Scoping paper on the potential risks of chemicals (other than caffeine) found in green and black tea in the maternal diet

Plant components

In this guide

In this guide

This is a paper for discussion. It does not reflect the views of the Committee and should not be cited.

95. For purpose of this this discussion paper, plant components are chemical compounds that are intrinsic to the normal physiology of *C. sinensis*. These include polyphenols.

Polyphenols

96. Tea polyphenols mainly include flavonoids, flavanols, phenolic acids. Tea polyphenols, known as catechins are reported to account for 30-42% of the dried weight of the solids in brewed green tea. Green tea contains the highest levels of catechins. These include: catechin, epicatechin, gallocatechin, epigallocatechin, catechin gallate, epigallocatechin-3-gallate (EGCG), epicatechin gallate, and gallocatechin gallate.

97. Due to various preparations of black tea, a definitive composition for the components of solid extracts in black tea can only be estimated, these are: catechins (10–12%), theaflavins (3–6%), thearubigins (12–18%), flavonols (6–8%), phenolic acids (10–12%), amino acids (13–15%), methylxanthines (8–11%), carbohydrates (15%), proteins (1%), mineral matter (10%), and volatiles (< 0.1%).

98. It has been suggested that the polyphenolic compounds EGCG and theaflavin-3'3-digallate found in green and black tea, respectively are the two compounds that result in positive health effects (Khan and Mukhtar, 2007).

99. In 2018, EFSA assessed the safety of green tea catechins (EFSA, 2018). It was noted by EFSA that none of the intervention studies addressed pregnant women, breast-fed infants or children. Overall, the conclude that "the sparse data on green tea exposure from traditional green tea infusions and noted that there was no evidence of elevated ALT [alanine transferase] levels at a consumption of green tea infusion of ≥ 5 cups per day or containing 700 mg EGCG/day."

100. Dania et al., (2022) performed a systematic review and meta-analysis to investigate whether pregnant women who drink tea have a higher incidence rate of anaemia than non-tea drinking pregnant women. Based on the seven studies that were selected, based on a set of inclusion criteria, pregnant women (n=280-550 per study) who were tea drinkers were shown to have a 1.94 times increased risk of developing anaemia compared to pregnant women who did not drink tea (adjusted odd ratio (OR) = 1.94; 95% confidence interval (CI) =1.10 to 3.43; p= 0.020). The authors proposed that this increase is based on the polyphenols in tea inhibiting iron absorption.

101. Yazdy et al., (2012) examined whether tea consumption during early pregnancy was associated with an increased risk of spina bifida as previous studies have demonstrated that catechin (present in tea) reduces the bioavailability of folate. The authors utilised data from the Slone Epidemiology Centre Birth Defects Study. Mothers of 518 spina bifida cases and 6,424 controls were interviewed. Data on tea intake were collected during three periods (1976–1988, 1998–2005 and 2009–2010). Logistic regression models were used to calculate ORs and 95% CIs. Among women with total folic acid intake greater than 400 µg, consumption of 3 cups or more of tea per day was associated with an increased risk of spina bifida in 1976-1988 (OR, 2.04; 95% CI, 0.69–7.66) and in 2009-2010 (OR, 3.13; 95% CI, 0.87–11.33). For 1976-1988, ORs were not elevated for daily tea intake). The authors acknowledged that the data generated

do not support an overall association between tea consumption and spina bifida; however, the data did suggest a possible interaction between higher levels of folic acid intake and tea consumption.

102. Ye et al., (2011) examined the association between tea drinking during periconceptional period and the risk of neural tube defects (NTDs) in a population-based case-control study in Shanxi, China. The authors hypothesized that tea catechins inhibit the activity of the enzyme dihydrofolate reductase, which catalyses the inactive form of folate 7,8-dihydrofolate to the active form of folate 5,6,7,8-tetrahydrofolate.They suggested that the inhibition would lead to disturbance of the folate metabolic pathway and to lower bioavailability of folate to cells and therefore, it may increase the risk of NTDs. Compared with women who did not drink tea during the periconceptional period (487 NTD cases and 688 controls), women who drank tea daily (20 NTD cases and 9 controls) had a 3-fold increased risk (ORs = 3.1 [95% CI = 1.4–7.0]) of having an NTD-affected pregnancy.