

# The truth about toxicity in plastics

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# In 2010 ...

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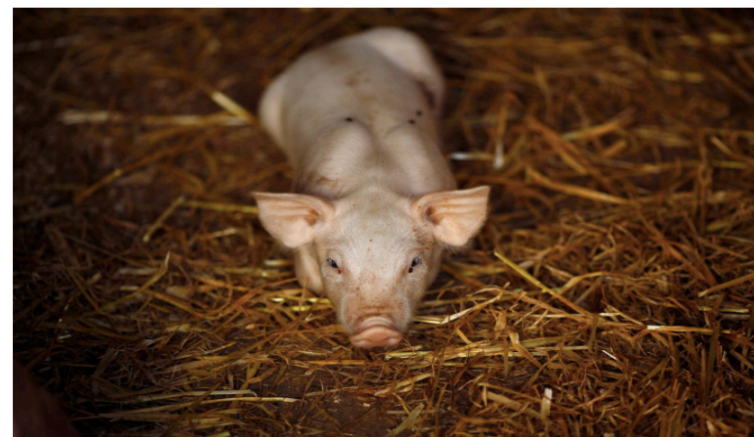
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# Compounds from multilayer plastic bags cause reproductive failures in artificial insemination

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A piglet rests at a farm in southern Spain. Low fertility rates among sows on Spanish pig farms in 2010 were traced to chemicals used to produce plastic semen bags.

PHOTOGRAPH BY JON NAZCA, REUTERS

## Infertility in Spanish Pigs Has Been Traced to Plastics. A Warning for Humans?

A scientist has connected infertility in pigs to compounds in plastic bags.

# What is a toxic?

**A toxic is any substance, artificial or natural**, that has toxicity (it produces a damage effect in the organism to be in contact with them).

**Toxicity** is the **capacity** of any **chemical substance** to produce **harmful effects** in a organism, to be in **contact with them**.

None chemical substance can be consider non toxic, due to any (water, oxygen) it is capable of producing a toxic effect if a sufficient dose is administered. All substances have toxicity; however some have greater effect than others.

# 1. Concepts: citotoxicity, reprotoxicity, migration

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## REPROTOXICITY

- Non “visible” sperm/oocyte damage
- Non detectable in the quality controls at boar stud
- Decrease in the reproductive parameters at farm

## CITOTOXICITY

- Visible sperm/ oocyte damage
- Detectable in the quality controls at boar stud
- Decrease in the reproductive parameters at farm

