



National Institute for Public Health  
and the Environment  
*Ministry of Health, Welfare and Sport*

**Risk assessment of propyl gallate in  
water-based vitamin D supplements  
intended for infants and young children**

RIVM letter report 2019-0217  
L. Razenberg | R.C. Sprong





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## Colophon

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## Synopsis

### **Risk assessment of propyl gallate in water-based vitamin D supplements intended for infants and young children**

The food additive propyl gallate (E 310) is used as an antioxidant in water-based vitamin D droplets ('aquosum'). It is not present in oil-based vitamin D supplements.

Babies (younger than 1 year) and toddlers (aged 1-3 years) are given vitamin D droplets every day. If water-based droplets are given, they ingest propyl gallate every day. Propyl gallate in these droplets is safe for babies older than 4 months and for toddlers. For babies younger than 4 months, more studies are needed to assess the safety. These are the conclusions of RIVM's research. RIVM assessed the safety of propyl gallate in these vitamin D supplement upon the request of the Ministry of VWS (Public Health Welfare and Sports).

A person can safely ingest 0.5 milligram propyl gallate per kilogram bodyweight every day. For babies younger than 4 months, the safe intake may be different. As their organs are still developing, a specific safe intake for this age group has to be derived. Additional studies are needed to do this.

Babies older than 4 months and toddlers ingest no more than 0.03 milligram propyl gallate per kilogram body weight per day via these droplets. They also ingest propyl gallate via other foods. This accounts for 0.3 milligram propyl gallate per kg body weight per day. In total, the ingested amount of propyl gallate is less than the acceptable daily intake of 0.5 milligram per kg bodyweight per day.

Keywords: food additives, propyl gallate, E 310, vitamin D supplements, infants, young children, exposure



## Publiekssamenvatting

### **Veiligheid van propylgallaat in vitamine D-druppels voor baby's en peuters**

Het voedseladditief propylgallaat (E 310) wordt als antioxidant gebruikt in druppels vitamine D op basis van water ('aquosum'). Het zit niet in druppels vitamine D op basis van olie.

Baby's (jonger dan 1 jaar) en peuters (1-3 jaar) krijgen iedere dag vitamine D-druppels. Bij het gebruik van druppels op waterbasis krijgen zij elke dag propylgallaat binnen. Propylgallaat in vitamine D-druppels is veilig voor baby's die ouder zijn dan 4 maanden en voor peuters. Voor baby's jonger dan 4 maanden is meer informatie nodig om hier een uitspraak over te kunnen doen. Dit blijkt uit onderzoek van het RIVM. Het ministerie van VWS heeft het RIVM gevraagd de veiligheid van propylgallaat in deze voedingssupplementen te beoordelen.

Een mens mag iedere dag 0,5 milligram propylgallaat per kilo lichaamsgewicht binnenkrijgen. Het kan zijn dat voor baby's jonger dan vier maanden andere veilige hoeveelheden gelden. Omdat hun organen nog in ontwikkeling zijn, moet voor hen een specifieke veilige hoeveelheid worden bepaald. Er zijn meer studies nodig om dat te kunnen doen.

Baby's ouder dan 4 maanden en peuters krijgen elke dag niet meer dan 0,03 milligram propylgallaat per kilo lichaamsgewicht binnen met deze druppels. Via andere voedingsmiddelen krijgen ze ook nog elke dag 0,3 milligram per kilo lichaamsgewicht binnen. Alles bij elkaar opgeteld is de hoeveelheid propylgallaat minder dan de veilige hoeveelheid van 0,5 milligram per kg lichaamsgewicht per dag.

**Kernwoorden:** voedseladditieven, propylgallaat, E 310, vitamine D supplementen, zuigelingen, jonge kinderen, blootstelling



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## Summary

The food additive propyl gallate (E310) is used as an antioxidant in water-based vitamin D supplements intended for infants (younger than 1 year) and young children (1-3 years). A risk assessment for the use of propyl gallate in these supplements was performed at the request of the Dutch Ministry of Public Health, Welfare and Sports.

