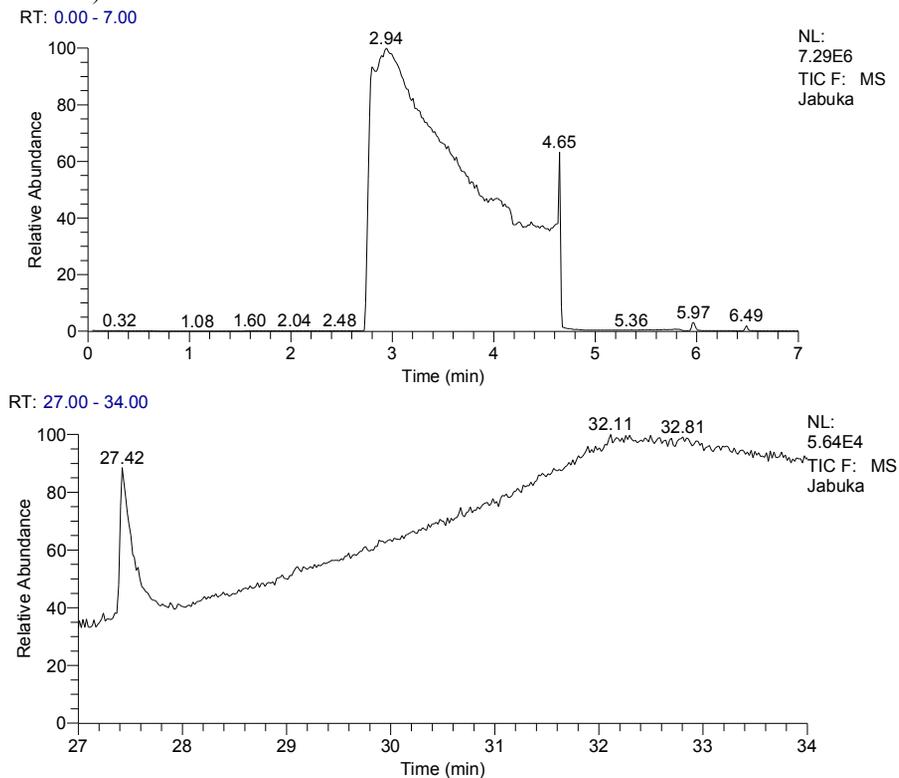


Figure 2. Testing result of dried apple contents

No.	Type or group	Hazards	Analysis/ Standard(s)	Verification	Note
1	<b>Mechanical hazards</b>	Kinetic energy, ..., Stability, Sharp edges			
2	<b>Electrical hazards</b>	Arc, Live parts, Short-circuit, ...			
3	<b>Thermal hazards</b>	Objective or materials with a high or low temperature, ...	√	Instruction manual	
8	<b>Ergonomic hazards</b>	Access, ...			
9	<b>Hazards associated with environment in which the machine is used</b>	Dust and fog, EMC, Lithing, Pollution, Temperature, Water, ...			
10	<b>Combination of hazards</b>				

*Table 4.1 Risk assessment,*

Reference subclauses	Requirement	Verification	Status
5.1	Hygiene risk assessment	Documentary evidence	
5.2.1	Durable	Material specification (food, process and cleaning) and/or practical or functional test	
5.2.1 5.3.1.1 : 5.3.2	Cleanable and/or capable of being disinfected	Visual inspection (of technical drawing and/or machinery) and/or practical test, micro biological test or functional test	√
5.2.2 5.3.3	Corrosion resistant	Material specification (food, process and cleaning) and/or practical or functional test	
5.2.2	Non toxic	Material specification or practical test for materials intended to come into contact with food	
5.3.1.1	Surface design	Visual inspection (of technical drawing and/or machinery)	
5.3.1.1 5.3.2	Surface finish	Measuring e.g. according to EN ISO 4288	
5.3.1.2.1	Permanent joints	Visual inspection	
5.3.1.2.2	Dismautable joints	Visual inspection	
5.3.1.6	Dead spaces	Visual inspection	
5.3.3	Non-food area	Compliance with Reference subclauses	

*Table 4.2 Risk assessment, hazards grouped, measure, verification*

## 5. CONCLUSION

European Directives defines the requirement for the machinery intended to use in food processing. Machinery Directive 2006/42/EC, Annex I define General essential health and safety requirement applicable to all machinery (part 1), and the supplementary essential health and safety requirement for foodstuffs

machinery (part 2.1).

This requirements has to be fullfild before the machin is plased on European market.

In this paper, the rquirement for the machinery intended to use in food procesing are presented. The "SOLARIS1" Dryer for fruits, vegetable, medical herbs, spices and mushrooms processing is presented.

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