Acute kidney injury associated with consumption of the slimming drink Matcha slim®

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ANSES received a report of life-threatening acute kidney injury following consumption of Matcha Slim® by a man with chronic kidney disease.

Given the severity of the adverse effect described, due to the intake of oxalates, ANSES wished to bring this case to the attention of the public and healthcare professionals.

It recommends that individuals with risk factors such as chronic kidney disease, diabetes or intestinal transit disorders limit their consumption of foods and drinks containing oxalates.

As part of the nutrivigilance scheme it has been running since 2009, ANSES received a report of acute kidney injury potentially associated with consumption of the product Matcha Slim® marketed by Laboratório FranceDiet. This slimming product mainly contains green tea (*Camellia sinensis*), vitamin C and taurine. ANSES published an opinion detailing this case [1].

THE ALERT

The report concerned a man in his sixties, a smoker for 45 years, on medication for insulin-dependent diabetes and chronic kidney disease, and an occasional alcohol drinker. In 2022, he began taking Matcha Slim®. This product comes in the form of a powder to be dissolved in water. He took a spoonful of this preparation each morning. Nine days later, he was admitted to the hospital emergency department with abdominal and epigastric pain, associated with respiratory difficulties.

Biological tests revealed acute kidney injury, with elevated serum creatinine levels[1] (770 µmol/L, i.e. four times his usual level, which was already high because of his illness), hyperkalaemia[2] (5.9 mmol/L) and hyperoxaluria[3] (60 µmol/mmol urine creatinine). Tests (abdominal CT scan, MRI and Doppler ultrasound of the renal arteries) did not support obstructive nephropathy, nor was there any evidence of acute kidney injury of functional origin, as the ratio of urinary [Na] to urinary [K] was greater than 1. The tests also ruled out an autoimmune disease. A renal biopsy showed acute tubulointerstitial damage due to precipitation of oxalate crystals[4]. The patient began haemodialysis[5] sessions, which continued three times a week when he was discharged after 11 days in hospital.

Analyses carried out by the hospital's pharmacology and toxicology laboratory ruled out any adulteration of the product.

[1] Blood creatinine concentration. The norm is between 110 µmol/L and 140 µmol/L.
[2] Blood potassium concentration that is too high. The norm is between 3.6 mmol/L and 4.5 mmol/L.
[3] Excessive urinary excretion of oxalate. Laboratory norms not provided.
[4] Kidney injury with oxalate deposits.
[5] A renal replacement therapy technique.

LINK TO CONSUMPTION OF THE PRODUCT

The causality of the product in the occurrence of the acute kidney injury was assessed using the method developed for the nutrivigilance scheme [2]. As a reminder, causality is calculated from two parameters: the chronological concordance of the adverse events with consumption of the product, and the search for another possible cause that would explain the adverse effects. Chronological concordance is examined on the basis of the time to onset of the effects, their progression and whether or not the adverse effects reappear upon reintroduction of the product.

For the Matcha Slim® product, the onset time for the adverse effect was found to be "compatible". Progression was described as "suggestive", the highest level of the scale, because the adverse effect was life-threatening to the consumer. The product was not reintroduced. The aetiological investigation was judged to be complete, and all the common causes – such as obstructive nephropathy, functional origin of acute kidney injury and an autoimmune cause – were ruled out.

The Matcha Slim® product was therefore deemed very likely responsible for the occurrence of the acute kidney injury, i.e. I4 on a scale ranging from I0 (excluded) to I4 (very likely).

NO IDENTICAL CASES DESCRIBED TO DATE

To date, no other reports concerning the Matcha Slim® product have been recorded by the nutrivigilance scheme. A literature search was carried out to identify cases of acute kidney injury in humans associated with the active ingredients in Matcha Slim®: taurine, vitamins A, B1, B3, B5, B6, B8, B9, B12, C, D3 and E, green tea (Camellia sinensis), marsh mallow (Althaea officinalis) and grapefruit (Citrus maxima). Although it found no cases of acute kidney injury, the analysis of the literature nevertheless yielded a number of explanatory hypotheses concerning the involvement of green tea, vitamin C and taurine in the occurrence of the adverse effects reported here.