For infants older than 16 weeks and young children, the maximum additional dietary exposure of propyl gallate due to consumption of water-based vitamin D supplements is 0.03 mg/kg bodyweight (bw) per day. When combined with a conservative estimate of a background dietary exposure of 0.3 mg/kg bw per day, the total dietary exposure of propyl gallate would remain below the acceptable daily intake (ADI) of 0.5 mg/kg bw. This implies that dietary exposure to propyl gallate from consumption of water-based vitamin D food supplements by infants older than 16 weeks and children older than 1 year is safe.

For infants younger than 16 weeks, additional toxicological studies are required to derive a health based guidance value, such as the acceptable daily intake, for this specific age group. Therefore, it is currently not possible to assess the safety of the estimated daily dose of 0.05 mg/kg bodyweight due to consumption water-based vitamin D droplets.

It should be noted that exposure to propyl gallate via other sources, such as food contact materials and personal care products, could not be taken into account because information on exposure levels due to those sources was too limited.



## 1 Introduction

Several European Member States have a national policy for supplementation of vitamins and/or minerals for infants<sup>1</sup> and young children<sup>2</sup>. In the Netherlands, there is a national policy for supplementation of vitamin K for children from birth up to 12 weeks and supplementation of vitamin D for children from birth up to 4 years. This supplementation is given in the form of food supplements, such as oil-based or water-based droplets. These food supplements contain food additives, which fulfil a certain technological need, such as prevention of oxidation of the vitamins and the (oil) matrix in which they are dissolved. According to Regulation EU no 1333/2008, the use of food additives is not allowed in food supplements for infants and young children. The authorization of food additives in food supplements for infants and young children for which Member States have a national policy is under discussion within the European Commission.

Some water-based vitamin D droplets for infants and young children available on the Dutch market contain the antioxidant propyl gallate (CAS Registry Number 121-79-9; EINECS number 204-498-2). In the EU, propyl gallate is currently authorized as food additive (E 310, table 1 lists the current authorisations in the EU), amongst others in food supplements. Those authorisations exclude any use in foods for infants and young children. Some consumers and maternity nurses expressed their concerns regarding the use of propyl gallate in vitamin D supplements for infants and young children. Therefore, the Dutch ministry of Public Health, Welfare and Sports (VWS) requested RIVM to perform a risk assessment for the use of propyl gallate in food supplements intended for infants and young children. The present document describes this risk assessment. We first describe how risk assessment for infants and young children should be performed. Next, a hazard assessment for propyl gallate is performed. Then, the dietary exposure to propyl gallate as a consequence of its use as food additive in supplements for infants and young children and taking into account background dietary exposure is described, followed by a risk assessment. Furthermore, other relevant considerations are discussed. Finally, conclusions are provided

<sup>1</sup> children under the age of 12 months as defined by Regulation 609/2013

<sup>2</sup> children aged between one and three years according to Regulation 609/2013

Table 1. Food categories in which propyl gallate is allowed, adapted from the EFSA opinion of 2014.

<b>Food category number</b>	<b>Foods</b>	<b>Restrictions</b>
1.5	Dehydrated milk as defined by Directive 2001/114/EC	only milk powder for vending machines
2.1	Fats and oils essentially free from water (excluding anhydrous milk fat)	only fats and oils for the professional manufacture of heat-treated foods; frying oil and frying fat (excluding olive pomace oil) and lard, fish oil, beef, poultry and sheep fat
2.2.2	Other fat and oil emulsions including spreads as defined by Council Regulation (EC) No 1234/2007 and liquid emulsions	only frying fat
4.2.5.4	Nut butters and nut spreads	only processed nuts
4.2.6	Processed potato products	only dehydrated potatoes
5.3	Chewing gum	
6.3	Breakfast cereal	only pre-cooked cereals
6.7	Pre-cooked or processed cereals	only pre-cooked cereals
7.2	Fine bakery wares	only cake mixes
8.3.1	Non-heat-treated processed meat	only dehydrated meat
12.2.2	Seasonings and condiments	
12.5	Soup and Broths	Only dehydrated soups and broths
12.6	Sauces	
15.1	Potato-, cereal-, flour- or starch-based snacks	only cereal-based snack foods
15.2	Processed nuts	
17.1	Food supplements supplied in a solid form including capsules and tablets and similar forms, excluding chewable forms <sup>a</sup>	
17.2	Food supplements supplied in a liquid form <sup>a</sup>	
17.1	Food supplements supplied in a syrup-type or chewable form <sup>a</sup>	

