



Istituto di Scienze dell'Alimentazione

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***Monitoraggio di Contaminanti Ambientali nella Catena  
Alimentare ed Effetti sulla Salute  
(CoAS – PIAS)***

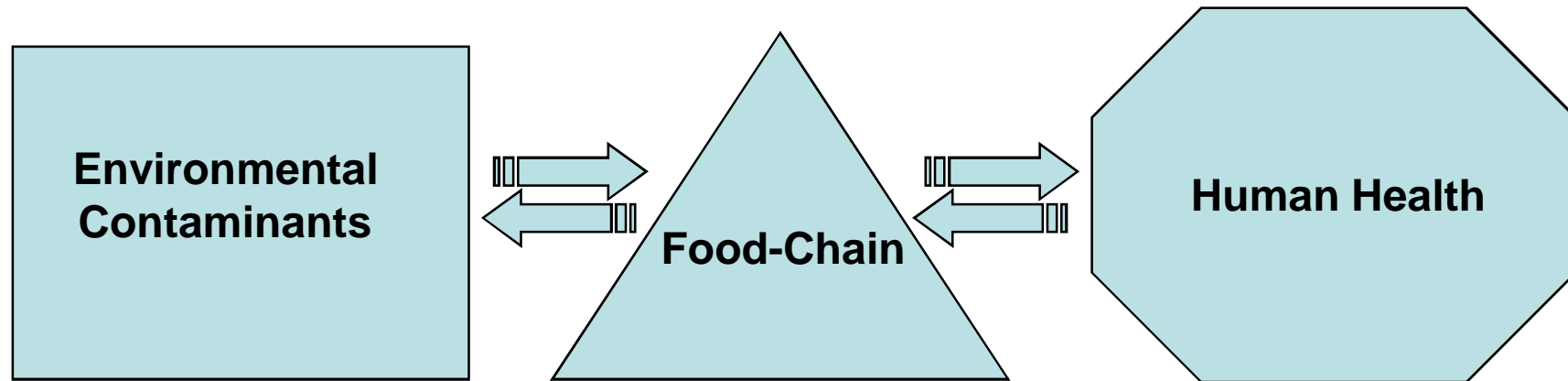
***Gian Luigi Russo***

***Aula Marconi – C. N. R. - ROMA  
18 giugno 2009***



# Obiettivi del GdL CoAS-PIAS

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*“... For consumers, safety is the most important ingredient of their food...”*

(Androulla Vassiliou, European Commissioner for Health)



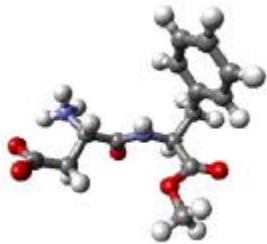
# Type of Food Contamination

**Environmental contaminants** are substances that are present in the environment in which **the food is grown, harvested, transported, stored, packaged, processed, and consumed**. The physical contact of the food with its environment results in its contamination.



## Ø Physical

Extraneous bodies in food  
(plastics, wood, glass etc)



## Ø Chemical

Heavy metals  
Pesticides  
Dioxins, PCB

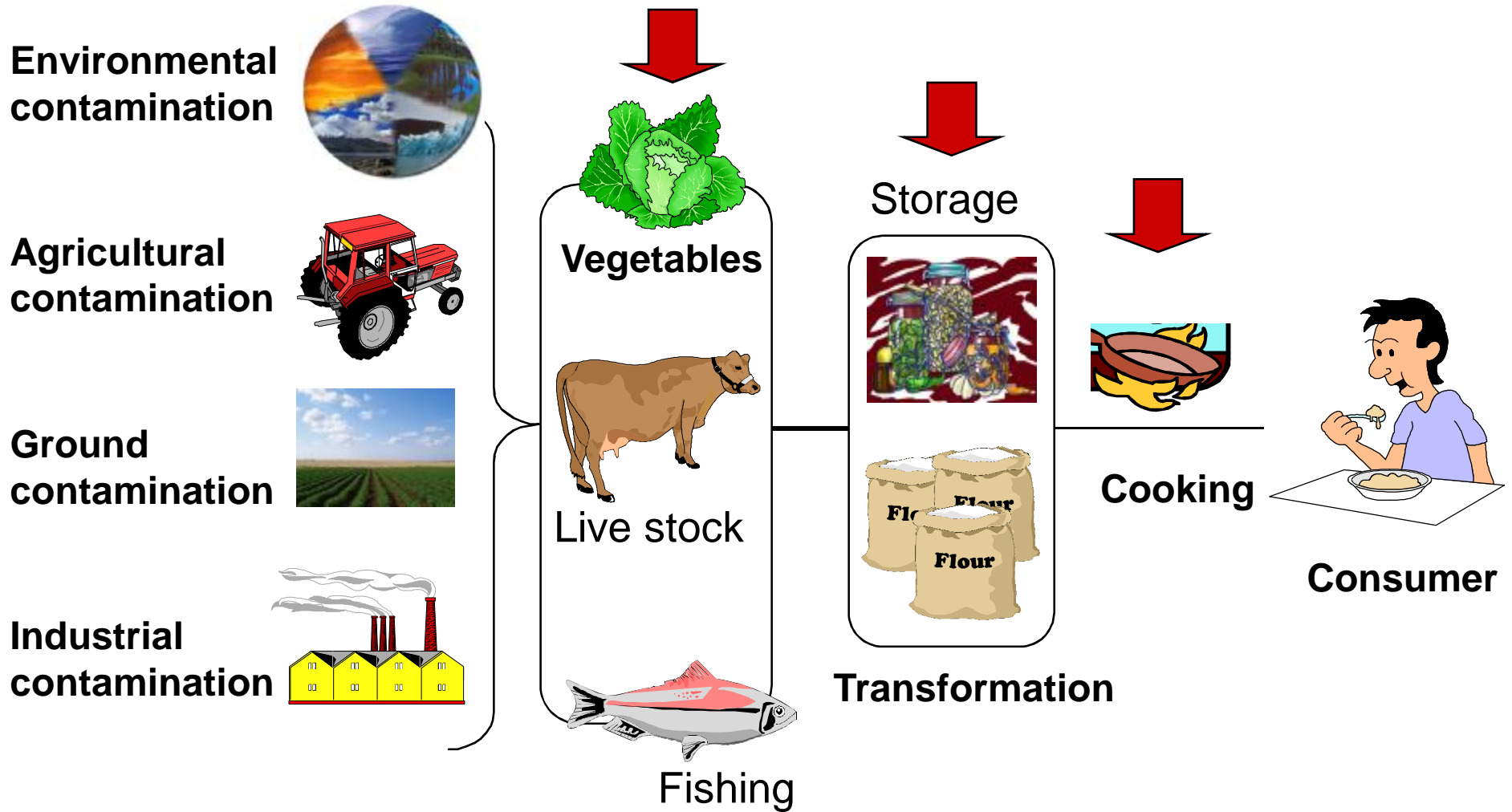


## Ø Microbiological

Bacteria  
Virus  
Parasites



# Levels of Food Contamination



# Food Contamination and Human Health

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## Ø Acute exposure (early effects)

### ***Melamine-contaminated powdered infant formula***

Melamine form stones and gravel in the urinary system. Stones can cause obstructive uropathy, and marked obstruction may cause acute renal failure

## Ø Chronic exposure (long term)

### ***Heavy metals (As,Hg,Cd).***

Cancer, neurological disease, physical illness

## Ø Fetal and infants exposure

### ***POPs (***persistent*** organic pollutants).***

Developmental effects: damages to the nervous system, reproductive disorders, immunopathological states.