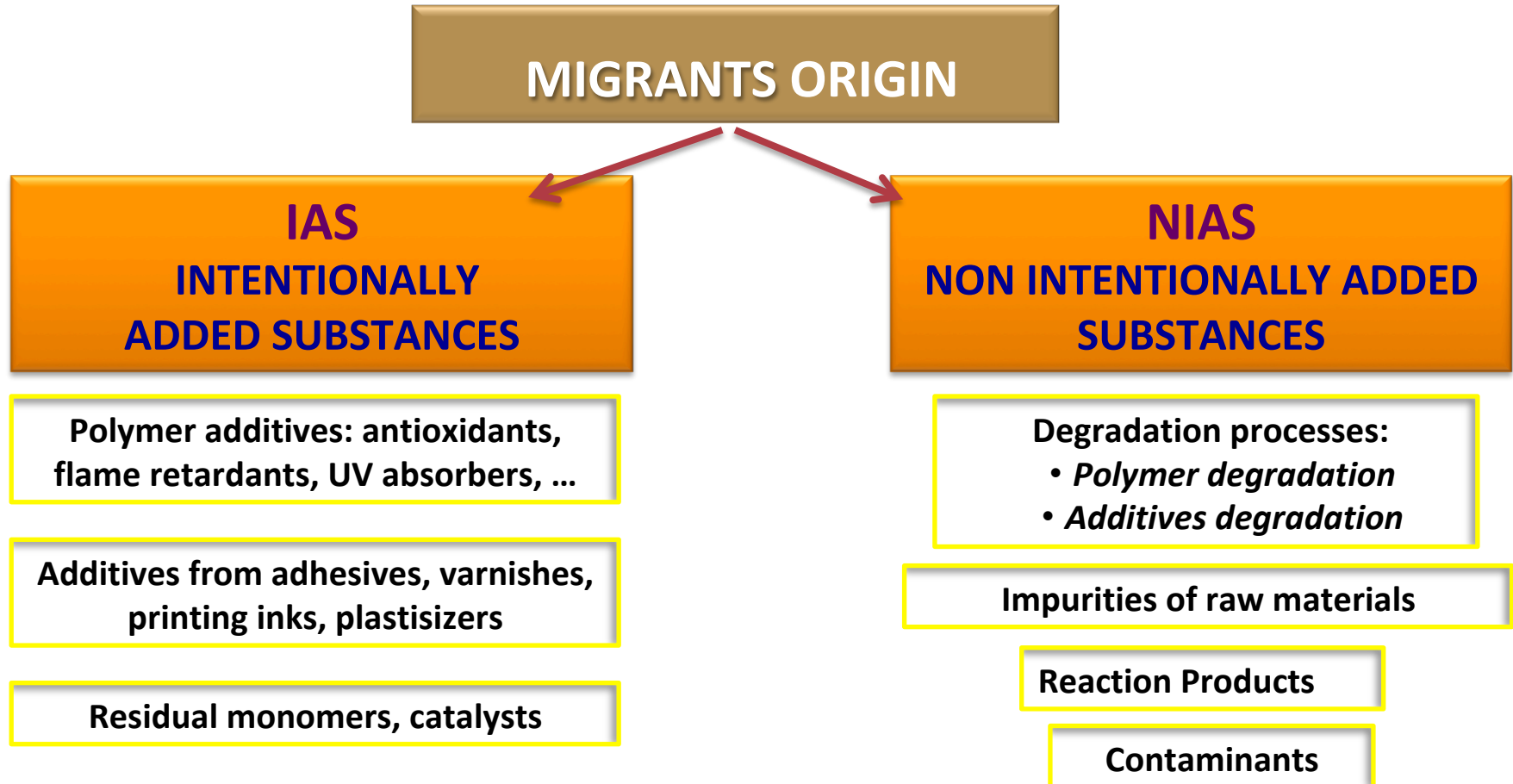
# 1. Concepts: citotoxicity, reprotoxicity, migration

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## Migration concept



## 2. Migrants origin



## 2. Migrants origin

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### What happens with the migrants?

- The compounds (migrants) are transferred to the packaged product
- Properties of the product can change
- Toxicity of the product can increase
- Shelf life of the product is shorten

## 2. Migrants origin

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### Which type of migrants?

- Phthalates
- PVC
- BPA
- BADGE
- Cyclic Lactone
- ...



## 2. Migrants origin

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### Chemical Print

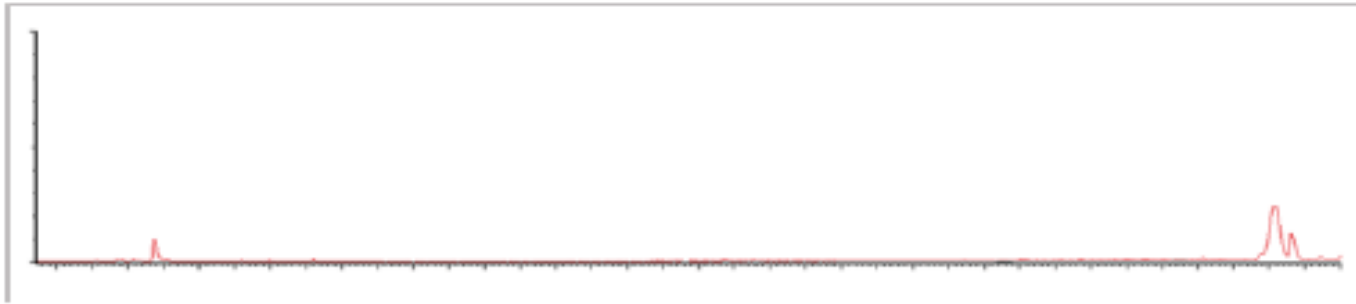
### How are controlled?

The chemical print is to describe the chemical identity and profile of the raw material for semen doses plastic packaging .

