



## Influence of goitrogenic foods intake on thyroid functions in healthy females of childbearing age with low habitual iodine intake

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Iodine is essential for the formation of thyroid hormones, which influence a wide range of organs and their functions. Recent surveys in the UK indicated iodine insufficiency in the female population<sup>(1,2)</sup>. Some foodstuffs, collectively known as goitrogens, have been proposed to interfere with iodine uptake, although evidence in humans is scarce. This study aimed to investigate the link between goitrogens intake, low habitual iodine levels and thyroid functions.

In a cross-over randomized intervention, females with low habitual dietary iodine intake followed two 15-days diets (separated by 4 weeks wash-out), with low iodine intake and either high (>3 portion per day) or low (<1 portion per day) goitrogen intake. Goitrogenic foods were provided, and participants asked to replicate their diets during both periods. Food diaries were completed throughout, and urinary iodine concentration (UIC) was measured in 24-hour urine collections at the beginning and the end of each diet. Thyroid stimulating hormone (TSH), thyroglobulin (Tg), triiodothyronine (T3) and thyroxine (T4) were also measured in plasma at the same time points.

Healthy women ( $n = 21$ , median age 25 (IQR 13), median BMI 23 (IQR 4)) were recruited. Goitrogen foods intake during low diet was 1.4 g/day (IQR 15.3) and 629.2 g/day (IQR 370.8) during the high diet ( $p < 0.001$ ). Iodine intake during both diets was below the recommended 140 µg/d: 75 µg/day (IQR 68) during the low goitrogen diet and 45 µg/day (IQR 68) during the high goitrogen diet ( $p = 0.014$ ).

Outcome measures for thyroid function did not change from the beginning to the end of either diet. Minor variations were observed, such as T3 and T4 being slightly higher at the end of the high goitrogen diet, compared to the low goitrogen diet ( $p = 0.006$ ,  $p = 0.017$ ). Variations between diets ( $\Delta$ low-high) were also significant, if minor, for T3 ( $p = 0.048$ ).

	Low goitrogen diet						High goitrogen diet						p value
	Beginning		End		$\Delta$		Beginning		End		$\Delta$		
	Median	IQR	Median	IQR	Median	IQR	Median	IQR	Median	IQR	Median	IQR	
TSH (mUI/L)	1.8	1.13	1.8	1.4	-0.2	0.9	1.8	0.8	2.0	1.6	-0.1	0.8	0.677
Tg (µg/L)	31.7	17.8	27.2	23.5	-3.2	8.6	28.8	17.1	31.3	27.8	-0.8	7.8	0.205
T3 (nmol/L)	1.4	0.3	1.3 <sup>a</sup>	0.3	-0.1	0.3	1.3	0.1	1.4 <sup>a</sup>	0.3	0.1	0.3	0.048*
T4 (nmol/L)	93.6	22.5	95.4 <sup>b</sup>	22.5	2.5	15.4	93.9	31.8	100.2 <sup>b</sup>	23.2	0.1	19.6	0.689
UIC (µg/L)	59.8	58.6	66.6	85.5	-19.9	45.9	64.8	91.3	54.3	49.6	-6.6	47.4	0.986
UI (µg/day)	90.2	59.5	87.0	78.4	-14.4	67.5	92.3	73.5	72.8	93.8	-14.4	66.3	0.876

\* Statistically significant difference between delta high and low diets ( $p < 0.05$ ); <sup>a,b</sup> Statistically significant difference between end points of high and low goitrogen diets ( $p < 0.05$ ).

Increased medium term intake of goitrogenic foods did not affect thyroid function in females of childbearing age with low habitual iodine intake. Longer exposure to goitrogenic foods may however still impact on thyroid functions, in groups displaying very low iodine intake.

1. Vanderpump MP, Lazarus JH, Smyth PP *et al.* (2011) *Lancet* 377, 2007–2012.
2. Bath SC & Rayman MP (2013) *P Nutr Soc* 72, 226–235.