# Chemical Contaminations

Tab.1- Sostanze che potrebbero contaminare gli elementi e quelle che sono effettivamente riscontrate in essi:

Categoria	Numero teorico di contaminanti	Numero di sostanze riscontrate negli alimenti
Farmaci uso veterinario	<100	<100
Sostanze chimiche industriali	>10.000	<100
Nitrosamine	<100	<100
Sostanze tossiche origine naturale	>1.000	<50
Sostanze chimiche da imballaggi	>1.000	<50
Pesticidi	>100	>100

Fonte: Watson, 1993



# Food Quality and Safety

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**WHO World Health Organization**



**Food & Drug Administration**



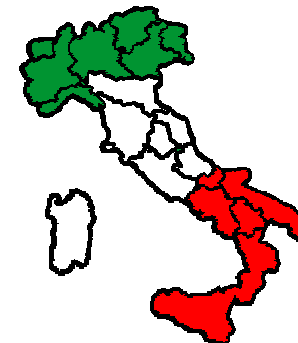
**EFSA European Food Safety Authority**



**Ministero della Salute**

**ISS Istituto Superiore Sanità**

**ARPA, ASL, NAS and others**



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# State of Art of Food Contamination in Europe and Italy

(The Rapid Alert System for Food and Feed [RASFF] 2008)



[www.ceirsa.org](http://www.ceirsa.org)

