

# Nutritional Interventions to Ameliorate Effect of Endocrine Disruptors on Reproductive Health

## A Semi-Structured Review



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## BACKGROUND & AIM

Endocrine disruptors (EDCs) are exogenous agents that interfere with the body's hormones. The main source of EDCs is diet. They affect a host of physiological systems and can have detrimental effects on reproductive, perinatal and obstetric health. Guidance on how to minimise the harm from EDCs is lacking. This study's aim was to analyse the evidence on nutritional interventions to ameliorate the effects of endocrine disruptors on reproductive health for regulatory bodies, healthcare providers, and patients alike.

## METHODS

A systematic search was conducted of MEDLine (Pubmed), Allied Health Literature (CINAHL), EMBASE, Web of Science and the Cochrane Database was conducted from inception to May 2021. Inclusion criteria was experimental studies on human populations Data was collected from eligible studies. Risk of bias assessment was completed using Cochrane risk of bias tool and the ROBINS-I Tool.

## RESULTS

Database searches yielded 15,362 articles. Removing 11,181 duplicates, 4,181 articles underwent abstract screening. Twenty-six articles were eligible for full manuscript review. Sixteen met full inclusion criteria. Key characteristics of each study are presented below. The studies were published between 2009 and 2021. Population size per study varied between fifteen and 355 participants. Of the sixteen included studies, eight were randomised controlled trials. In addition, there were three crossover trials and six non-randomised experimental trials.

## RESULTS

There is high-quality evidence to show that these interventions reduce endocrine disruptor exposure:

- Plastic containers, bottles and packaging avoidance
- Canned food/beverage avoidance
- Fresh and organic food consumption
- Fast/processed foods avoidance
- Supplementation with Vitamin C, Iodine and Folic Acid

There were few interventional studies examining therapies to improve clinical outcomes related to endocrine disruptors.

Intervention	Study Author, Year	Intervention and Duration vs Control	Summary of Findings
Organic Food Consumption	Hagobian 2017	<b>Intervention:</b> Lifestyle interventions include Education sessions, BPA-Free tupperware/water bottles, make up, hygiene and feminine products), organic foods packaged in BPA-free glass/cardboard containers; For Three Weeks;	Lifestyle Intervention significantly reduced BPA Urine concentration
	Sathyanarayana 2012	<b>Intervention:</b> Dietary replacement consistent of fresh/organic food, catered foods prepared without plastics; <b>Duration of Intervention:</b> Five days <b>Control:</b> Education alone, conducted via handouts	
	Curl 2019	<b>Intervention:</b> Organic Fruit and Veg; <b>Duration of Treatment:</b> Twenty-four weeks <b>Control:</b> Conventional Fruit and Veg	Organic diet significantly reduces BPA. No difference in PBP or TCPY
Plastics Avoidance	Rudel 2011	<b>Intervention:</b> diet consisting of fresh organic fruit, veg, grains and meats. No canned foods, Avoiding plastic utensils, non-stick cookware, glass containers with BPA-free plastics, stainless steel water bottles and containers; <b>Duration of Treatment:</b> Three days ; <b>Control:</b> Typical Diet	EDC urinary levels decreased with intervention and increased again with resumption of typical diet
	Lu 2006	<b>Intervention:</b> Organic Food Diet; <b>Duration of Treatment:</b> Five Day <b>Control:</b> Conventional Diet	Organic diet caused immediate reduction in median urinary concentrations of organophosphorus pesticide metabolites Significant reduction in urinary BPA levels with non-plastic intervention
	Sessa 2021	<b>Intervention:</b> certified compostable materials only. <b>Control:</b> typical plastic beverage bottles, plates etc <b>Duration of Intervention:</b> Five days	
Canned Food and Beverage Avoidance	Carwile 2011	<b>Intervention:</b> Fresh soup; <b>Control:</b> Canned soup <b>Duration of Intervention:</b> Five days of each intervention/control, with two day washout period in between crossover	Canned soup 1221% higher urinary BPA compared to fresh soup
	Bae 2014	<b>Intervention:</b> Glass containers for beverages; <b>Control:</b> Canned containers <b>Duration of Intervention:</b> One week on each intervention, with weeklong wash-out period between	Canned beverage avoidance reduced urinary BPA. But this did not translate to improvements in blood pressure
Iodine Supplementation	Brucker Davis 2015	<b>Intervention:</b> Iodine supplementation of 150ug/day in Iodine-enriched pregnancy vitamin; <b>Control:</b> pregnancy vitamins not enriched with iodine <b>Duration of Treatment:</b> From first trimester through pregnancy	Exposure to PCB118 linked with dysfunctional early language development – not improved with iodine supplementation
Fatty Fish Diet	Dusanov 2019	<b>Intervention:</b> Fatty fish consumption, Nuts consumption <b>Control:</b> Usual diet with avoidance of fatty fish / nuts <b>Duration of Treatment:</b> Six months	No reduction in POPs with fatty fish consumption
Personal Care Product Alterations	Harley 2016	<b>Intervention:</b> Consumer-choice of specific EDC-free personal care products as specified on product label <b>Control:</b> Pre intervention measurement <b>Duration of Treatment:</b> three-day intervention period	Intervention was associated with 27.4% reduction in urinary mono-ethyl phthalate levels, 43.9% reduction in methyl parabens and 45.5% reduction in propyl parabens.
Vitamin C Supplementation	Guo 2016	<b>Intervention:</b> Vitamin C 1000mg/day; <b>Duration of treatment:</b> two months <b>Control samples:</b> Prior to Vitamin C supplementation	Vit C reduced PCBs and OCPs but not PBDEs

## CONCLUSION

Diets rich in fresh organic foods reduces harm from Endocrine Disruptors.

Avoiding processed canned and plastic-contaminated foods also aids to reduce harmful exposure

