



# PRESERVATIVES IN LIQUID HERBAL DIETARY SUPPLEMENTS AND EXPOSURE ASSESSMENT

Dietary supplements could contain preservatives, chemicals widely used to prolong shelf life of sensitive products, and thus present potential health risk. An investigation of actual usage levels of preservatives in dietary supplements was conducted to provide concentration data for exposure assessment, further combined with product usage instructions declared by the manufacturers.

Eighty eight herbal dietary supplements purchased in pharmacies in Novi Sad in 2018 (36) and 2021 (52) were liquids with either sorbates or benzoates on ingredients list.

The method of analysis was HPLC-UV. Daily intake of sorbic and benzoic acid was expressed as percentage of their respective acceptable daily intakes (ADI) of 11 and 5 mg/kg body weight/day.

Sample Number	Ingredients	Shelf life	Population	Usage instructions	Intake (mg/kg bw/day)	% ADI
1	Primrose, Thyme	2022 08	preschool children, 4-7 years	3 x 1 coffee spoon (5 ml)	7.8	156
			toddlers, 1-3 years	3 x 1 coffee spoon (5 ml)	15.0	300
2	Primrose, Thyme	2022 12	adults	3 x 1 table spoon (15 ml)	7.4	148
3	Primrose, Thyme	2022 06	preschool children, 4-7 years	3 x 1 coffee spoon (5 ml)	4.9	99
			children, 7-10 years	3 x 1 table spoon (15 ml)	10.3	206
			adolescents	3 x 1 table spoon (15 ml)	6.6	132
			adults	3 x 1 table spoon (15 ml)	4.5	90

Table 1. Samples which exceeded benzoic acid ADI

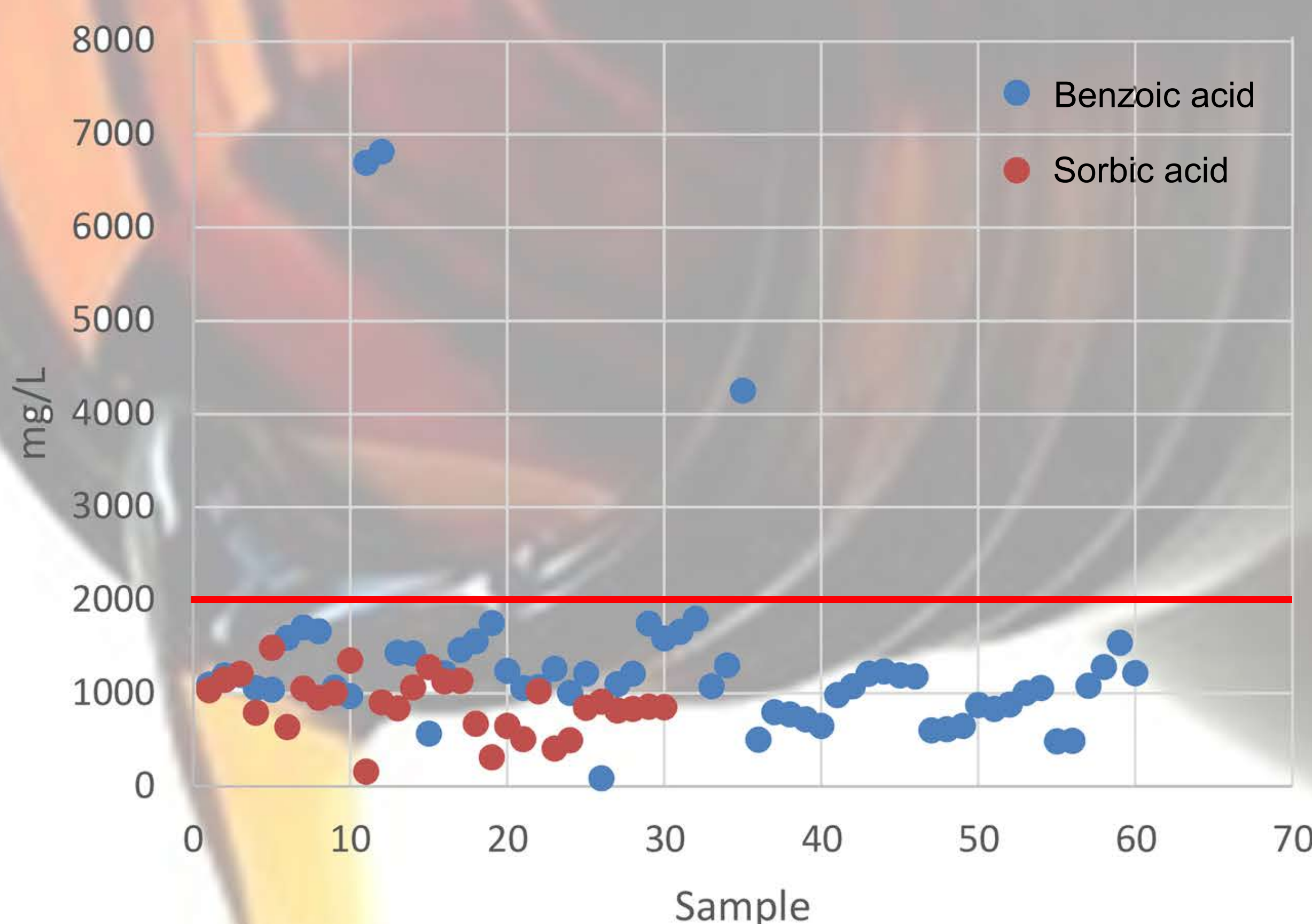


Figure 1. Conformity evaluation for benzoic and sorbic acid (maximum permitted level 2000 mg/L)