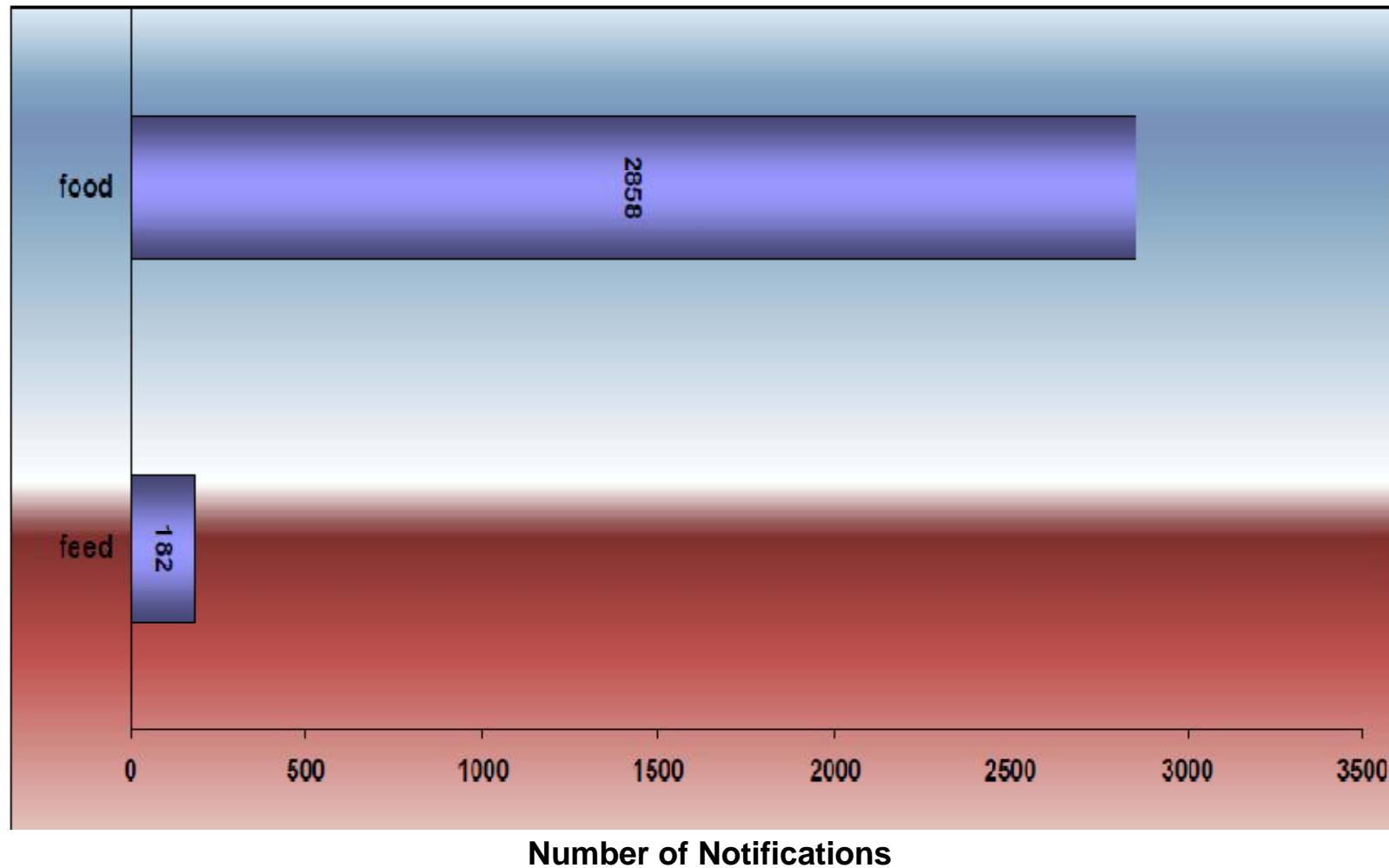


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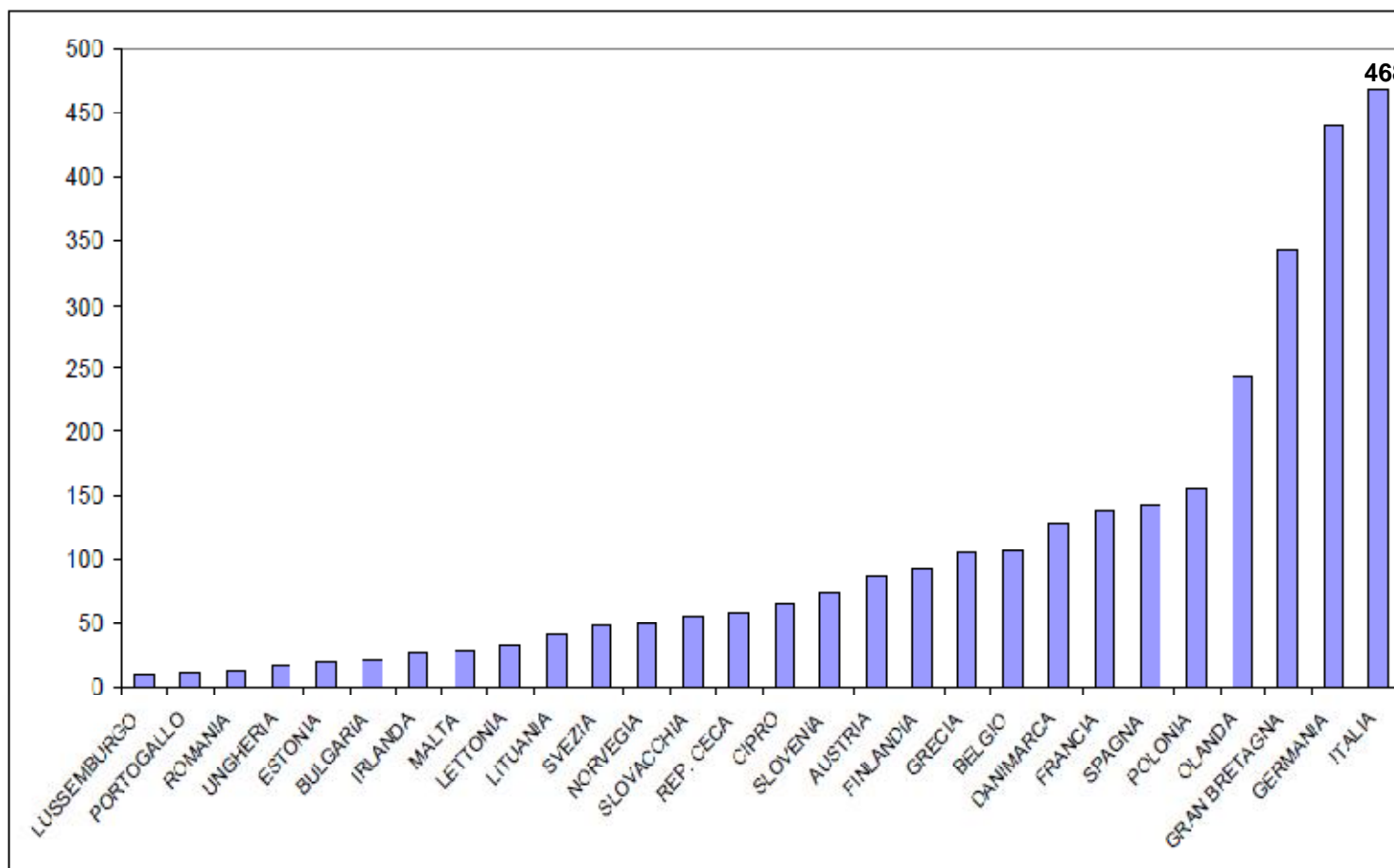




# Community Alert Notification on Food and Feed Contaminations (2008)



# Numbers of Notifications From European Countries



# Types of Food Contaminations



## Microbiological and biological

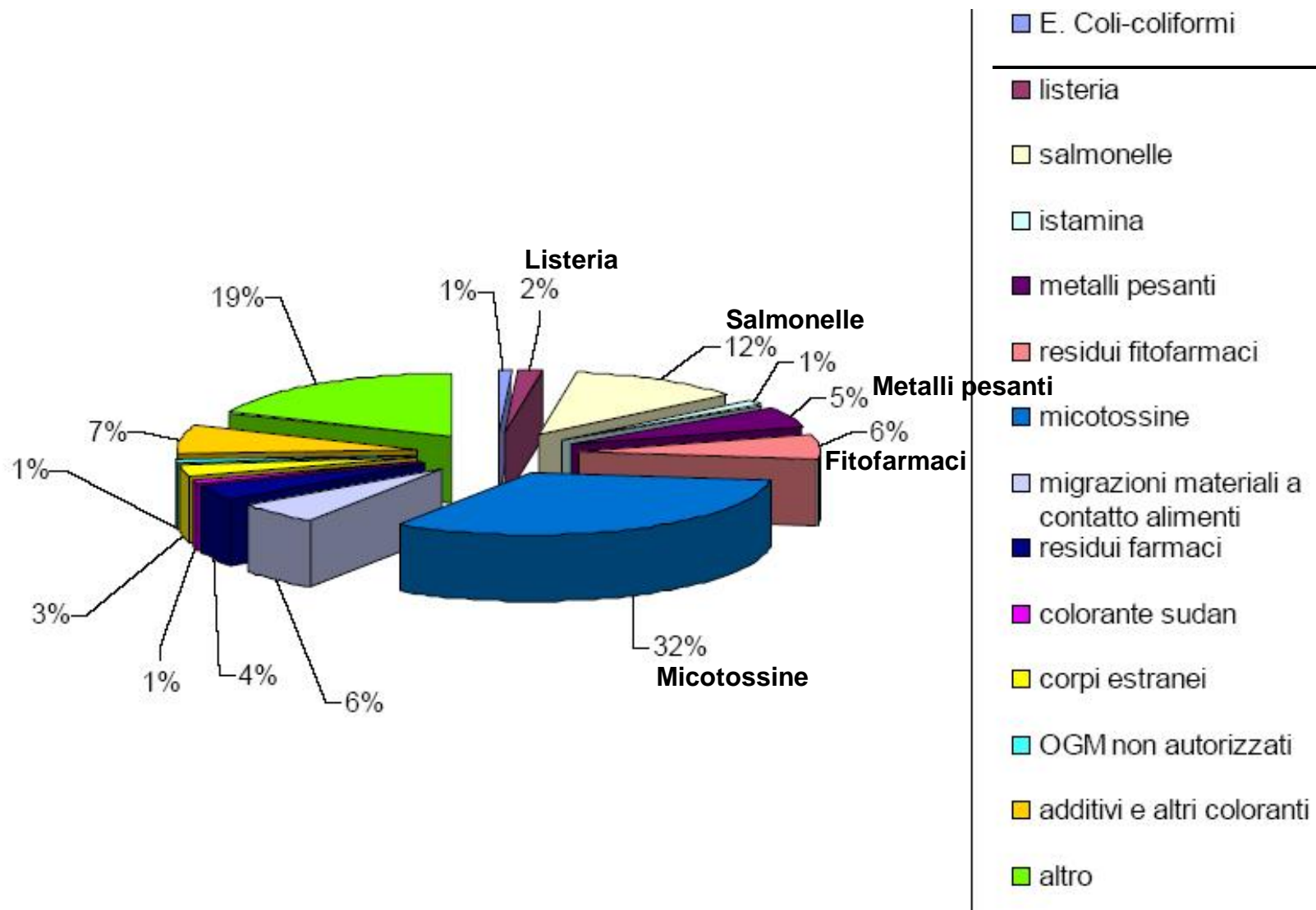
CONTAMINANTE	NOTIFICHE
Bacillo Cereus/Pumilus	5
Biotossine Alqali	6 ↓
Campylobacter	13 ↓
Trichinella	1
E. Coli- Coliformi Fecali	26 ↓
ISTAMINA (casi di Istaminosi)	37 (2)
Listeria	47 ↑
Larve di Anisakis	28 ≈
Norovirus	6 ↑
Pseudomonas Aeruginosa	5 ↑
Salmonelle	33-4 ↑
Stafilococchi	3
Vibrio Cholerae/Vulfinicus	10 ↑