<sup>a</sup>Excluding supplements destined for infants and young children below the age of three years.

## 2 Guidance on risk assessment for infants and young children

Guidance is available for risk assessment for infants and young children. This section describes the available guidance.

### 2.1 Infants younger than 16 weeks

In April 2017, the EFSA Scientific Committee (EFSA SC) published its Guidance on the risk assessment of substances present in food intended for infants below 16 weeks of age (EFSA 2017a). This guidance gives an overview of studies required to perform a risk assessment of substances in infant formulae (considered as the only source of food for infants younger than 16 weeks besides mother's milk).

In general, the EFSA SC considers in its guidance that the safety evaluation of substances in food intended for infants younger than 16 weeks can be done based on the principles used for safety evaluation for substances in food for the general public. Usually, effects observed in adults are also expected to occur in infants, although the effects may occur at a higher or lower dose. It is generally assumed that infants are more sensitive than adults. Furthermore, additional effects that are not seen in adults may occur in infants. Those effects may be present shortly after exposure or become apparent only later in life. Taken together, this means that data on the toxicity and/or kinetics of the specific substance can be used for the safety assessment for young infants, but specific studies on the sensitivity of this population may be required to generate enough information to complete the safety evaluation for infants younger than 16 weeks. EFSA SC also provides guidance on the type of specific studies required to complete the safety evaluation for infants younger than 16 weeks. In principle, an extended one-generation reproductive toxicity (EOGRT) study is required. When toxicological studies do not show adverse effects and ADME studies show no relevant absorption, a repeated dose study with direct oral administration to neonatal animals (e.g. in piglet models) is considered sufficient.

In case the additional study in neonatal animals or the EOGRT study do not show additional effects or effects at lower doses, the health-based guidance value (HBGV) for the general public is also applicable to infants younger than 16 weeks. In case additional effects or effects at lower doses are shown in the neonatal study or the EOGRT study, the reference point from this study should be taken into consideration when establishing a HBGV for infants younger than 16 weeks (see also figure 1).

