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PRODUCTION OF DRY FOOD FOR ANIMALS IN A ROMANIAN COMPANY IN FOOD SAFETY CONDITIONS

PRODUCEREA DE HRANA USCATA PENTRU ANIMALE INTR-O COMPANIE ROMANEASCA IN CONDITII DE SIGURANTA ALIMENTARA

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ABSTRACT

To day the animal feed industry, including the ingredient suppliers, is a part of the food chain and responsible for the safety of its products. Feed manufacturers must prove the products are safe for animals and for consumers of animal products. Paper is a study to draw up a HACCP plan in a company producing dry food for pet, fish and game. After the identification of the processes and activities to manufacture the products, was drawn up a *Technological flowchart*. Analyzing for risks each stage of the chart, were identified the stages which are in the class of high-risk. Using the *Decisional Tree* method, were identified the critical control points of technological flow. Finally was drawn up a HACCP plan to control the technological parameters of the critical points in order to prevent, eliminate or reduce the risk to an acceptable level.

REZUMAT

In zilele noastre, productia de nutreturi, inclusiv furnizorii de ingrediente, a devenit o parte a lantului alimentar si este responsabila de siguranta produselor sale. Producatorii de nutreturi trebuie sa demonstreze ca produsele furnizate sunt sigure pentru hrana animalelor si pentru consumatorii produselor animaliere. Lucrarea este un studiu privind intocmirea unui plan HACCP intr-o companie producatoare de hrana uscata pentru

animale de companie, pesti si vanat. In urma identificarii proceselor si activitatilor desfasurate pentru realizarea produselor s-a intocmit *Diagrama flux tehnologic.* Analizand riscurile pentru fiecare etapa din diagrama s-au identificat etapele situate in clasa de risc ridicat. Prin metoda *Arborelui decizional* s-au identificat punctele critice de control ale fluxului tehnologic. In final s-a intocmit planul HACCP pentru a tine sub control parametrii tehnologici ai punctelor critice cu scopul de a preveni, elimina sau reduce riscul la un nivel acceptabil.

KEYWORDS: food, safe, flowchart, stage, hazard, analyze, plan

CUVINTE CHEIE: hrana, siguranta, diagrama flux, etapa, pericol, analiza, plan

REZUMAT DETAILAT

Producatorii de nutreturi din intreaga lume se confrunta, in prezent, cu probleme serioase din cauza impunerii unor noi responsabilitati in asigurarea securitatii alimentare. Ei trebuie sa demonstreze ca produsele pe care le furnizeaza sunt sigure atat pentru hrana animalelor cat si pentru consumatorii produselor animaliere. In acest context, s-a realizat, intr-o societate de fabricare a hranei uscate pentru animale de companie, pesti si vanat, un studiu privind identificarea si evaluarea pericolelor si intocmirea unui plan HACCP prin care societatea sa tina sub control pericolele si sa furnizeze produse sigure. Primul pas a fost elaborarea *Diagramei fluxului tehnologic* utilizat pentru obtinerea produselor, prezentata in Anexa 1. Pentru intocmirea diagramei s-au identificat procesele si activitatile necesare pentru realizarea produselor. In continuare, pentru fiecare etapa din diagrama s-a efectuat analiza pericolelor: biologc (B), chimc (C) si fizic (F). Rezultatele analizei, prezentate in tabelul 1, au reliefat ca in clasa de risc ridicat (3) se afla: receptia materiilor prime, procesele de macinare, omogenizarea, preconditionarea si extrudarea. Utilizand metoda *Arborelui decizional*, vezi tabelul 2, s-au identificat doua puncte critice de control (CCP): macinarea si extrudarea care au fost introduse in diagrama flux. Pentru a tine sub control parametrii tehnologici ai punctelor critice, cu scopul de a preveni, elimina sau reduce riscurile la un nivel acceptabil, s-a intocmit planul HACCP prezentat in tabelul 3. Pentru intocmirea planului au fost stabilite activitatile si masurile de control

necesare, limitele critice ale parametrilor tehnologici, procedurile de monitorizare, corectiile si actiunile corective care trebuie intreprinse daca limitele critice sunt depasite, modul de inregistrare a monitorizarii si functiile responsabile.