## Chemical

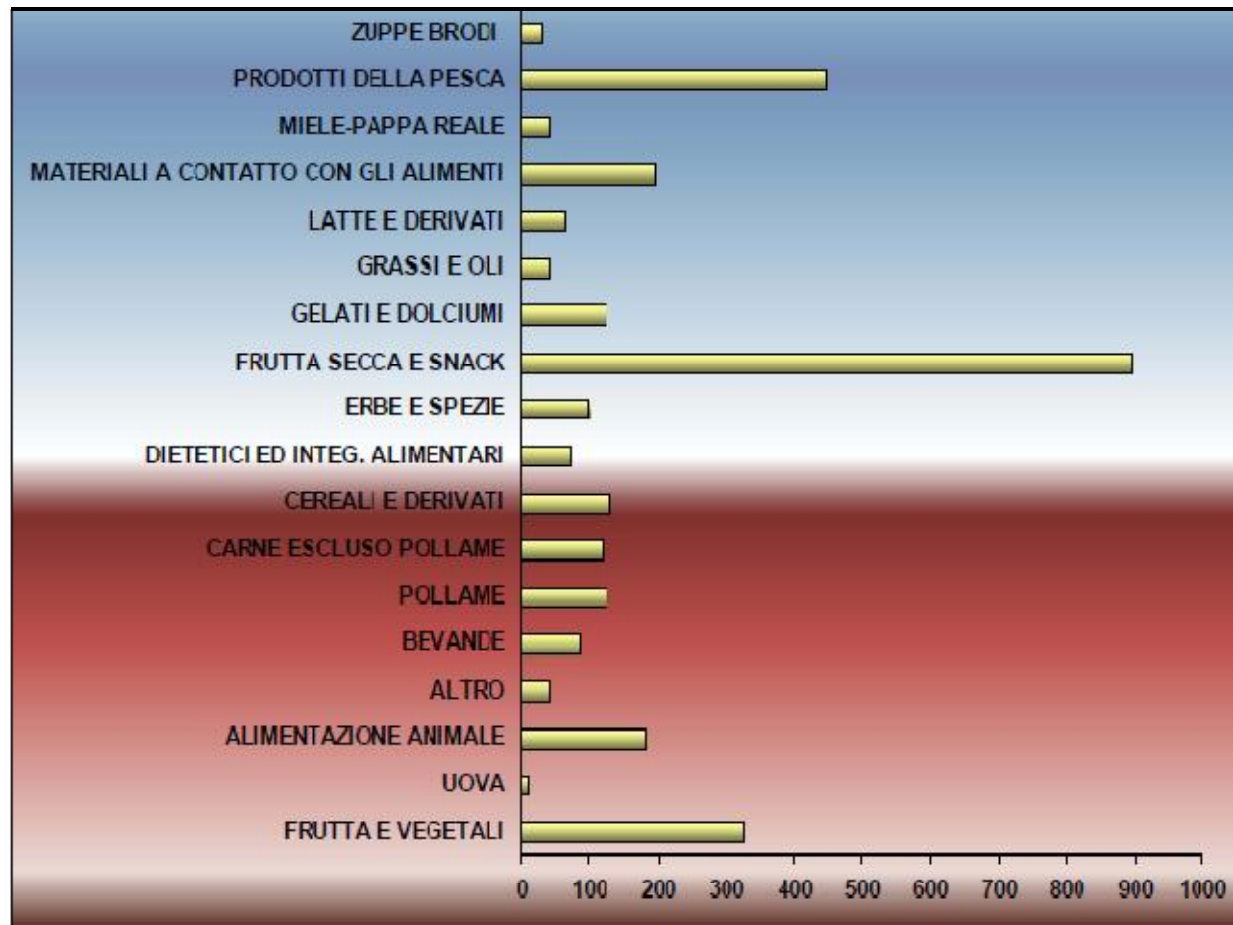
CONTAMINANTE	NOTIFICHE
Metalli pesanti	148 ↓
Residui di fitofarmaci	176 ↓
Micotossine	930 ↑
Migrazioni in materiali a venire a contatto con gli alimenti	170 ↓
Residui di farmaci	118 ≈
Additivi e altri coloranti	184 ↓
Colorante Sudan I, III, IV	25 ↓
Diossine	12
Melamina	58 ↑