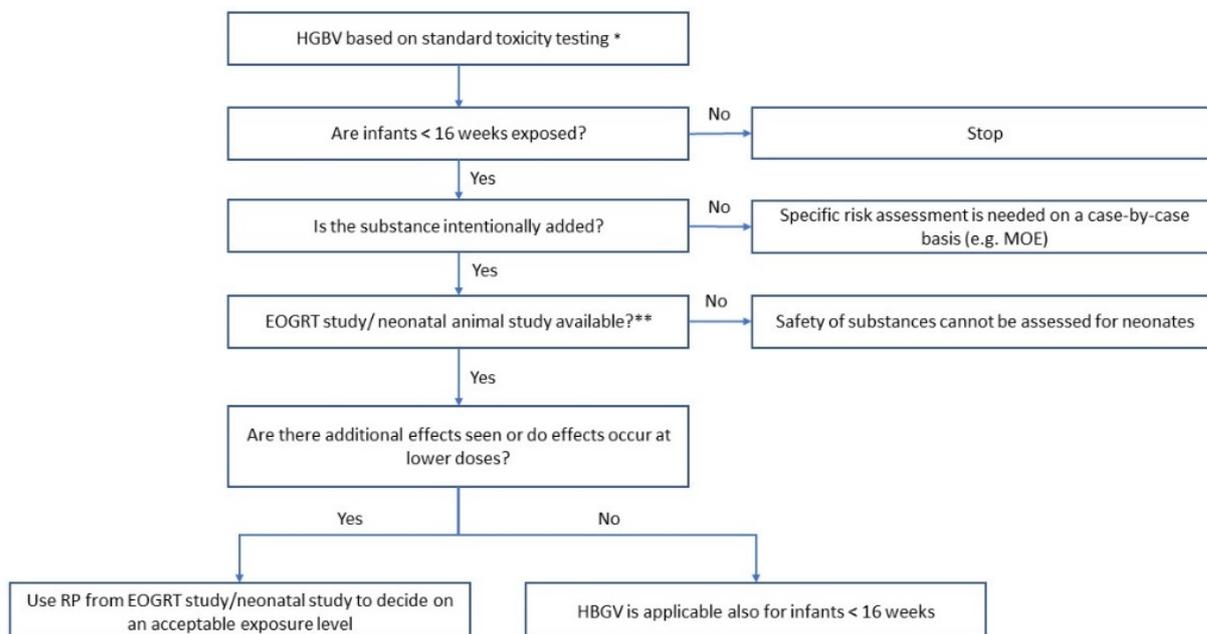


Figure 1. Decision tree for the risk assessment of substances present in food intended for infants younger than 16 weeks of age. From: EFSA 2017a.

RP: reference point.

\*This decision tree assumes that a standard chemical risk assessment [i.e. risk assessment for the population older than 16 weeks] has already been performed on the substance of interest.

\*\* Extended one-generation reproductive toxicity (EOGRT) study if the substance is systemically available, neonatal animal study if the substance is not absorbed from the gastrointestinal tract and is not systemically available.

## 2.2 Infants (older than 16 weeks) and young children (1-3 years)

The EFSA SC (2017a) considers infants below 16 weeks of age as a subpopulation for which the general HGBV is not considered applicable. EFSA SC did not specifically address the risk assessment for infants older than 16 weeks in its guidance.

In 2018, the EFSA Panel on Plant Protection Products and their Residues (PPR Panel) concluded based on currently available evidence that differences in physiology of organs (gut, nervous system, immune system, the male and female reproductive systems, and the endocrine system) and toxicokinetics (i.e. absorption, distribution, metabolism and excretion of chemicals) between infants above the age of 16 weeks and young children on the one hand and adults on the other hand are limited. Therefore, the PPR Panel concluded that HGBV can be applied to infants above 16 weeks of age and to young children, and that an additional assessment factor to cover higher sensitivities is not necessary for these age groups (EFSA, 2018).

In the current assessment for propyl gallate in food supplements for infants and young children, we will therefore consider the ADI applicable to infants older than 16 weeks and for young children aged 1 – 3 years.

### 3 Hazard assessment for propyl gallate

The hazard assessment for propyl gallate as food additive in water-based vitamin D supplements for infants and young children was based on the most recent re-evaluation of propyl gallate as food additive by the EFSA Panel on Food additives and Nutrient Sources added to Food (ANS Panel) in 2014. The Panel established an ADI for propyl gallate of 0.5 mg/kg bw. Relevant information from this re-evaluation is summarised below.

Propyl gallate is well absorbed and hydrolysed to propyl alcohol<sup>3</sup> and gallic acid. Gallic acid is further metabolised and excreted, while propyl alcohol is incorporated into the individual's regular metabolism of alcohols.

Propyl gallate is of low acute oral toxicity. Short term- and subchronic studies showed adverse effects of propyl gallate on several endpoints, including body weight, liver weight, some blood parameters and enzyme activities in several organs. In a 90-day study in rats, the NOAEL was 135 mg/kg bw per day, based on haematological effects seen at a higher dose.

