
بسم الله الرحمن الرحیم
وبه نستعین

Title:

Study of specific migration of Bisphenol A from plastic packaging into food stimulants by HPLC

By:

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What is Bisphenol A?

- Bisphenol A, also known as BPA, is a commonly used chemical to make polycarbonate plastics.
- Before its known use as a chemical that makes plastic, it was discovered as a synthetic estrogen in the 1930's.

Who discovered its uses?

- The first reported synthesis of BPA was done by Thomas Zincke at the University of Marburg, Germany.
- Dodds and Lawson first showed BPA to be oestrogenic in ovariectomized rats in 1938.
- Then in 1953 Dr. Herman Schnell of Bayer, Germany developed manufacturing processes for a new plastic, polycarbonate, that used BPA as a starting material.
- In the same years large-scale uses for polycarbonate plastics.

Where is it in the environment?

- There are many places where BPA is found:

- Baby bottles and water bottles
- Dental sealants and medical equipment

- As coatings on soda cans

- Household appliances, CD's & DVD's

Resin identification code

Why is BPA used so much?

- many things made of plastic are made with BPA
- BPA is used so much because it is highly durable
- It has a high heat-resistance
- It is shatter resistance and has high optical clarity.

Why is there such argument?

- The plastic industry is stating that the amount of BPA that a normal person is exposed to is not toxic.
- Other scientists and researchers have found that their research proves that in causes cancer and premature maturity.

The independent researcher's opinion

- BPA binds with the estrogen receptor and has capacity to stimulate estrogenic responses.
- This means that it is biologically active a therefore not "totally safe."
- Moreover, there are a series of animal studies t show that bisphenol A actually does lead developmental abnormalities in laboratory anim at low levels of exposure.
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- This also directly contradicts their assertion tha is totally safe.

What we can do to minimize exposure…

- Use filter systems instead of bottled water
- Buy fresh produces instead of canned food
- Choose baby bottles and cups made of glass or polyethylene (#1,#2,#4 recycling symbols), or polypropylene (#5)
- Store food in glass, ceramic or metal containers.
- Instead of having young children get dental sealants for teeth that will fall out within a few years, and have them increase their practice of at home dental care.

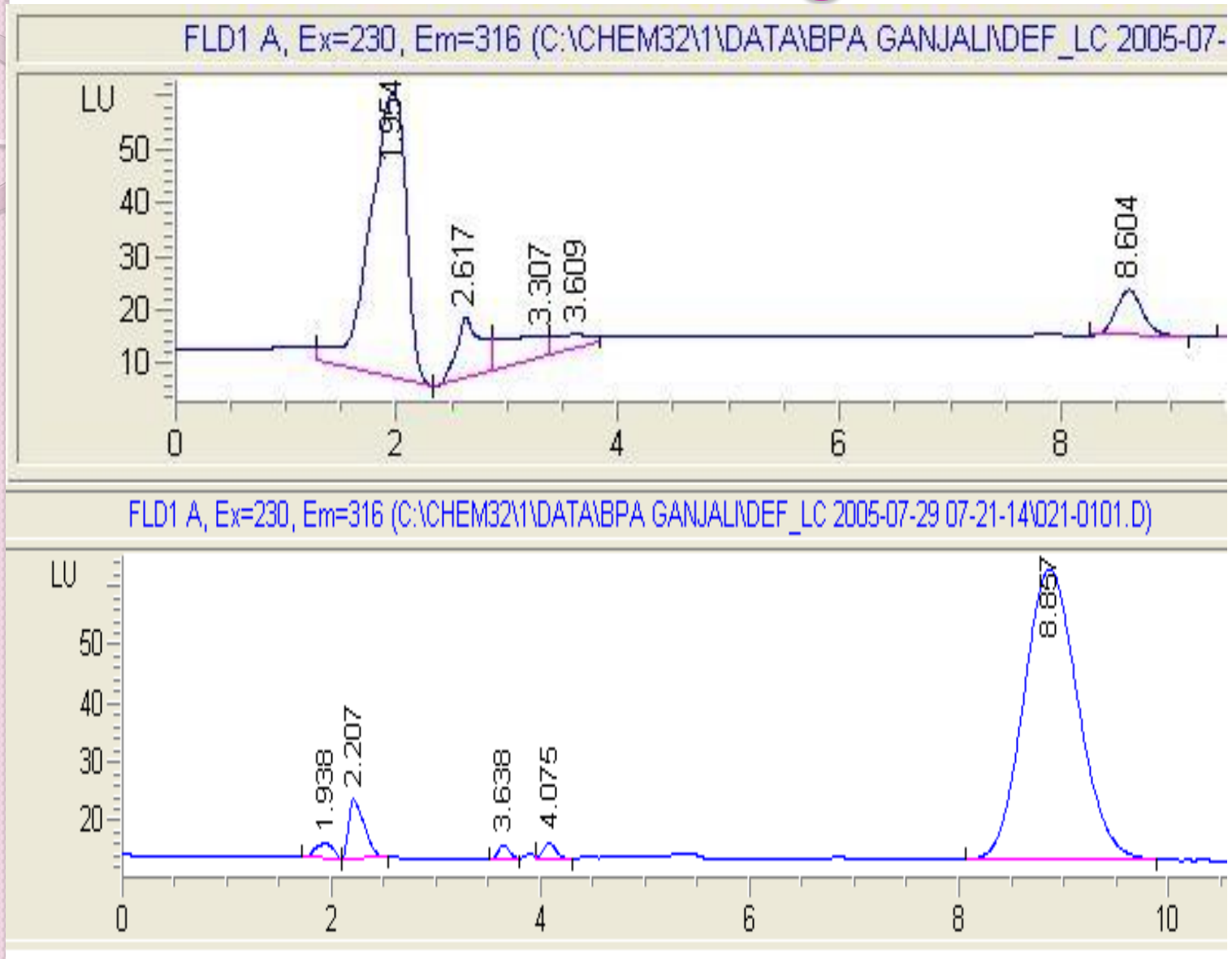
Analysis Methods:

- BPA has been determined with the use of GC/MS or HPLC.
- These instrumental methods are expensive and need complicated pretreatment and are not applicable to onsite monitoring.
- Electrochemical techniques have been recognized as suitable methods for detection of phenolic compounds.

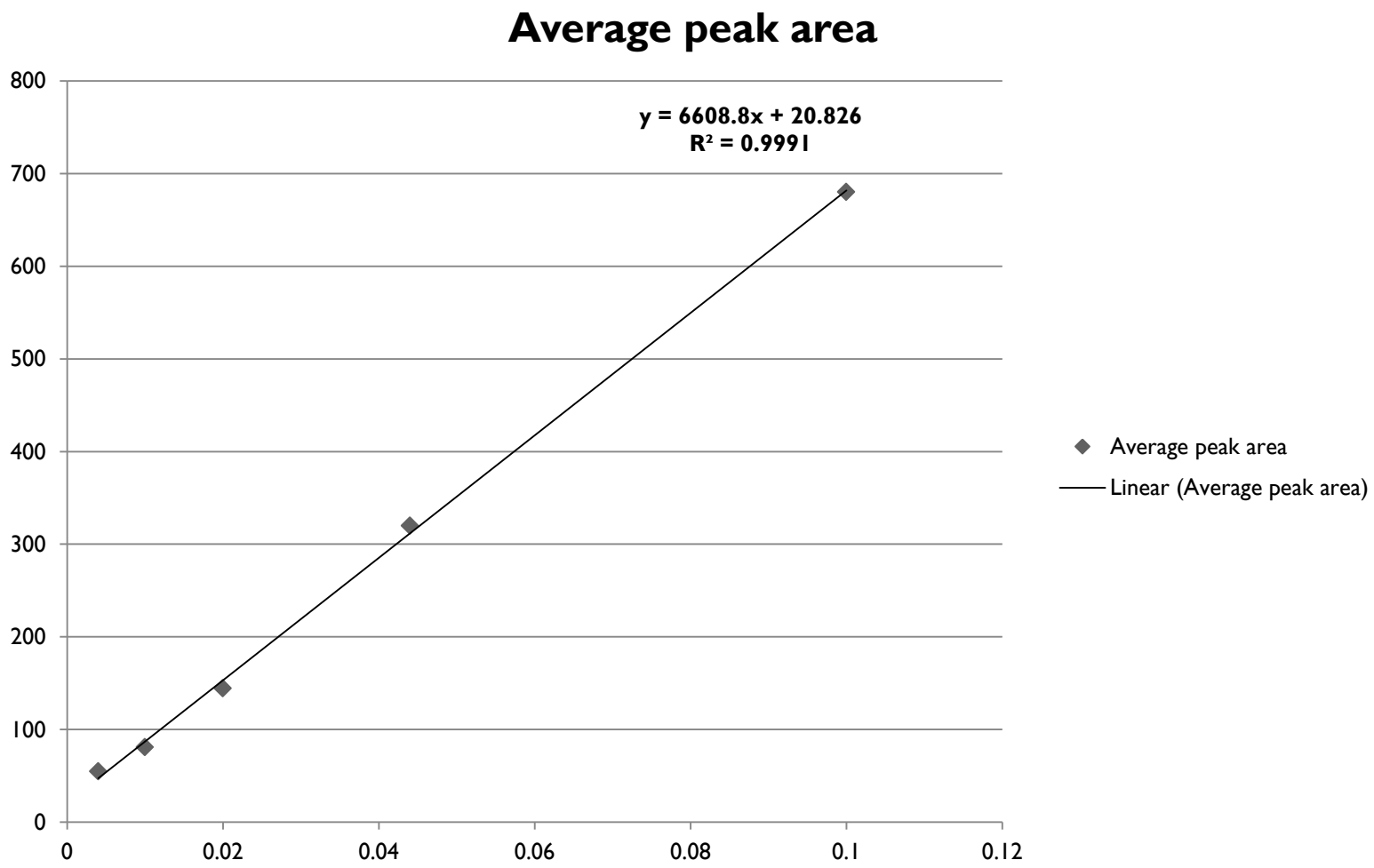
Analysis Method:

- HPLC(RP)
- Mobile Phase(ACN 40%, H2O 60%)
- Flow Rate(1.2 ml/min)
- Detector(FL, Ex=230nm, Em=316nm)
- PMT Gain(10)
- Inj Val(20ul)

Chromatogram:



Calibration Curve:



Voltammetry

Voltammetry = Volt-Am(pero)-Metry

Voltage ramp applied to electrode

Current measured

$$I = f(U)$$

Method first described 1922 by Heyrovsky

Advantages of this method:

1-Repeadability

2- low cost

3-low analysis time

4- low LOD

5-Enviromentally Friendly

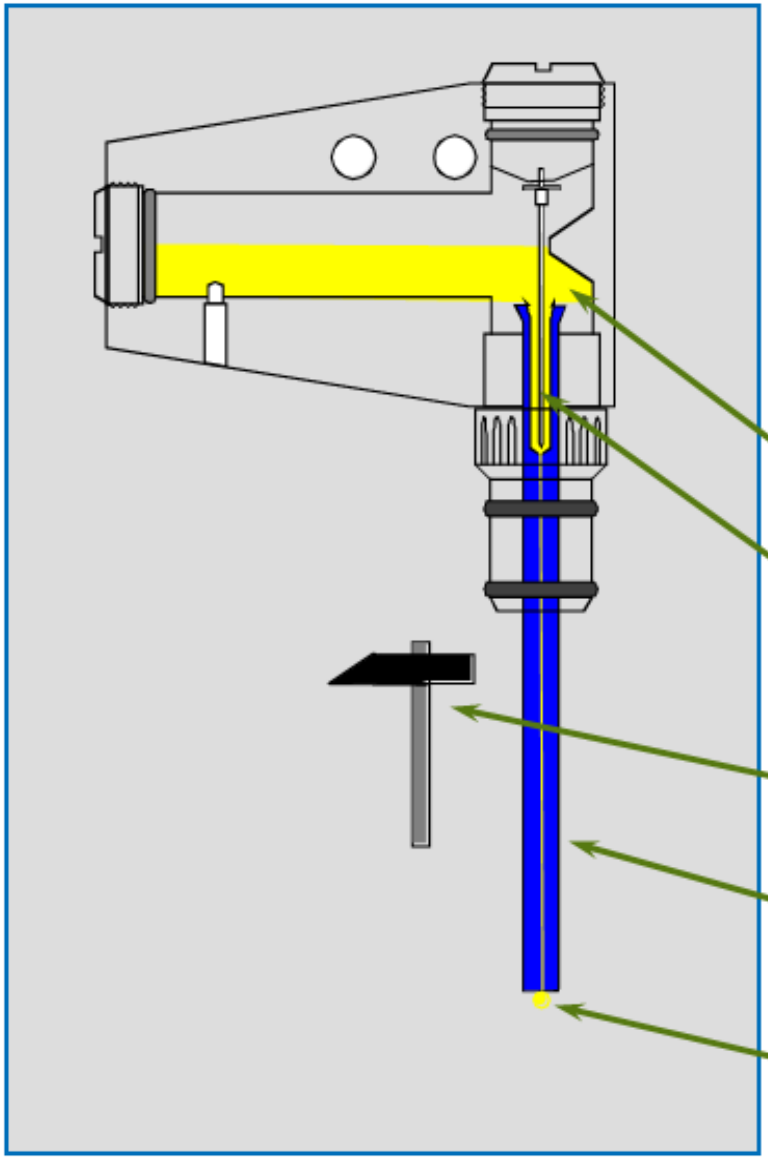
Sensitivity

Titration	IC	VA
0.000 1% = 1 ppm to 100%	0.000 000 1% = 1 ppb to 0.1%	0.000 000 000 1% = 1 ppt to 0.000 1% = 1 ppm
Major constituents	Anions	Cations

Voltammetry → Traces of heavy metals

MME

Multi mode electrode



Thanks
for
your
attention