INTRODUCTION

The European Community promoted since 1983 the introduction of HACCP principles in its legislation. European Union Council directives regarding food hygiene and European Union regulations regarding food safety cover all stages of food road from "farm to fork". European Union directive 93/94/CEE on food hygiene stipulates the obligation to adopt the system of food safety guaranteeing quality hygienic-health foods based on HACCP principles. The seven HACCP principles have been formulated in 1993 by the Codex Alimentarius Commission: (1) **Conduct a hazards analysis** to identify the realistic hazards, which can be biological, chemical and physical, (2) **Determine the critical control points** (CCP) on the technological flow, which kept under control, prevent, eliminate or reduce the risk to an acceptable level, (3) **Establish a system of control** at each CCP, which involves identifying suitable criteria and setting critical limits for those criteria which must not be exceeded, in order to ensure that the critical control point is under control, (4) **Develop monitoring procedure** of each CCP, to ensure that the CCP is functioning effectively (5) **Establish the corrective actions** to be taken when monitoring indicates that a certain CCP is no longer under control, (6) **Determine procedures** for verifying that the HACCP system is working properly overall (7) **Arrange documentation** on all necessary procedures and keep records appropriate to the above principles and their application. [2]

HACCP (Hazard Analysis of Critical Control Points) system is a preventive system of self control, in which, product safety is achieved through the analysis and control of the **biological, chemical and physical hazards**, from the purchasing and handling of the raw materials, up to the manufacture, distribution and consumption of the finished product. [1]

Requirements for management systems regarding food safety have been specified in several national standards, for example DS 3027 E: 2002 promoted by Denmark, used also in Romania until 2005, when it was launched the international standard ISO 22000:2005 - Food Safety Management Systems. Requirements for any organization in the food chain. The standard establishes the requirements for a system of food safety management, through which an organization of the food chain may prove its capacity to control food safety hazards in order to ensure the product is safe upon consumption.

All the requirements of the International Standard are general and are proposed for implementation for all food industry organizations regardless of their size and complexity.

MATERIALS AND METHODS

Paper is a study to draw up a HACCP plan into a company producing dry food for pet, fish and game. The inputs of the study are the processes and the activities required to manufacture the products, the practices for hygiene, monitoring, measurement, controls and analyses which the organization carries out to ensure the quality and safety of the manufactured products. First step was to draw up the *Technological flowchart*, presented in Annex 1, which shows the processes and activities performed for products manufacture. For each stage of the flowchart was performed a hazard analysis to evaluate the biological (B), chemical (C) and physical (P) risks. Table 1 shows the results. Although the probability is low, there are hazards with high-risk class (3) in the following stages: raw materials reception and grinding (biological and physical hazard), homogenization, preconditioning and extrusion (biological hazard).

Applying the *Decisional Tree* method [1] for each stage with important hazard there were identified the critical control points (CCP) by which the mentioned hazards can be controlled. As it can be seen from table 2, and from the *Technological flowchart,* have been identified two critical control points: grinding and extrusion.

To control the technological parameters of identified critical control points was drawn up a HACCP plan, presented in the table 3. To draw up the plan were established the necessary control actions and measures, the critical limits of the technological

parameters, the monitoring procedures, the corrections and corrective actions which must be taken if the critical limits are exceeded, the monitoring recording and the responsible functions.

RESULTS AND DISCUSSION

The study regarding to draw up a HACCP plan included the following steps:

a. Identification of the processes and activities of the organization performing a diagnostic audit followed by drawing up the *Technological flowchart*, presented in Annex 1

b. Hazards analysis and risk assessment. The results are shown in Table 1. There were identified important hazards with high-risk class (3) in the following stages: raw materials reception and grinding (biological and physical hazard), homogenization, preconditioning and extrusion (biological hazard)

c. Identification of the critical control points. The results are shown in Table 2. There have been identified two critical control points: grinding and extrusion

d. Establishment of HACCP plan to keep under control the identified critical control points. The plan presented in the Table 3 contains the necessary control measures, the critical limits of the technological parameters, the monitoring procedures, the corrections and corrective actions which must be taken if the critical limits are exceeded, the monitoring recording and the responsible functions.