EFSA concluded that propyl gallate is not genotoxic and not carcinogenic. The data on reproductive toxicity of propyl gallate are old and poorly described, and were therefore not considered appropriate to conclude on reproductive effects of propyl gallate. The No Observed Adverse Effect Level (NOAEL) for developmental toxicity is 300 mg/kg bw per day.

EFSA established an ADI for propyl gallate of 0.5 mg/kg bw based on the NOAEL of 135 mg/kg bw per day in a 90-day study in rats and an uncertainty factor of 300. The NOAEL is based on hematological effects seen at higher doses. The uncertainty factor consists of the standard factors for intraspecies (factor 10) and interspecies (factor 10) differences and an additional factor 3 to extrapolate from a subchronic to chronic data and due to the limitations in the reproductive toxicity database.

In the EFSA opinion on propyl gallate (EFSA, 2014), an EOGRT study or neonatal animal study is not available. For propyl gallate, such studies are currently not available in scientific literature.

<sup>3</sup> Also called propanol



## 4 Exposure Assessment

Based on information provided by the industry to the European Commission, only some water-based vitamin D droplets on the Dutch market contain propyl gallate. As far as we know, propyl gallate is not present in other food supplements that are included in the national supplementation policy in the Netherlands or other European countries. Therefore, we only used the recommended daily dose of the water-based vitamin D supplements and propyl gallate levels used in those supplements available on the Dutch market in the exposure assessment.

First, the dietary exposure to propyl gallate from water-based vitamin D food supplements was assessed and thereafter background dietary exposure via other foods was included in the assessment.

### 4.1 Dietary exposure to propyl gallate from food supplements

To calculate the dietary exposure to propyl gallate via consumption of water-based vitamin D supplements for infants and young children, information provided by the producer was obtained. The use level in the water-based vitamin D supplement was reported as 300 mg/L and the recommended daily dose was reported as 10 drops corresponding to 0.4 mL.

For the exposure calculations, bodyweights of Dutch infants (TNO groeidiagrammen) were used. Standard bodyweights from the World Health Organisation (WHO child growth standards) were used as a proxy for other European countries. For a conservative approach, the following decisions were made:

- For body weight, the lowest available percentile was used, which is the P1 of the WHO and the P0.6 for the Netherlands;
- For each age group, the bodyweight of the youngest infants and children was used;
- In addition, for the calculation of the dietary exposure to propyl gallate due to consumption of water-based vitamin D food supplements the lowest bodyweight of boys or girls of each age group was used.

Table 2 shows the bodyweights for the particular age groups. For example, for infants below the age of 16 weeks, calculations were performed with body weight from girls (lowest in both WHO and Dutch tables) with the bodyweight at birth (WHO) or 1 week old (TNO).

Table 2. Bodyweights (kg) used for calculation dietary exposure to propyl gallate due to vitamin D supplements

Age	P1 WHO <sup>1</sup>		P0.6 NL <sup>2</sup>	
	boys	Girls	boys	girls
0 months	2.3	2.3	2.8	2.6
4 months	5.4	4.8	4.9	4.6
12 months	7.5	6.8	8.1	7.2

<sup>1</sup> World Health Organisation; WHO child growth standards

<sup>2</sup> TNO groeidiagrammen

Table 3 lists the calculated dietary exposure to propyl gallate from water-based vitamin D food supplements based on information obtained from the industry (use level and recommended daily dose) and on the body weights shown in Table 2. The dietary exposure to propyl gallate varied from 0.017 to 0.052 mg/kg bw per day, depending on age and body weight. For infants aged between 16 weeks and 12 months, the propyl gallate dietary exposure reflects up to 5.2 % of the ADI. For children older than 12 months, the propyl gallate equals up to 3.5% of the ADI.