Green tea is a plant that contains oxalates, between 300 mg and 2000 mg per 100 g of dry matter. Oxalate or oxalic acid can form insoluble crystals in the form of calcium oxalate. A diet providing 10 mg of oxalates per 2500 kcal could lead to hyperoxaluria and thus a risk of oxalate crystal formation. In the literature, there are numerous cases of oxalic nephropathy and acute kidney injury following excessive consumption of foods containing oxalates, in subjects with or without a history of kidney disease or other risk factors (diabetes, intestinal transit disorders).

In "matcha" form, green tea is ground and ingested, unlike traditional green tea preparations where only the infusion water is consumed. Matcha Slim® contains 200 mg of green tea per 7 g of product, which is the daily dose recommended by the manufacturer. However, 200 mg of green tea provides a maximum of 4 mg of oxalates. This level of daily oxalate intake remains below the doses found in the literature to cause oxalate crystal formation.

Vitamin C is also a precursor of oxalate. Cases of oxalic nephropathy due to excessive vitamin C consumption, of between 480 mg and 6.5 g per day, have been reported in the literature. However, these intakes are much higher than those provided by the daily dose of Matcha Slim® (5 mg of vitamin C per day).

As for taurine, in patients with kidney failure, consumption of 50 mg/kg/d seems to cause it to accumulate in plasma due to low renal excretion. Four cases of acute kidney injury associated with excessive consumption of so-called energy drinks have been reported in the literature. Among the ingredients, the authors identify taurine as a possible cause, with reported taurine intakes of between 4.6 g and 12 g per day. By comparison, Matcha Slim® provides 0.5 g a day.

PEOPLE AT RISK SHOULD LIMIT THEIR OXALATE CONSUMPTION

The consumption of large quantities of green tea, vitamin C and taurine appears to be responsible for the renal adverse effects. Although the quantities provided by Matcha Slim® are comparatively very small, consumption of this product represents an additional daily intake in a diet that may already include high levels of these three components.

The literature reports numerous cases of oxalic nephropathy leading to acute kidney injury in people with or without risk factors (diabetes, chronic renal disease, intestinal transit disorders) but who have consumed excessive amounts of foods rich in oxalates or vitamin C. Excessive taurine intake could also be the cause of the acute kidney injury, but by a different mechanism.

Thus, combining such sources of oxalates in a beverage consumed daily could constitute a risk factor for developing acute kidney injury. People with risk factors for acute kidney injury should limit their consumption of foods high in oxalates (spinach, rhubarb, beetroot) and beverages containing oxalates, on top of their normal diet.

CONCLUSIONS AND RECOMMENDATIONS

The causality of the Matcha Slim® product in the occurrence of the acute kidney injury in an individual with chronic kidney disease was deemed very likely.

In order to prevent further renal adverse effects in individuals with risk factors such as chronic kidney disease, ANSES recommends that they limit their consumption of foods and beverages containing oxalates.

More generally, with regard to the consumption of food supplements and foods fortified with substances for nutritional or physiological purposes, such as Matcha Slim®, ANSES reminds consumers to:

- notify a healthcare professional of any adverse effect occurring after consumption;
- comply with the conditions of use specified by the manufacturer;
- avoid taking such products on a multiple, prolonged or repeated basis throughout the year without having sought the advice of a healthcare professional (doctor, dietician, etc.);
- exercise great vigilance with regard to improper claims;
- be very vigilant when purchasing products sold on certain websites or social media, which are subject to less stringent monitoring.

Healthcare professionals are invited to report to the nutrivigilance scheme any cases of adverse effects they suspect are associated with the consumption of food supplements or fortified foods (https://www.nutrivigilance-anses.fr).

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FIND OUT MORE

[1] **ANSES. 2024**. Opinion of the French Agency for Food, Environmental and Occupational Health & Safety on "a case of acute kidney injury associated with consumption of the product Matcha Slim®" (Request 2023-VIG-0159). ANSES (Maisons-Alfort), 15 p. https://www.anses.fr/fr/system/files/NUT2023VIG0159.pdf

[2] **ANSES. 2019**. Revised Opinion of the French Agency for Food, Environmental and Occupational Health & Safety on the updating of the method for determining causality in reports of adverse effects in nutrivigilance (Request 2018-SA-0026). Maisons-Alfort: ANSES. https://www.anses.fr/fr/system/files/NUT2018SA0026.pdf