The company in case may utilize these results to step forward, to design a food safety management system according to ISO 22000:2005.

REFERENCES

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HAZARD ANALYSIS Table 1

ANALIZA PERICOLELOR

Stage	Hazard		Gravity	Probabi-lity	Risk class	Preventive actions / Control measures
Raw materials reception	B	Bacteria, moulds, viruses	High	Low	3	Raw material reception according to the supply procedure Laboratory analysis Supplier evaluation
	C	Preservatives	Low	Low	1	
	P	Sand, gravel, metals, biological waste	Mediu m	Medium	3	
Raw materials storage	B	Contamination from pests and birds	Low	Low	1	Cleaning, disinfecting rodent control (with substances for food industry, mechanical and ultrasonic traps)
	C	Residues for detergents, disinfectants and raticides	Low	Low	1	
	P	Dust	Low	Medium	2	
Weighing dosing	B	Contamination from personal	Low	Low	1	FIFO Training and personal hygiene
	C					Food Bags
	P					
Grinding	B	Bacteria, moulds, viruses	High	Low	3	
	C	-				
	P	Metal scraps	High	Low	3	Sieves, magnets
Homogeni-zation	B	Bacteria, moulds, viruses	High	Low	3	
	C					
	P					
Preconditio-ning	B	Bacteria, moulds, viruses	High	Low	3	Pretreatment with saturated steam
	C					
	P					
Extrusion	B	Bacteria, moulds, viruses	High	Low	3	Temperature monitoring
	C					
	P					
Packing	B	Contamination from personal	Low	Low	1	Training and personal hygiene
	C					
	P					
Storage	B					Cleaning, disinfecting rodent control, (with substances for food industry, mechanical and ultrasonic traps), FIFO
	C					
	P					
Transport and delivery	B					Cleaning, disinfecting
	C					
	P					

IDENTIFICATION OF THE CRITICAL CONTROL POINTS Table 2

IDENTIFICAREA PUNCTELOR CRITICE DE CONTROL

Stage	Important hazard		Class of risk	Questions				CCP/ CP
				Q1	Q2	Q3	Q4	
Reception	B	Bacteria, moulds, viruses	3	yes	no	yes	yes	CP
	P	Sand, gravel, metals, biological waste	3	yes	no	yes	yes	CP
Grinding	B	Bacteria, moulds, viruses	3	no	no	-	-	CP
	P	Metal scraps	3	yes	yes	-	-	**CCP 1**
Homogenization	B	Bacteria, moulds, viruses	3	no	no	-	-	CP
Preconditioning	B	Bacteria, moulds, viruses	3	no	no			CP
Extrusion	B	Bacteria, moulds, viruses	3	yes	yes	-	-	**CCP 2**