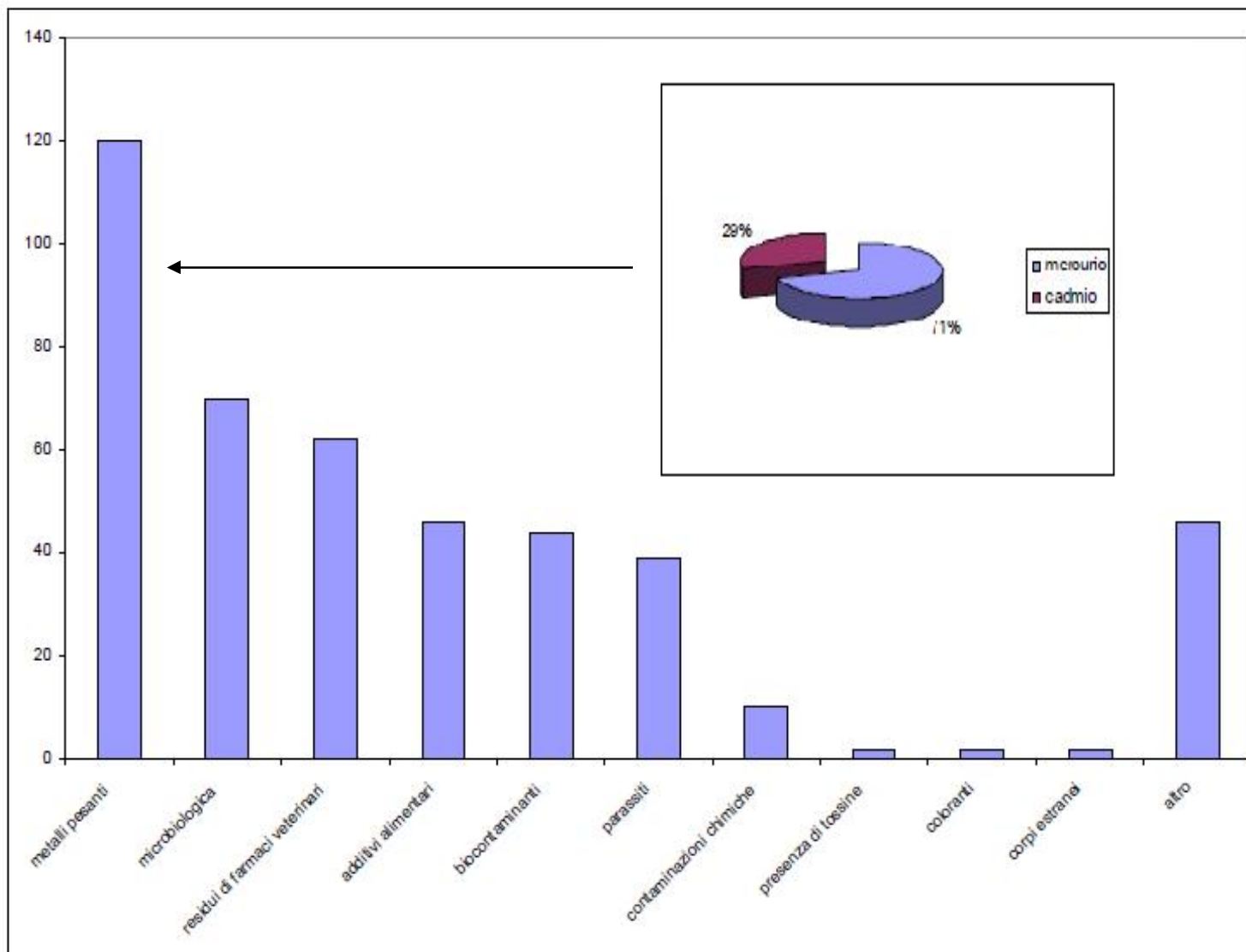
# Global Contamination Analysis



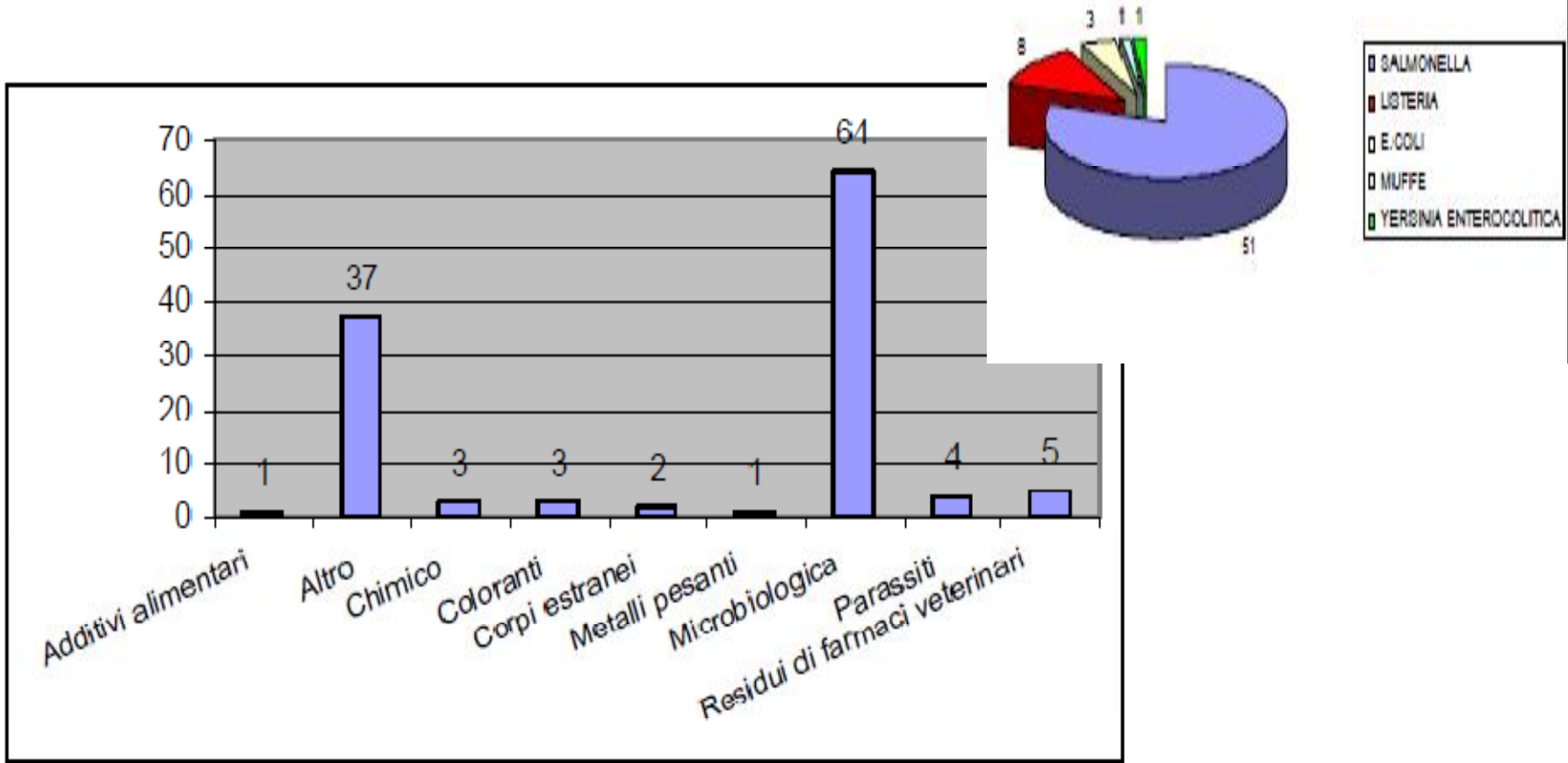
# Notification of Food Contamination: Food Products



