DETERMINATION OF ACRYLAMIDE USING IMMUNO-ENZYMATIC METHOD IN COMMERCIAL DOG AND CAT FOOD

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Acrylamide

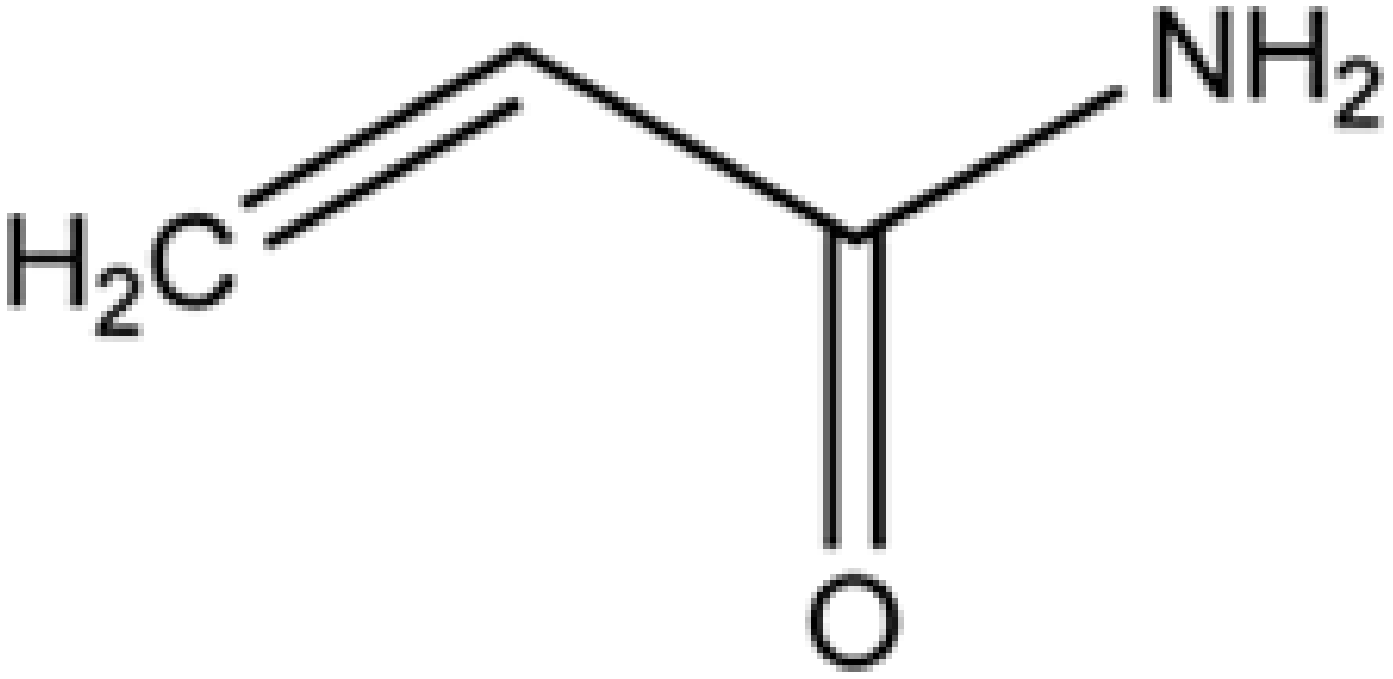
- Acrylamide is an essential industrial and scientific chemical
- It is estimated worldwide production more than 200 million kg /year
- The acrylamide monomer is a white,odourless, crystalline solid at room temperature
- One of the latest discovered neurotoxic and carcinogenic substances in foodstuffs is acrylamide.

Acrylamide formation

- The major acrylamide formation mechanism in food involves the Maillard reaction of the amino acid asparagine with reducing sugars
- Solubility of acrylamide in solvents is variable ,highest in water

Structure of acrylamide

Acrylamide (CH^2=CH-CO-NH^2; 2-propenamide)



Toxicological profile
(Absorption, distribution, metabolism, excretion)

- Rapid and complete absorption by oral, inhalation and dermal routes in a range of species
- Rapid distribution to a range of tissues and organs
- Accumulation in liver, kidney, testes, epididymis, skin and red blood cells
- Metabolised to Glycidamide
- 60% dose excreted in urine in 24 h
- Information on bioavailability from foodstuffs as consumed needed
- ***Animals-Incomplete information available***

Acute Chronice dose studies

- Oral LD_{50} in rats, mice, guinea pigs and rabbits 107-203 mg/kg bw
- Skin and eye irritant and skin sensitization
- Main effect non-lethal reversible neurotoxicity (peripheral nerves)