HACCP PLAN Table 3

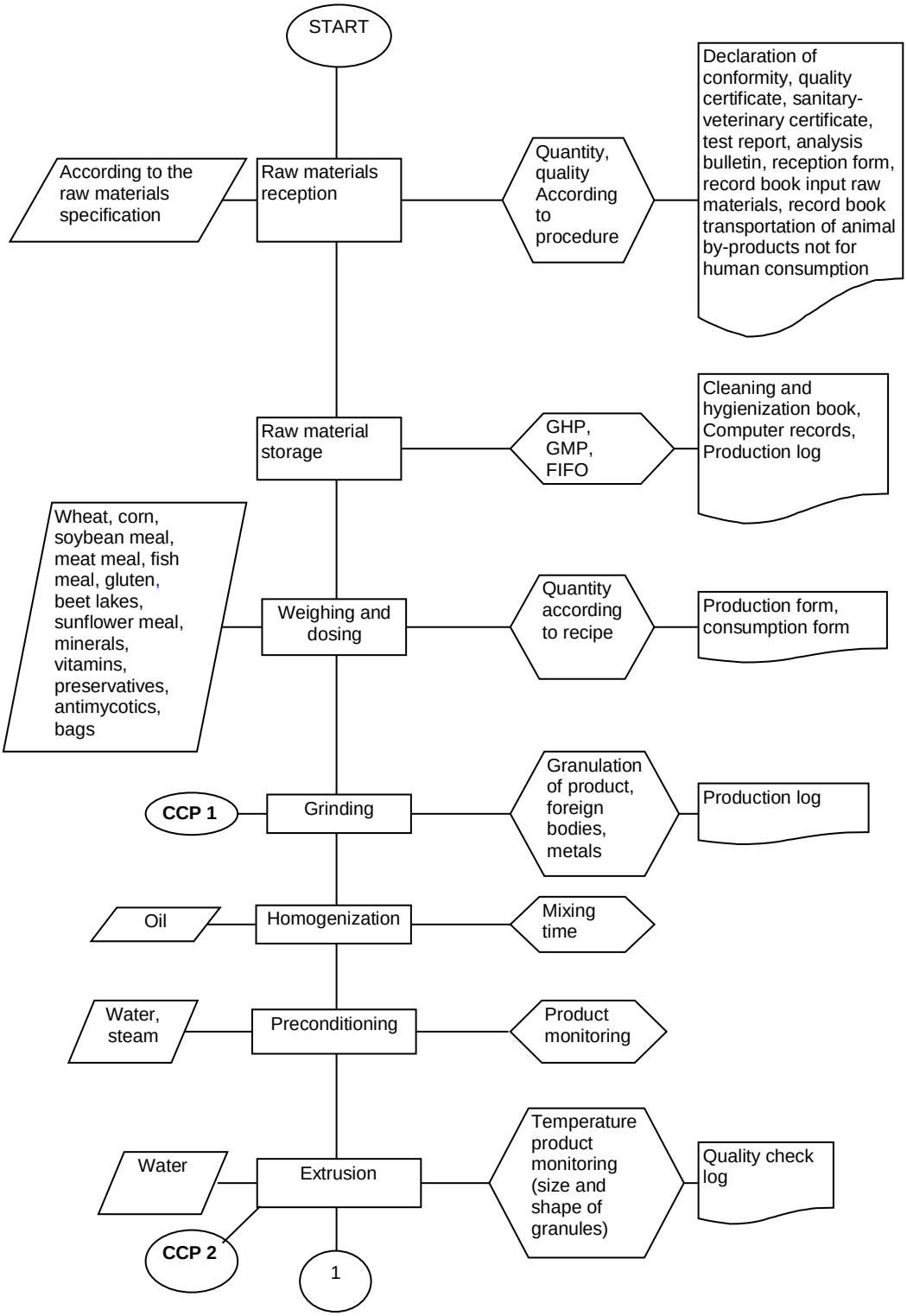
PLANUL HACCP

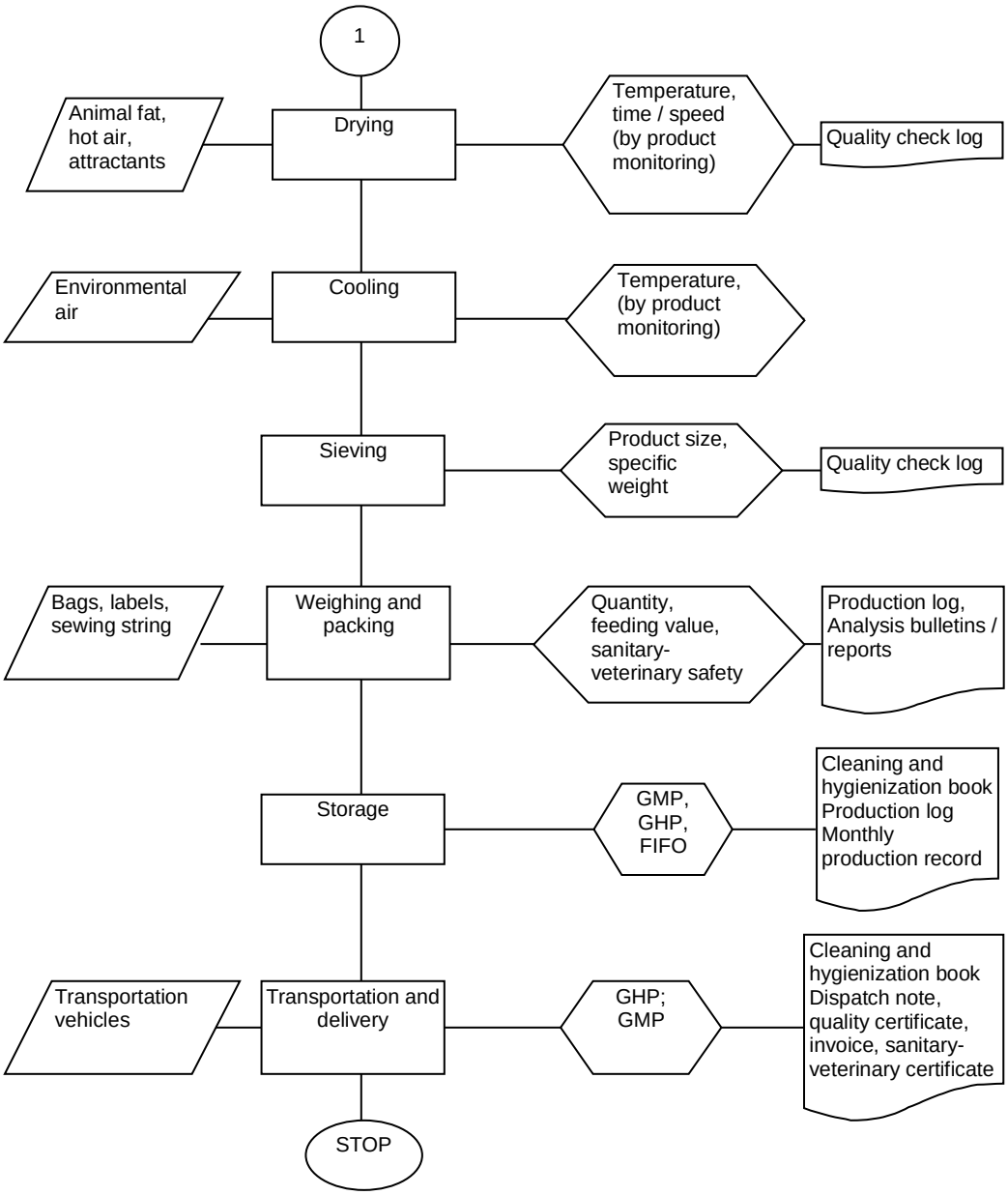
Stage	Important hazard	Control measure	CCP	Critical limits	Process / product monitoring			Correction/ Corrective action	Records	CA Responsible
					Method	Frequency	Responsible			
Grinding	P Metal scraps	Checking magnets and sieve	CCP 1	No metal scraps Foreign bodies under 1mm diameter	Visual observation and listening	Daily	Operator	New grinding/ Cleaning or replacing magnets, replacement sieve	Production log	Operator
Extrusion	B Bacteria, moulds, viruses	Temperature monitoring	CCP 2	L_{inf} 100°C	Measuring with digital thermometer	Permanent	Quality check responsible	Reprocessing/ regulation of air flow, reconfiguration of extruder	Production log	Operator

Annex no. 1

TECHNOLOGICAL FLOW CHART

Product: dry food for pet, fish and game




1
Animal fat, hot air, attractants
Drying
Temperature, time / speed (by product monitoring)
Quality check log
Environmental air
Cooling
Temperature, (by product monitoring)
Sieving
Product size, specific weight
Quality check log
Bags, labels, sewing string
Weighing and packing
Quantity, feeding value, sanitary-veterinary safety
Production log, Analysis bulletins / reports
Storage
GMP, GHP, FIFO
Cleaning and hygienization book Production log Monthly production record
Transportation vehicles
Transportation and delivery
GHP; GMP
Cleaning and hygienization book Dispatch note, quality certificate, invoice, sanitary-veterinary certificate
STOP