# Fishing Products Contamination

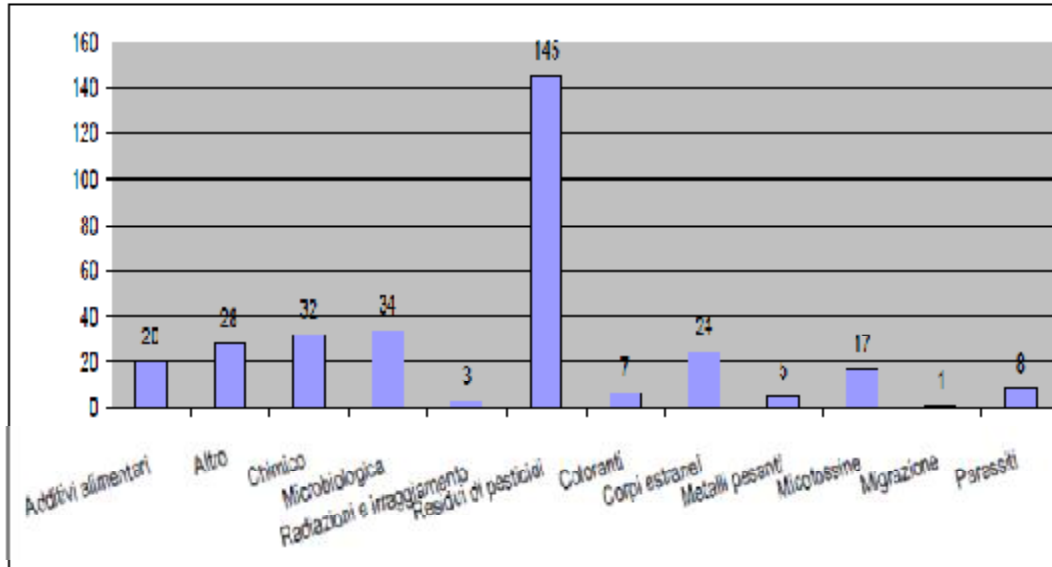


# Meat Products Contaminations

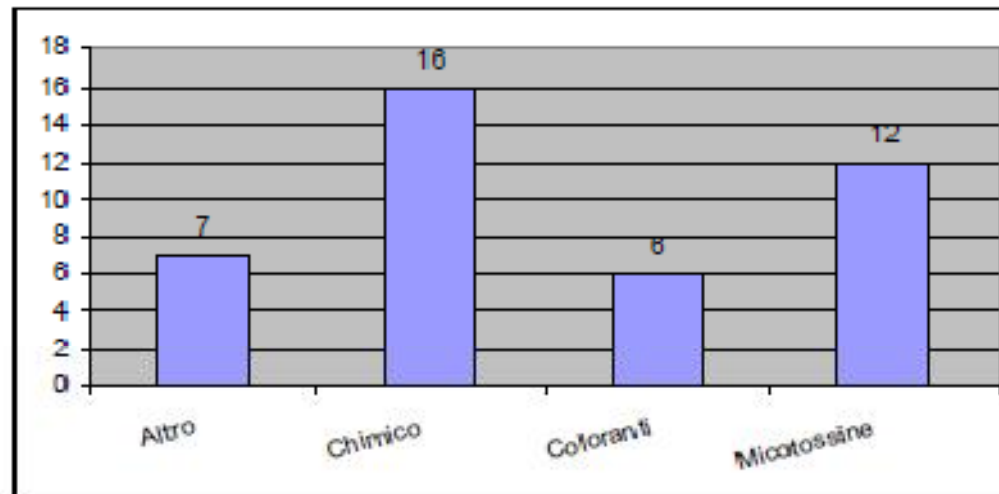




# Product Contaminations



*Fruits and vegetables*

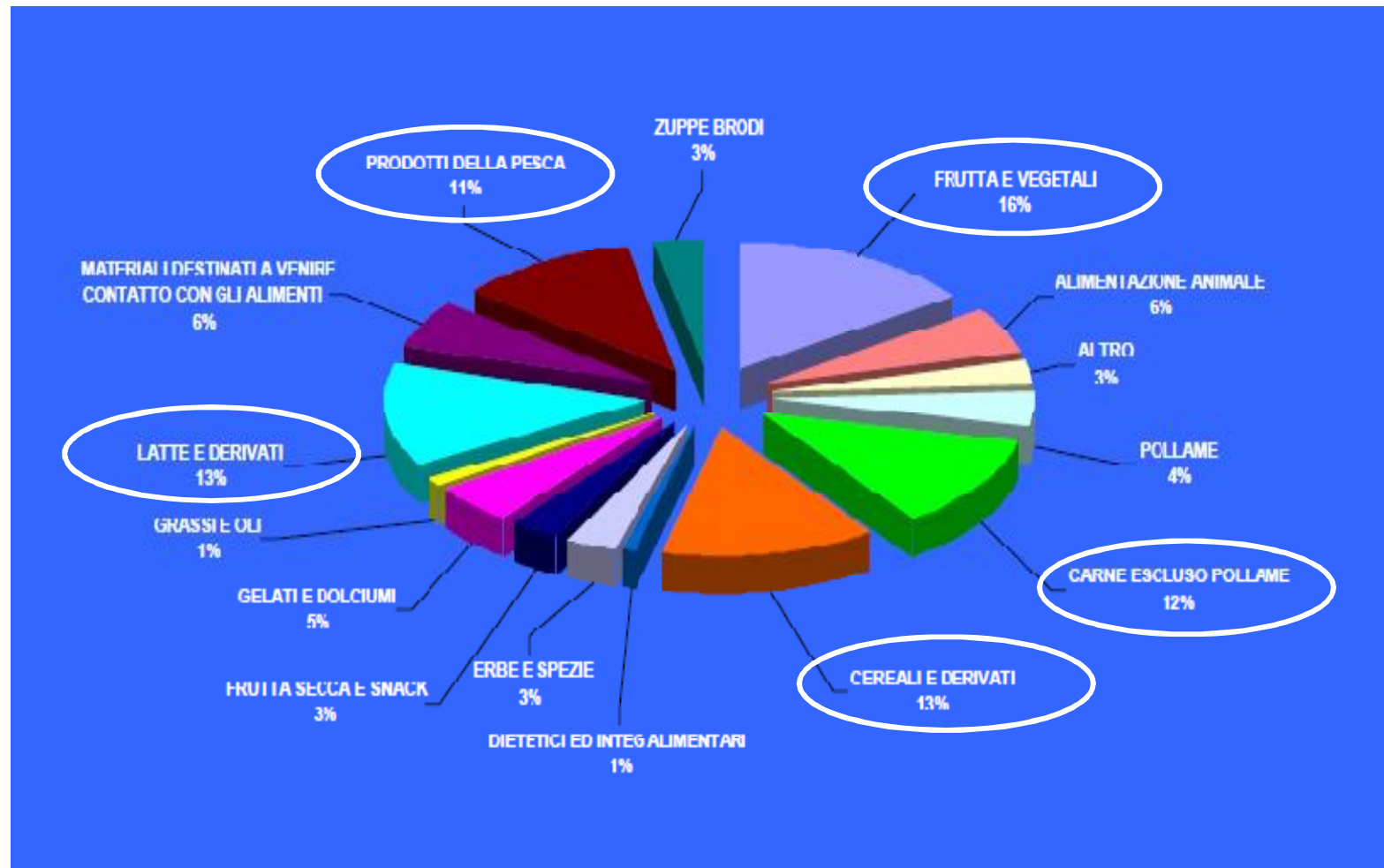