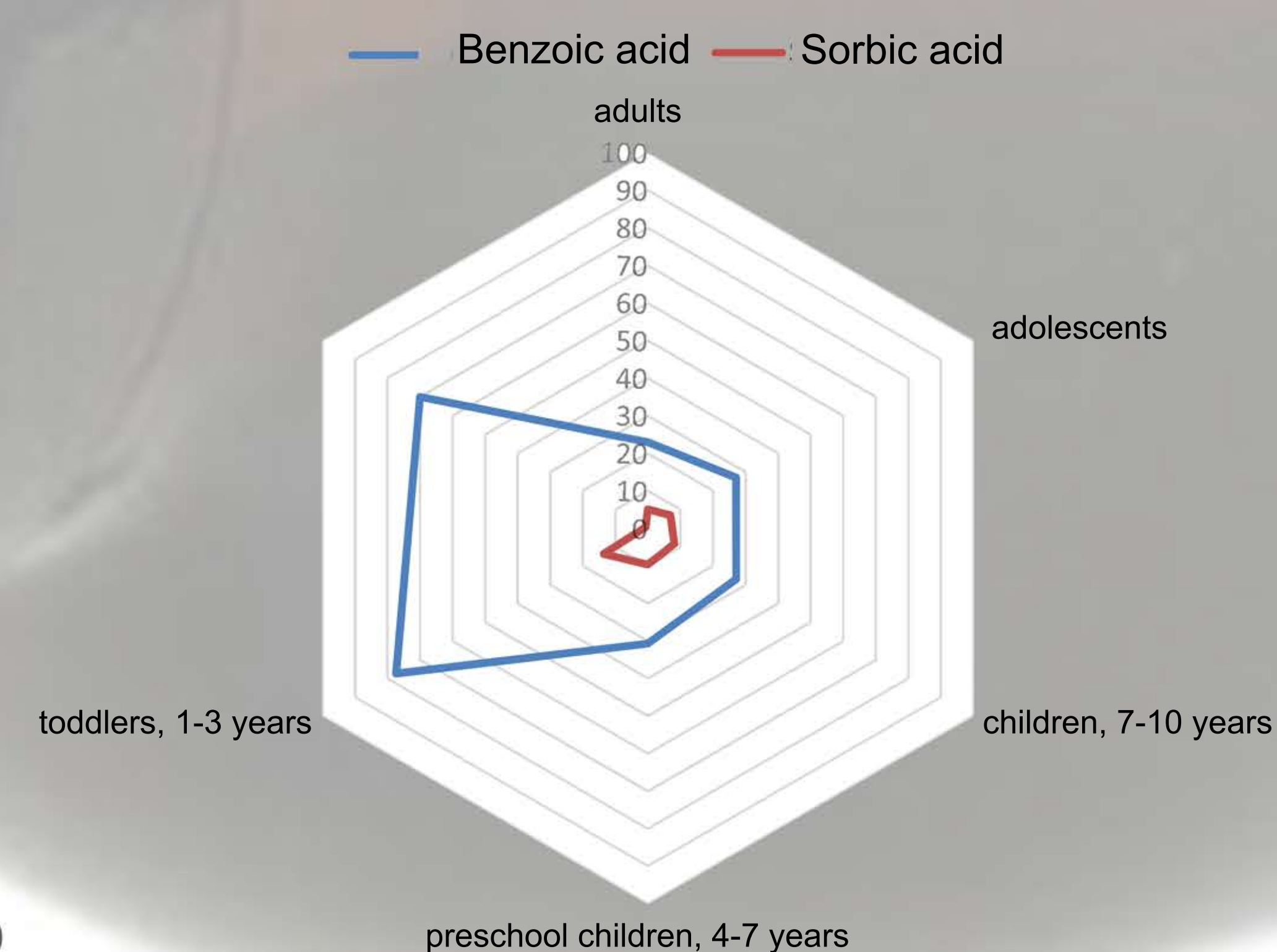


Figure 2. Mean exposure (% of ADI) by different population groups

Conformity evaluation revealed three samples containing benzoic acid in excess of the maximum permitted level of 2000 mg/L (4244-6811 mg/L) (Figure 1).

Benzoic acid ADI was exceeded by three samples (Table 1), one intended for adults (148%), one for adolescents (132%) and children (206%), one if used by preschool children (156%) and toddlers (300%). No samples exceeded sorbic acid ADI by any of the population groups.

Mean exposure of adults, adolescents, children and preschool children ranged from 23 to 31% of ADI for benzoic acid, and from 5 to 10% of ADI for sorbic acid (Figure 2).

Mean exposure from 31 samples intended for toddlers, excluding nine samples demanding pediatrician's recommendation for dosing, corresponded to 77% of ADI for benzoic and 14% for sorbic acid. Only three samples were intended for infants, one of which reached 70% of benzoic acid ADI.

High exposure level (95<sup>th</sup> percentile) reached 84% (benzoic) and 23% (sorbic acid) in population of preschool children.

However, more realistic approach considering usually short period of supplements' usage showed significantly lower exposure and no health concern.