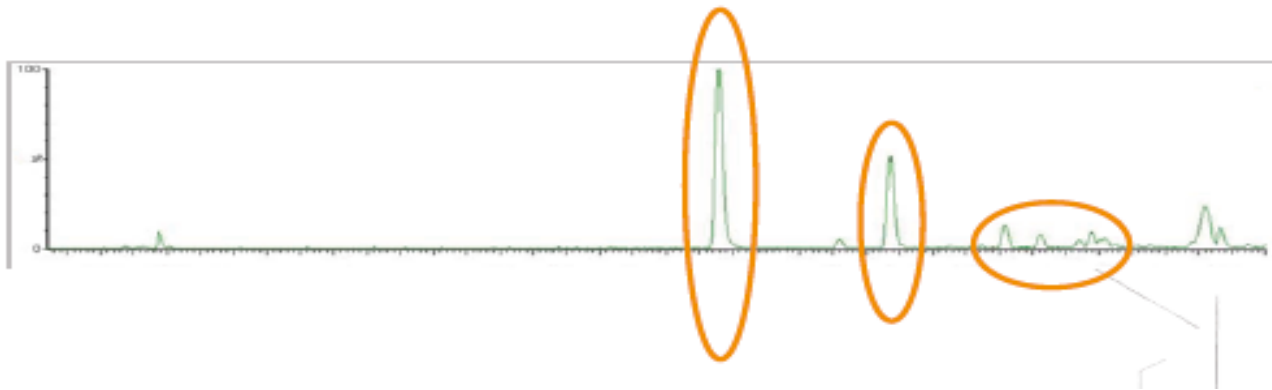
This technique allows to rule out the presence of toxic components using the most advanced technology, ensuring full traceability of the product.

## 2. Migrants origin

### Chromatographic profile RTC material . Analysis #1.



### Chromatographic profile RTC material . Analysis #2.



### 3. Reprotoxic substances: Way of working

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#### 1) They may have different origin:

Natural hormones contained in meats and other animal subproducts

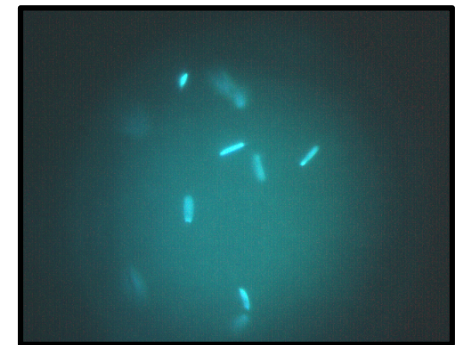
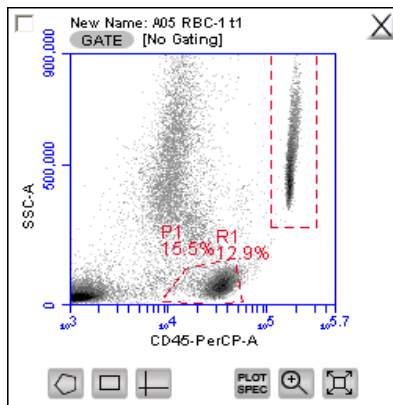
Synthetic hormones introduced into man by the same routes as natural ones, and used in livestock and even anabolic steroids, used by humans

Natural estrogens of non-animal origin, such as phytoestrogens, mycotoxins, ....