*Oils and fats*

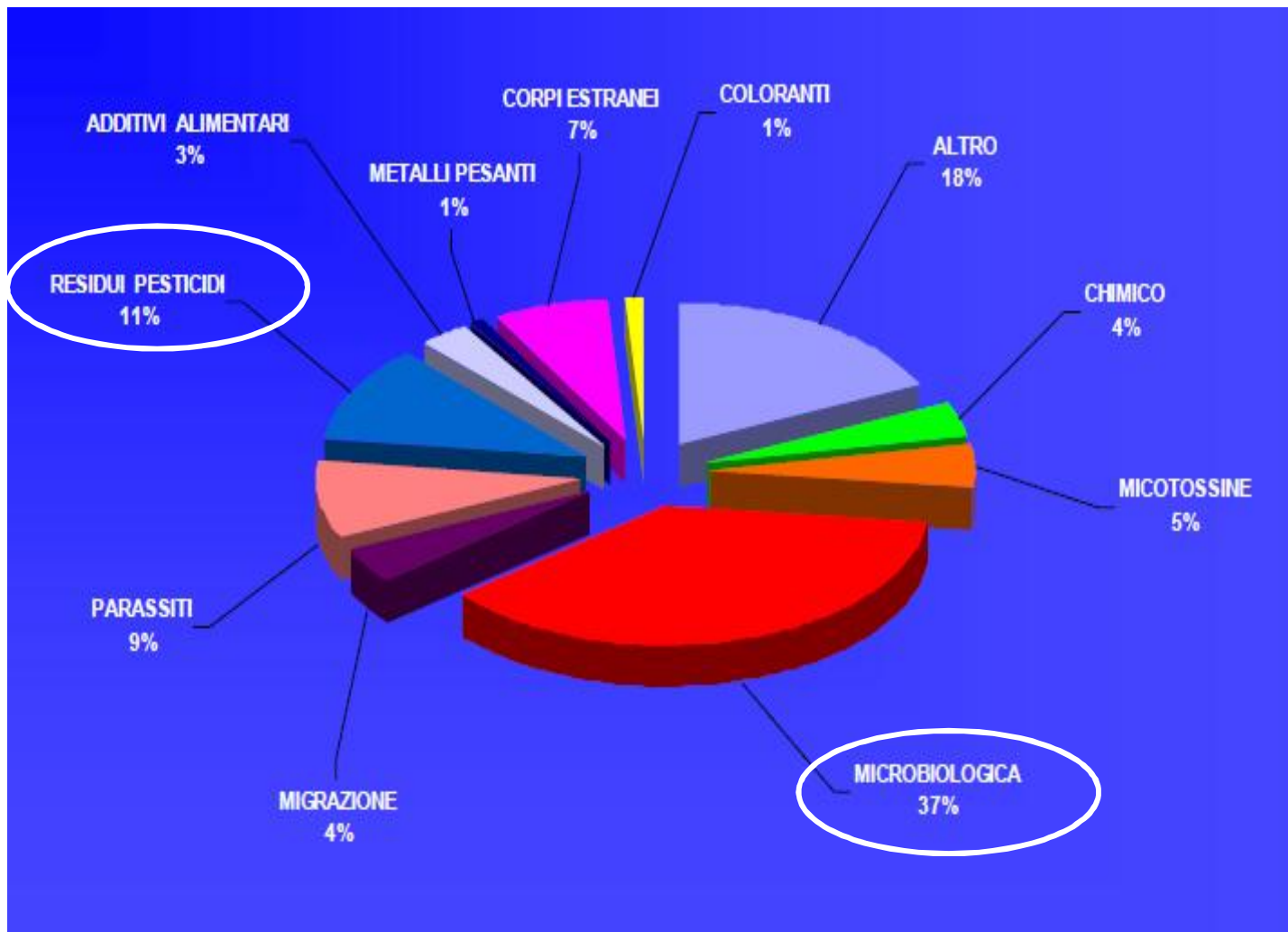
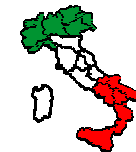


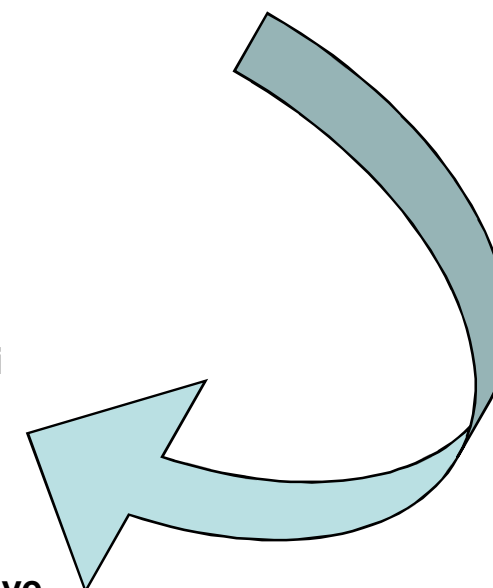
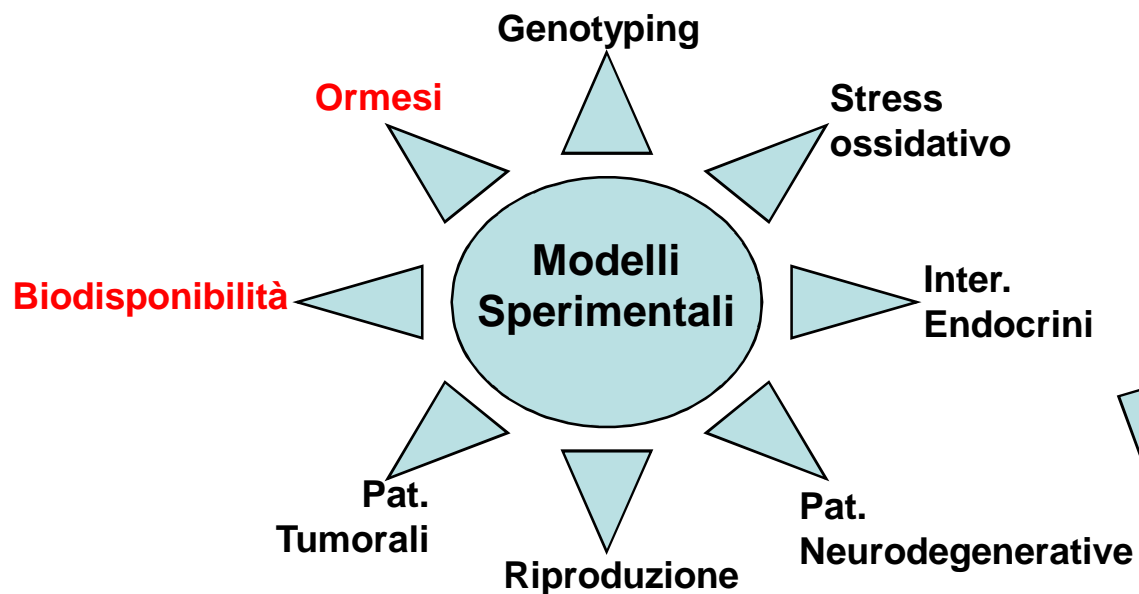
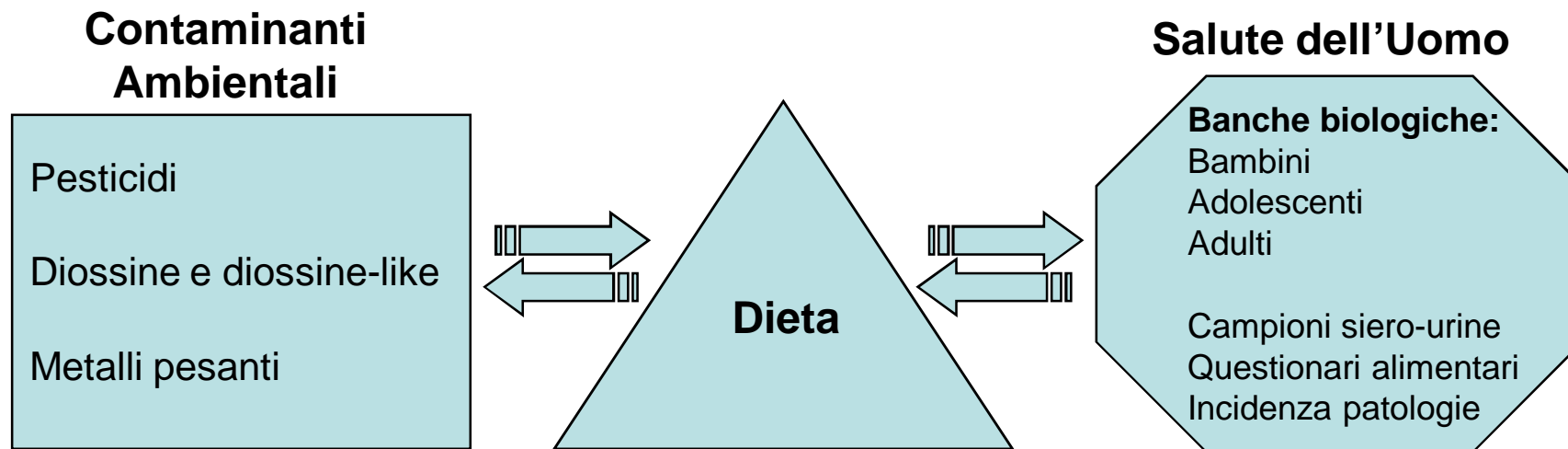


