

# Phthalate and Novel Plasticizer Concentrations in Food Items from U.S. Fast Food Chains

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## INTRODUCTION

- Exposure to phthalates is widespread among the U.S. population<sup>1</sup> and is linked to adverse health outcomes such as endocrine disruption and reproductive toxicity.<sup>2</sup>
- Non-phthalate plasticizers such as dioctyl terephthalate (DEHT) have emerged as replacement plasticizers, despite limited available toxicity data.<sup>3,4</sup>
- Diet is the primary source of exposure for many plasticizers, including phthalates<sup>5</sup>; fast foods, due to processing packaging, and handling, may be important sources of exposure for these chemicals.<sup>6</sup>

**We aimed to characterize ortho-phthalates and replacement plasticizers in food items and food handling gloves from popular fast food chains.**

## METHODS

- Sampling occurred at **Hamburger, Pizza, and Tex-Mex chains** at multiple locations per chain across 2 phases (Ph. 1= 2017, n=42 foods; Ph. 2= 2018, n=22 foods, n=3 gloves)
- Eleven analytes analyzed in fast food items (**n=64**) and gloves (**n=3**) by gas chromatography mass spectrometry (GC/MS)

## RESULTS

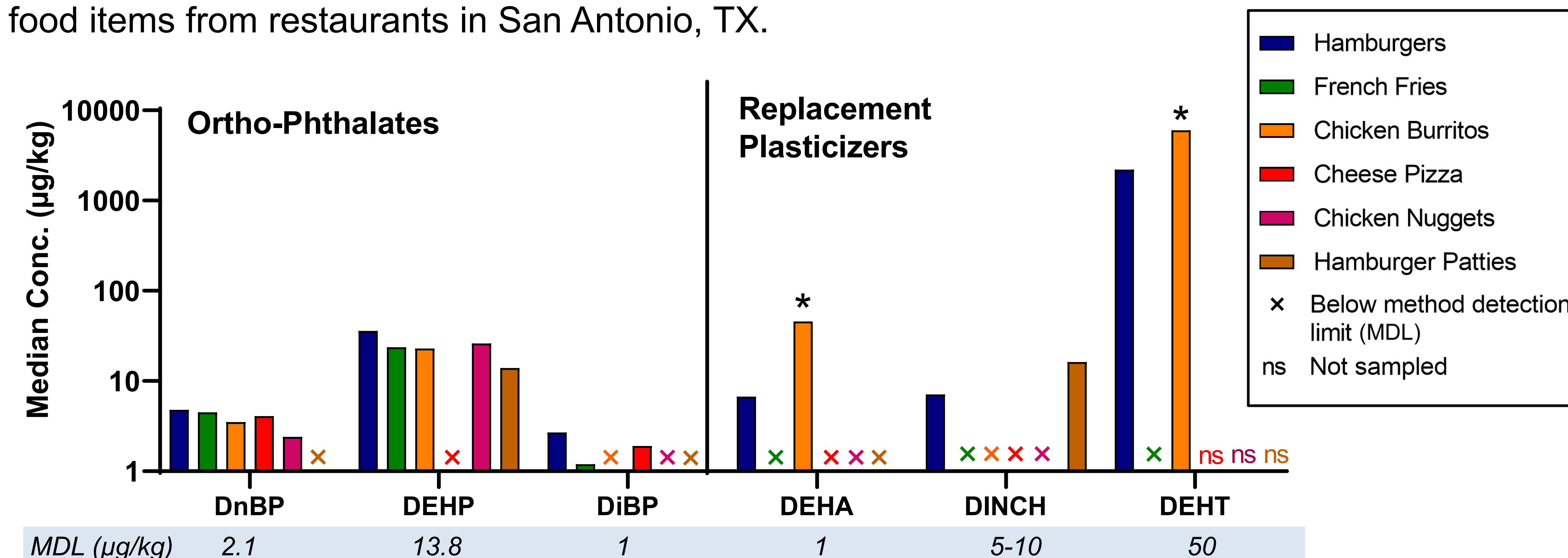
**Table 1.** Detection frequencies for ortho-phthalates and replacement plasticizers detected in fast food items from fast food restaurants in San Antonio, TX.

	Hamburgers (n=21)	Fries (n=10)	Chicken Burritos (n=14)	Cheese Pizza (n=8)	Chicken Nuggets (n=7)	Hamburger Patties (n=4)
	<b>Total % Detect</b>	<b>% Detect</b>	<b>% Detect</b>	<b>% Detect</b>	<b>% Detect</b>	<b>% Detect</b>
<b>Ortho-Phthalates</b>						
BBzP	20.3	29	40	7	0	29
DnBP	81.3	100	80	71	100	57
DnOP	6.3	0	0	0	38	14
DEP	39.1	38	50	36	13	29
DEHP	70.3	100	70	57	0	100
DiBP	38.1	88	57	13	50	0
DiNP	28.6	0	0	100	50	0
DMP	0	0	0	0	0	0
<b>Replacement Plasticizers</b>						
DEHA	40.6	62	30	71	0	0
DINCH	14.1	24	0	0	29	50
DEHT	86.4	100	0	100	ns	ns

\*DiNP and DiBP are phase 1 analytes only (n=42); DEHT is a phase 2 analyte only (n=22)

## RESULTS

**Figure 1.** Median concentrations of selected ortho-phthalates and replacement plasticizers in fast food items from restaurants in San Antonio, TX.



**Table 2.** Comparison of plasticizers DEHT and DINCH detected in fast food items and gloves from selected fast food restaurants in San Antonio, TX.

Replacement Plasticizer	Location	Median Conc. in fast food (µg/kg)	Conc. in gloves (g/glove)
DEHT	Hamburger Chain A #1	Hamburger	1,900
	Hamburger Chain B #2	Hamburger	2,400
	Tex-Mex Chain A #1	Chicken Burrito	5,000
DINCH	Hamburger Chain B #2	Hamburger	364.1

## CONCLUSIONS

- Ortho-phthalates and replacement plasticizers are abundant in prepared meals available at popular fast food restaurants; generally, foods containing meat had higher chemical concentrations.
- DEHT was found at the highest concentrations in burritos (n=6; median = 6,000 µg/kg) and food handling gloves (n=3; range= 1.24-1.84 g/glove). To our knowledge, these are the first data available of DEHT in food, and the first data of plasticizers from US fast food chains.
- Replacement plasticizers were found at high concentrations in food and gloves. This is consistent with studies showing increased human exposure to replacement plasticizers.
- Further research is needed to identify health implications, particularly for replacement plasticizers, and inform opportunities for intervention.

### References

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