Table 3. Calculated dietary exposure to propyl gallate from water-based vitamin D containing food supplements for infants and young children

Age	Dietary exposure (mg/kg bw per day) <sup>1</sup>		Dietary exposure % of ADI <sup>4</sup>	
	WHO <sup>2</sup>	NL <sup>3</sup>	WHO <sup>2</sup>	NL <sup>3</sup>
< 16 weeks	0.052	0.046	NA <sup>5</sup>	NA <sup>5</sup>
Between 16 weeks and 12 months	0.025	0.026	5.0%	5.2%
> 12 months	0.017	0.017	3.5%	3.3%

<sup>1</sup> Based on information obtained by industry: Use levels propyl gallate of 300 mg/kg and a daily supplement dose of 10 drops, which is 0.4 mL. This resulted in a dietary exposure to propyl gallate of 0.12 mg/day.

<sup>2</sup> Based on standard global bodyweights obtained from the World Health Organisation (WHO child growth standards).

<sup>3</sup> Based on standard Dutch bodyweights (TNO groeidiagrammen).

<sup>4</sup> Acceptable daily intake (ADI) of 0.5 mg/kg bodyweight per day obtained from EFSA (2014).

<sup>5</sup> The ADI for the general population does not apply to infants younger than 16 weeks.

## 4.2 Dietary exposure to propyl gallate from other sources

For background dietary dietary exposure to propyl gallate, information was obtained from the most recent EFSA opinion (EFSA, 2014).

For infants aged younger than 16 weeks, mother's milk and/or infant formulae form the sole sources of food. No background dietary exposure from infant formulae is to be expected for this age group as propyl gallate is not allowed in infant formulae. Thus, the maximum total propyl gallate dietary exposure of infants younger than 16 weeks fed infant formulae is 0.052 mg/kg per day (exposure via vitamin D supplements only). Information on excretion of propyl gallate or its metabolites into mother's milk is not known. Therefore, we do not know whether there is any background exposure in breast-fed children.

At the time of the EFSA re-evaluation of propyl gallate (2014), no food consumption data were available for infants below the age of 12

months. Information was only available for children older than 12 months from 4 European countries. Recently, EFSA published a Scientific opinion on pesticides in foods for infants and young children and concluded that exposure to pesticides was the highest for young children and the lowest for infants from 3 to 6 months old (EFSA 2018). The observed increase in pesticide exposure with age between the age of 3 months and 3 years was correlated to the increasing consumption of foods destined for the general population, which was the main source of exposure in all case studies described in the particular EFSA opinion. A similar increase in dietary exposure in children between the age of 3 months to 3 years could also be applicable for the background dietary exposure of propyl gallate, because this food additive is only authorised in foods for the general population and not in baby foods (Table 1). Therefore, assuming that the background dietary exposure to propyl gallate by children older than 16 weeks and younger than 12 months is similar to that of children aged 1 to 3 years, is likely a worst case assumption. Table 4 lists the exposure estimates given by EFSA for the re-evaluation of propyl gallate using a refined scenario based on analytical data and maximum permitted levels in case analytical data were not available (EFSA 2014). Dietary exposure to propyl gallate varied from 0.0 to 0.3 mg/kg bw per day, depending on the population and exposure statistics. Breakfast cereals (as a source of pre-cooked cereals), fine bakery wares (as a source of food containing food category 2.1 'only fats and oils for the professional manufacture of heat-treated foods'), 'herbs, spices and seasonings', and 'soups and broths' contributed most to the exposure of toddlers.

It should be noted that EFSA qualified this estimate as conservative, as it was assumed that all processed foods belonging to a food category contain the antioxidant propyl gallate added at the maximum permitted level or the maximum reported data on analytical levels (EFSA 2014). Of the nine food categories considered in the assessment of EFSA, six had no or too few reported analytical data and maximum permitted levels were used instead. Also, for the remaining three food categories, almost all reported concentrations were below the limit of quantification (LOQ). Out of the 1029 data points submitted to EFSA, only two (two pork lard samples) had quantifiable levels of propyl gallate. This indicates that use of propyl gallate is indeed low. EFSA performed the exposure estimate using the FAIM template. This template is based on deterministic approach that used food consumption statistics of food categories of a certain population rather than individual consumption data. Taken together, all these conservative assumptions led to an overestimation of the exposure.