Clinical signs

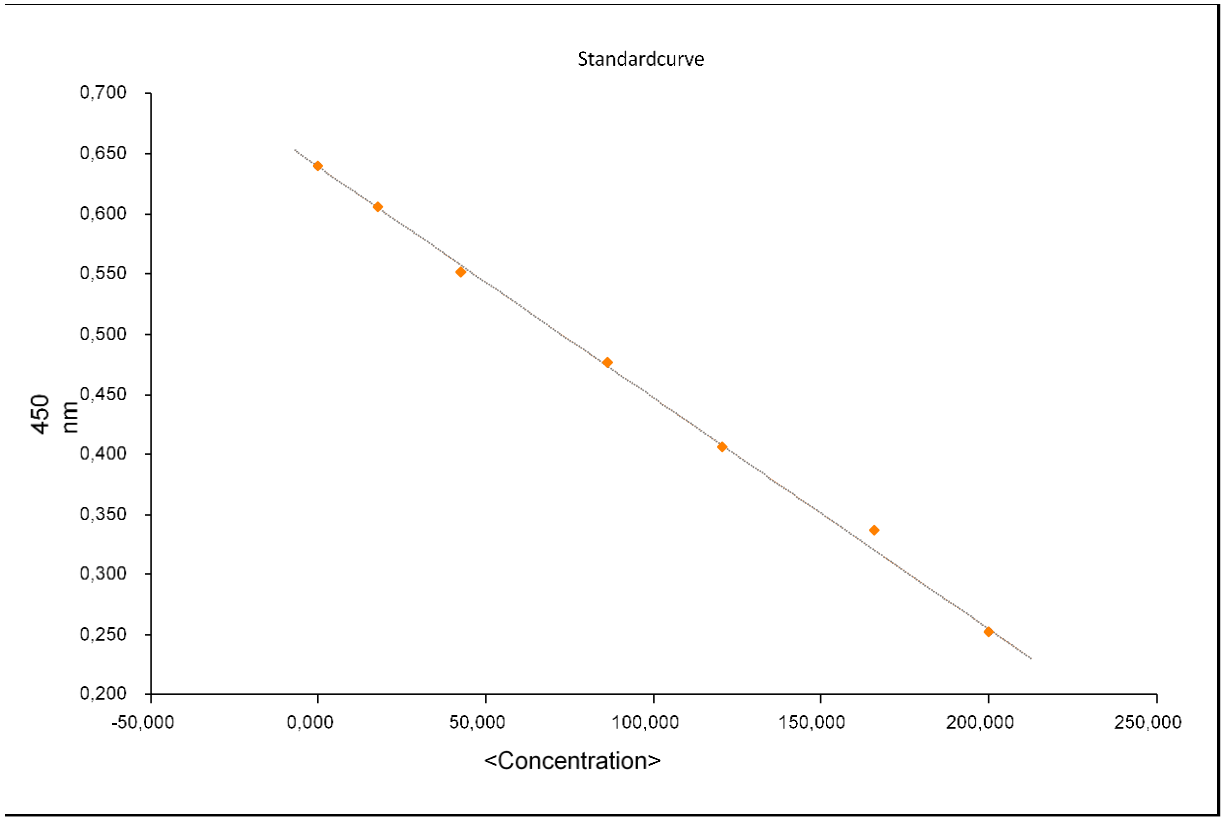
- sweating,
- nausea,
- myalgia,
- speech disorders,
- numbness and weakened extremeties
- abnormal manner
- vomited
- Convulsions
- ataxic and displayed hypermetria.
- nephropathy

Aim(Importance of Acrylamide Determination)

- Acrylamide is a known carcinogen in laboratory animals,
- impairing fertility in male animals
- and causing nerve damage in animals
- the starch-rich foodstuffs may be a neurotoxin in dogs
- The aim of this study is to detect possible acrylamides levels in dry cat and dog food

Materials and methods

- Analitical method which is immunoenzymatic method.
- The test is a direct competitive ELISA based on the recognition of Acrylamide by specific antibodies
- used commercial ELISA kit
- 42 cat and dog food were randomly collected and analyzed
- In order to analyse food samples for Weigh 2.0 g of a representative sample
- Extraction/Clean Up with Methanol/deionized water
- Derivatization Procedure (Derivatization Reagent reconstitution solution)


Standardcurve
0,700
0,650
0,600
0,550
0,500
0,450
0,400
0,350
0,300
0,250
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450 nm
-50,000
0,000
50,000
100,000
150,000
200,000
250,000
<Concentration>

Results

- 33% (14 samples) presence of acrylamide have been found
- highest acrylamide level is 155 ppb
- the lowest is 45 ppb,
- average acrylamide level is 87.35 ppb

Table1, Statistical Findings

Pet foods	N	Range	Minimum	Maximum	Average		Std. deviation	variance
					values	Std error		
	14	110,00	45,00	155,00	87,3571	8,42589	31,52681	993,940

Discussion 1

- immunoenzymatic detection appears to be an effective analytical technique for use in cat and dog food due to its high sensitivity, low cost, and easy handling
- simple and low-cost alternative to chromatographic methods and is suitable and sensitive for the rapid determination of acrylamide in petfood samples
- immunoenzymatic method can be used as a standart technique on cat and dog food but It should be supported by more sensitive methods
- it was below the level that would affect the health of cats and dogs.

Discussion 2

- The possibility of acrylamide toxicity occurring in pet animals, especially，immature animals,
- and should not be ignored when neurological cases are seen.
- Further studies are needed to quantify the risk acrylamide in foodstuffs poses to dogs and cats.

REFERENCES

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