# Italian Products Contaminations



# Heterogeneous Risk of Food Contamination in National Products





# PESTICIDES IN THE PLATE 2009

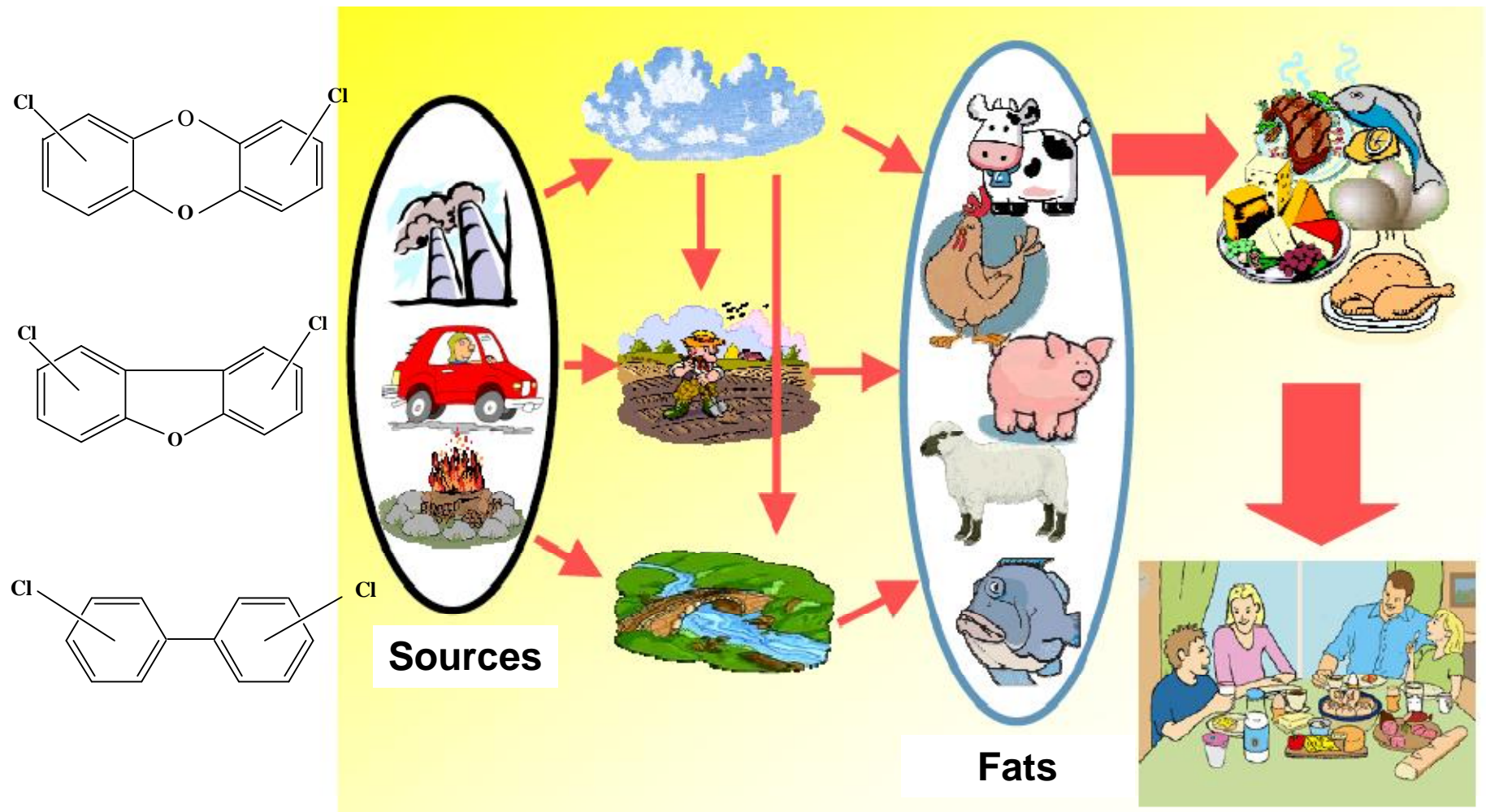


Tabella riepilogativa 2009

Genere	campioni analizzati	irregolari	%	regolari senza residui	%	regolari con 1 solo residuo	%	regolari con più di 1 residuo	%
Verdura	3474	28	0,8%	2881	82,9%	445	12,8%	120	3,5%
						445 + 120 = 565 16,3%			
Frutta	3507	81	2,3%	1889	53,8%	696	19,9%	841	24%
						696 + 841 = 1537 43,9%			
Derivati	1496			1205	80,5%	194	13%	97	6,5%
						194 + 97 = 291 19,5%			
Varie	287			270	94,1%	7	2,4%	10	3,5%
<b>TOTALE</b>	<b>8764</b>	<b>109</b>	<b>1,2%</b>	<b>6245</b>	<b>71,3%</b>	<b>1342</b>	<b>15,3%</b>	<b>1068</b>	<b>12,2%</b>



# Dioxins Cycle



## Heavy metals and human health

Organo o sistema bersaglio	Elementi
Apparato respiratorio	Alluminio, Berillio, Cromo, Nichel, Silicio
Sistema cardio-vascolare	Arsenico, Cadmio, Tallio
Rene	Cadmio, Mercurio
Fegato	Cadmio, Cromo, Vanadio
S.N.C.	Alluminio, Mercurio, Piombo, Manganese
S.N. Periferico	Piombo, Mercurio, Tallio
Cute e annessi	Arsenico, Tallio

Elemento	Conc. mg/g	Conc. mg/g in Food
<b>Se</b>	50 - 200	
<b>Cd</b>	0.05 – 1.00	
<b>Hg</b>	0.5 – 1.0	
<b>Pb</b>	0.02 – 1.50	0 – 0.3
<b>Cu</b>	0.5 – 5.0	0.1 – 87
<b>Zn</b>	5.0 – 50.0	0.7 – 56

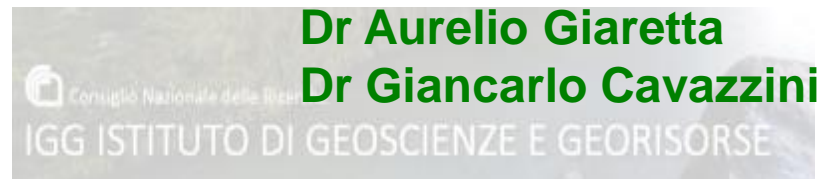


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