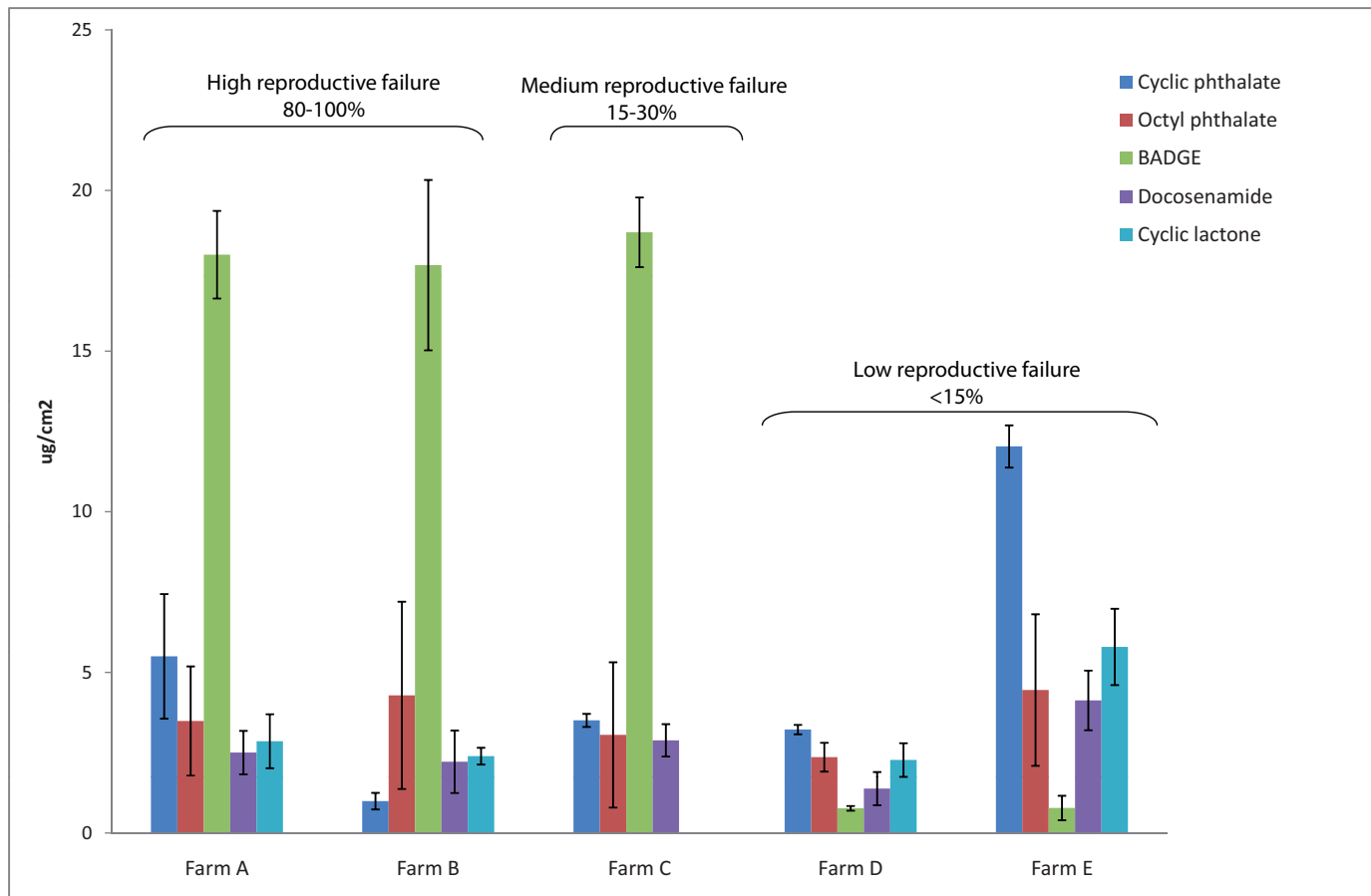
Chemical substances (of very different origin and structure) contaminants of the environment and food

### 3. Reprotoxic substances: Way of working

- The reprotoxic substances act at different levels within the living cell
- Normally no alterations are detected in the parameters analyzed in the cytotoxicity tests
- They can fertilize the oocyte: IVF goes unnoticed
- It is easy to go unnoticed depending on the fluorochrome used in cytometry



## Relation of NIAS and reprotoxicity at farm



## 4. Concepts: Conclusions

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- Reprotoxicity is still present nowadays
- Heat sealing tubes and blister can have toxic compounds inside
- Adjustment of the technique and personnel performing tests
- Several mechanisms of action of toxic substances in the sperm (some unknown yet) so go unnoticed in routine checks
- It is not always easy to know what is the limit to consider a compound in a plastic material as toxic
- More studies have to be conducted to decipher what level toxics affect to the sperm cell
- Different combinations and synergies have to be studied in deep

# Thanks!

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Raquel Ausejo