

# Report on BISPHENOL-A (BPA) IN TEETHERS – AN INDIAN PERSPECTIVE



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## INTRODUCTION

Bisphenol-A (BPA), an endocrine disruptor is a substance which interferes with the production, secretion, transport, action, function and elimination of natural hormones. BPA can mimic our body's own hormones in a way that could be hazardous for our health. There are number of research studies confirming that babies and young children are especially sensitive to BPA effects.<sup>1</sup> In an important study conducted at New York University (NYU), researchers have established linkages between BPA concentration and obesity, found that children with the highest BPA levels were more than twice as likely to be obese than those with the lowest levels.<sup>2</sup>

## ABOUT TEETHER AND ITS COMPOSITION

### TEETHING

The emergence of the first baby teeth through a baby's gums can be a frustrating time for many babies and their parents. The baby's gums become sore at the point of a new tooth. This is painful and unpleasant for the child. To relieve the pain and calm the child, it helps for them to "bite" into something. The easier the child gets through the first teething phase and better the teeth are hardened and attached, the healthier the milk teeth will become subsequently.<sup>3</sup>

When babies are teething, they spend a lot of time putting things into their mouths trying to soothe their aching gums. So, teethers are being commonly used

1 [www.medicalnewstoday.com/articles/221205.php](http://www.medicalnewstoday.com/articles/221205.php)

2 Trasande L, Attina TM, Blustein J., Association between urinary bisphenol A concentration and obesity prevalence in children and adolescents., Journal of the American Medical Association's, 2012 Sep 19;308(11):1113-21.

3 <http://naturallytrendy.blogspot.in/>



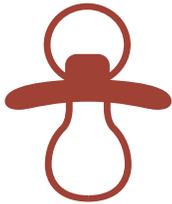
for the purpose, which is generally made of plastics. There is also a growing usage of teether across all sections of the society in India as it is now considered an important aspect for growing babies. There are a variety of teethers that are being flooded into markets now. As per analysts forecast, baby soothers and teethers market globally is expected to grow at a Compound Annual Growth Rate (CAGR) of 3.63% during the period 2016-2020.

### COMPOSITION

BPA added in making poly vinyl chloride (PVC) based plastics is also used for making teethers. Samples that were collected by us had no labeling of the chemical content. Though teethers are regulated in India under the Bureau of Indian Standards (BIS) IS 9873 (Part -1), however, the regulation is voluntary



**...babies and young children are especially sensitive to BPA...**



**...teether regulation is voluntary in nature and does not mandate to disclose the details of the chemicals.**

## EXPOSURE ROUTE OF BPA IN PRODUCTS

Long-term exposure to BPA may also occur due to the contact with toys and products intended for infants and young children, such as baby dummies and teethers that may be put into the mouth for several hours during the day. A research study has found that, one minute exposure of saliva with teethers caused the presence of BPA at the concentration of 5.9 µg/l.\*

Keeping this in mind a rough calculation for Tolerable Daily Intake (TDI) can be calculated.

A seven month old child weighing 7 kgs (approximately), will ingest 0.84 µg/kg (5.9/7) after keeping the teether in the mouth for a minute. By taking this figure if the child keeps teether up to 10 minutes then it will be about 8.4 µg/kg which is more than double while compared to the European Food Safety Authorities (EFSA) revised TDI limit i.e. 4 µg/kg bw/day prescribed for the adult. Thus, technically BPA use should be completely avoided in the product.

\* <http://goo.gl/3eqym8>

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## TOLERABLE DAILY INTAKE (TDI) LIMITS

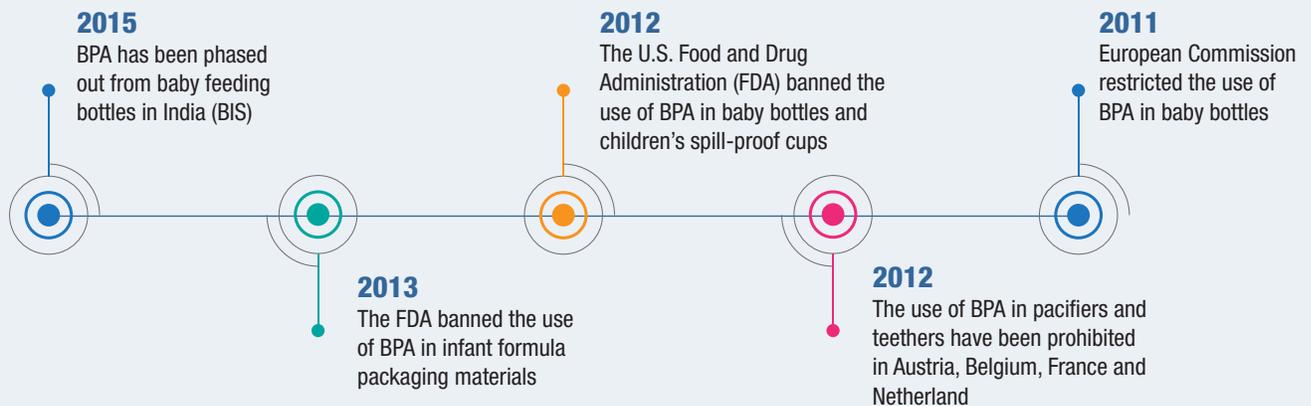
There is a TDI limit for BPA intake across the globe and as more research studies are coming into the lime light, countries have started reducing the limit of BPA TDI limits. European Food Safety Authority (EFSA) published its comprehensive re-evaluation of BPA exposure and toxicity in January 2015 when it reduced TDI for BPA from 50 to 4 µg/kg bw/day. Similarly, US has also taken a decision to reduce TDI limits of BPA. The BPA limits of the countries are as follows:

Country/Organisation	TDI (µg/kg bw/day)
EU	5
US FDA	5 (Reduced from 50 temporarily )
Australia	50
China	50
Korean Food Safety Authority	50
India	No standards

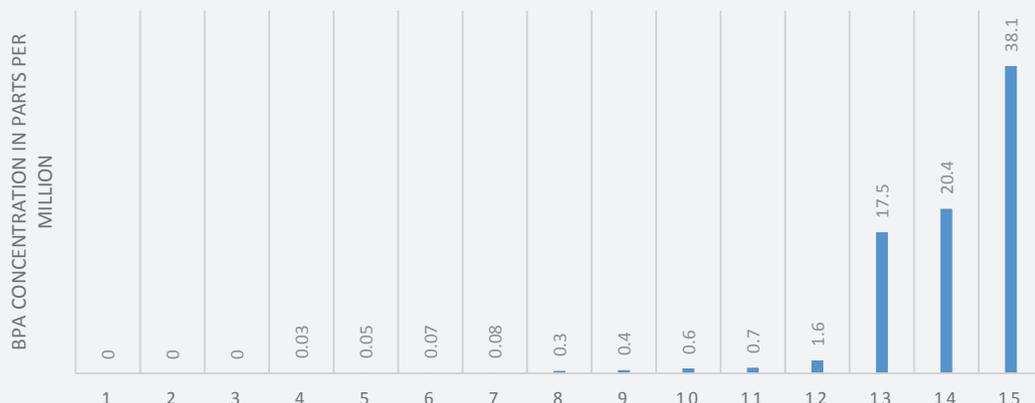
## LAB RESULTS OF BPA IN TEETHER SAMPLES

Fifteen samples were collected from various markets in Delhi. The samples included labeled and non-

## REGULATIONS FOR BPA IN PRODUCTS



**FIGURE 1 - VARIED LEVELS OF BPA IN TEETHERS**



(NOTE - First three samples type had BPA concentration below detectable level, hence marked as 0 (zero))

labeled with BPA warning. They were analysed in Sri Ram Institute of Industrial Research using the standard protocol for BPA testing. The results of the samples are as follows.

**TABLE 1 - CONCENTRATION OF BPA IN TEETHERS**

SN	Sample Type	Instructions	Results in ppm
1	Teether	0% BPA#	BDL
2	Teether	No Instructions#	BDL
3	Teether and Rattle set	Durable/Safe#	BDL
4	Teether	No Instructions	0.03
5	Teether	BPA Free*	0.05
6	Teether	No Instructions	0.07
7	Teether	Safest for Baby*	0.08
8	Teether	No Instructions	0.3
9	Teether	Non Toxic*	0.4
10	Teether	No Information	0.6
11	Teether	No Instructions	0.7
12	Teether	No Information	1.6
13	Teether	Non PVC*	17.5
14	Teether	Non Toxic*	20.4
15	Teether	No Instructions	38.1

BDL: Below Detected Level

# Samples type were labeled safe and BPA free and BPA was found to be below detection level

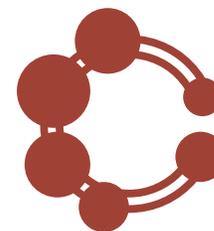
\* Samples type are labeled as BPA free/safe but BPA was detected while sample testing

## ANALYSIS OF THE RESULTS

- BPA was found in twelve of the fifteen samples tested
- BPA is detected in well known brands and in samples that had mentioned safe and non-toxic for children (0% BPA)
- The maximum concentration of BPA was found to be 38.1 ppm
- Some of the samples were below detection limit
- In five of the seven samples, BPA has been detected though they were labeled BPA-free

## DISCUSSION

The tests results show that BPA is found in teethers and there is a possibility that it may leach out gradually and enter into the body. So, as a precautionary approach teethers should not contain BPA. There should be stricter regulations in place keeping in mind children's health.



**There should be stricter regulations in place keeping in mind children's health.**



## REFERENCES

1. <https://en.wikipedia.org/wiki/Teether>
2. <http://www.merriam-webster.com/dictionary/teether>
3. <http://www.medicalnewstoday.com/articles/221205.php>
4. <http://www.niehs.nih.gov/health/topics/agents/sya-bpa/>
5. <http://www.prnewswire.co.in/news-releases/baby-soothers-and-teethers-market-to-see-363-cagr-to-2020-577055551.html>

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