When assuming the highest background level of 0.3 mg/kg (high dietary exposure of Dutch young children), the overall dietary exposure to propyl gallate from authorised use in food and that of unauthorised use in water-based vitamin D food supplements will be 0.33 mg/kg bw per day for children between 16 weeks and 12 months and 0.32 mg/kg bw for children from 12 months to 3 years, respectively.

*Table 4. Background dietary exposure to propyl gallate for young children (12-35 months) calculated by EFSA in 2014 using reported data on analytical levels, supplemented with maximum permitted levels.*

<b>Country</b>	<b>(mg/kg bw per day)</b>	
	<b>Mean</b>	<b>High dietary exposure</b>
Bulgaria	0.0	0.1
Finland	0.0	0.1
Germany	0.0	0.1
NL	0.0	0.3

## 5 Risk assessment for propyl gallate used in food supplements for infants and young children

### 5.1 Risk assessment for infants younger than 16 weeks

Currently, the safety of propyl gallate for infants younger than 16 weeks cannot be assessed because the ADI of 0,5 mg/kg bw per day derived by EFSA is not applicable for this specific age group. An EOGRT study or other suitable study would be needed to assess the safety of the substance for infants younger than 16 weeks. An EOGRT study for propyl gallate is – to the best of our knowledge – not available. In addition, the reproductive toxicity study available for propyl gallate (a 2-generation study described in the re-evaluation by EFSA) was considered not appropriate as the data were old and poorly described. To be able to finalize the risk assessment of propyl gallate for infants younger than 16 weeks, an EOGRT study should be performed.

### 5.2 Risk assessment for infants older than 16 weeks and young children

In the current risk assessment, the ADI of 0.5 mg/kg bw per day as derived by EFSA is used to assess the risk for infants older than 16 weeks and for young children.

The propyl gallate exposure via water-based vitamin D food supplements is estimated to be 0.025-0.026 mg/kg bw per day for infants older than 16 weeks. This corresponds to 5.0-5.2% of the ADI for propyl gallate. For young children (1-3 years old), the estimated exposure was 0.017mg/kg bw per day.

The dietary background exposure to propyl gallate is estimated to be 0.3 mg/kg bw per day for children aged 1-3 years old. Here, it is assumed that dietary background exposure to propyl gallate by infants older than 16 weeks and younger than 1 year will be comparable.

The total dietary exposure to propyl gallate will be 0.326 mg/kg bw per day (corresponding to 65.4% of the ADI) for infants older than 16 weeks (and 0.317 mg/kg bw per day (corresponding to 63.7% of the ADI) for young children.

The total dietary exposure to propyl gallate by infants older than 16 weeks and young children aged 1-3 years old is therefore considered safe. This implies that dietary exposure to propyl gallate from consumption of water-based vitamin D food supplements by infants older than 16 weeks and children older than 1 year is safe. Further, it is noted that food supplements have a minor contribution to the propyl gallate dietary exposure compared to the dietary background dietary exposure.



## 6 Other considerations

The estimates for background dietary exposure (EFSA, 2014) and the additional exposure due to water-based vitamin D supplements showed that the dietary exposure to propyl gallate is low and remains below the ADI. It should be noted that additional exposure from other sources cannot be excluded. Such other sources could be food contact materials and cosmetics. According to Commission Regulation (EU) No 10/2011 on plastic materials and articles, propyl gallate, octyl gallate and dodecyl gallate are permitted in Food Contact Materials with a sum-specific migration limit for the three gallates of 30 mg/kg (expressed as gallic acid). No additional restrictions exist in R 10/2011, implying that those gallates can be used in food contact materials for infant foods.

According to EFSA in their opinion on the re-evaluation of propyl gallate the exposure resulting from this source is considerably higher than those from its use as food additive (EFSA 2014). This was based on exposure estimates from food contact materials that were based on the assumption that individuals consume 1 kg of food packed in plastics regardless of their age. RIVM considers an assumption of a daily consumption of 1 kg of packaged food as not realistic for infants and young children, but more refined estimates are not available. We did therefore not include these exposure estimates in our risk assessment.

Gallates are also permitted in cosmetic products without a limit according to Regulation 2009/1223/EC. Therefore, they can be used in both leave-on products (such as skin creams) and wash-off products (such as hand and bathing soaps) intended for infants and young children, but exposure estimates for this route of exposure are not available.

Currently, two approaches to assess the risk of substances present in food for infants below 16 weeks of age are proposed. The first one, proposed by EFSA SC and outlined in Figure 1, considers that for substances intentionally added to foods for infants below 16 weeks of age, an EOGRT study or neonatal animal study is required to assess the risk for young infants. For substances not intentionally added, EFSA SC considers that a specific risk assessment on a case-by-case basis is needed (EFSA, 2017). The other one, proposed by the EFSA PPR panel, adds an additional uncertainty factor of 3 in case an EOGRT is not available (EFSA, 2018).

As food additives are by definition added on purpose to foods (and in this case to food supplements intended for infants below 16 weeks of age), the approach proposed by EFSA SC is considered most relevant for the risk assessment of propyl gallate in food supplements intended for infants below 16 weeks of age.

We performed a risk assessment for propyl gallate used in water-based vitamin D supplements, but this is not the only food additive used in food supplements for infants and young children on the Dutch market. In 2017, RIVM made an inventory of food additives present in all types of food supplements for infants and young children available on the Dutch market to fulfil the national supplementation policy. In addition to

propyl gallate, food additives used in food supplements with a national supplementation policy were:

- E 306 tocopherol-rich extract,
- E 307 alpha-tocopherol,
- E 330 (citric acid),
- E339 (ii) disodium phosphate,
- E433 polysorbate 80,
- E 422 glycerol,
- E202 potassium sorbate,
- E470b magnesium salts of fatty acids,
- E570b fatty acids,
- E 551 silicium dioxide,
- E 421 mannitol, and
- E 463 hydroxy propyl cellulose.

For all these food additives, the risk of their use in food supplements for infants and young children needs to be assessed. At present, only the first three food additives are under consideration for authorisation for food supplements intended for infants and young children for which member states have national policies by the EU. If the European Commission regards the use of these three supplements as admissible, the risk of their use in food supplements for infants and young children will be assessed by EFSA. For all other food additives, including propyl gallate as used in water-based vitamin D supplements, the European Commission decided in 2018 that producers of food supplements for infants and young children need to submit an application together with a full dossier addressing toxicological studies to the European Commission. If the European Commission and the Member States regard these applications as admissible, EFSA will perform a safety assessment.

## 7 Conclusions

For infants older than 16 weeks and young children, a conservative estimate of additional dietary exposure of propyl gallate due to consumption of water-based vitamin D supplements is maximal 0.03 mg/kg bw per day. When combined with a conservative estimate of a background dietary exposure 0.3 mg/kg bw per day, the total dietary exposure to propyl gallate would remain below the acceptable daily intake (ADI) of 0.5 mg/kg bw and therefore considered as safe. This implies that dietary exposure to propyl gallate from consumption of water-based vitamin D food supplements by infants older than 16 weeks and children older than 1 year is safe.

For infants younger than 16 weeks, additional toxicological studies are required to derive a health based guidance value, such as the acceptable daily intake, for this specific age group. Therefore, it is not possible to assess the safety of the estimated daily dose of 0.05 mg per kg bodyweight due to consumption water-based vitamin D droplets.

Exposure to other sources of propyl gallate, such as food contact materials and personal care products, could not be taken into account.



## 8 References

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<http://www.who.int/childgrowth/standards>

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