Nitrate surveillance: Summary

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Summary

Every Member State is required to monitor and report levels of nitrate in specified foodstuffs as part of the European Commission regulation and the UK also requires this information as part of the collection of data to support the review of retained EU law in the UK and inform the setting of policy around maximum nitrate levels. The requirement to carry out monitoring for nitrate in lettuce, spinach and rocket is being met by the UK Nitrate Surveillance Programme. Results are presented for the period between 1st April 2021 and 31st March 2022.

A total of 202 samples were collected within the sampling period, comprising of 130 lettuce, 9 rocket, 26 spinach samples. A further 37 samples categorised at “Other Green Leafy Vegetables”, which comprised of samples including mustard, mizuna, celery, Pak Choi and cabbage. The lowest average nitrate concentration was recorded in summer-grown iceberg lettuce (935.2 mg/kg), and no iceberg samples exceeded the maximum nitrate concentration. The highest average nitrate concentration was seen in winter grown non-iceberg lettuce grown under protection within the lettuce group (3242.2 mg/kg), and in winter-grown rocket overall (4271.2 mg/kg).

The number of samples exceeding the maximum threshold increased this year to 7 samples – 2 samples of open-air non-iceberg lettuce sampled in the summer, 1 sample of protected non-iceberg lettuce in the summer, and 3 samples of spinach. A further 4 samples were within 10% of the maximum threshold.

Consistent with previous years of this project, a strong correlation was found between nitrate concentration and sampling date, with samples collected later in the season showing greater concentrations, indicating potential interactions between nitrate accumulation and climate – particularly light levels and available soil moisture and the accumulation of nitrate in the soil through subsequent fertiliser applications with successive planting. Furthermore, there was significant interaction between nitrate accumulation, product type and cultivation type, which could be further explored to better identify risk factors associated with nitrate accumulation in leafy vegetables grown in the UK.

Introduction

Nitrates (NO_3) are chemicals which are present in plants, soils and water. While background levels of nitrate will be present in the soil, additional nitrate will be applied either as inorganic fertiliser (e.g. calcium ammonium nitrate) or through the breakdown of soil organic material during crop production. Plants will uptake nitrates from the soil for amino acid and protein synthesis, although a level of nitrate will be present in plant material at harvest.

Regulatory Framework

Due to the potential human health risk, the European Commission (EC) introduced maximum residue levels in lettuce, spinach and rocket based on a compromise of individual Member States national levels to ensure continuity of trade. The Contaminants in Food (England) Regulations 2003 implement EC regulations 466/2001 and 1881/2006 setting limits for nitrate concentrations in lettuce and spinach.

A new Commission Regulation (EC) No 1258/2011 came into force in December 2011. This Regulation sets out new, permanent limits in green leafy vegetables; except the limits for rocket which applied specifically from 1 April 2012. It ends the previous temporary derogations which permitted the UK and some other EU countries to exceed maximum limits, without compromising consumer food safety, for fresh lettuce and spinach grown and intended for consumption on their own respective territories.

Nitrate Surveillance

EC regulations allow Member States to communicate results of the monitoring programme to the European Food Safety Authority (EFSA) on a regular basis, rather than the mandatory deadline of June 30 each year. Every Member State is required to monitor and report levels of nitrate as part of a European Commission regulation Whilst the UK is no longer part of the EU, monitoring activities have continued to be carried out by monitoring nitrate levels in lettuce, spinach and rocket by the UK Monitoring Programme (under GB retained law 1258/2011 since January 2021). This has been undertaken since May 1996 and reported in earlier MAFF (now Defra)/FSA Food Surveillance Information Sheets. Monitoring of UK grown lettuce, spinach and rocket is currently being led by RSK ADAS Ltd (ADAS) in partnership with NRM Laboratories.

Study Objectives

The current study was undertaken to assess nitrate levels in domestic produce between May 2020 and March 2021 as part of an ongoing monitoring program. This program was undertaken to ensure a representative spread of sampling (including both geographically and seasonally) to ensure the following objectives were met.

1. To collect a total of 200 domestic samples of fresh produce (principally lettuce, rocket and spinach, but also including ‘other leafy green veg’).
2. To carry out the chemical determination of nitrate concentration in fresh tissue in accordance with the appropriate Directives.
3. To report results to the agency in an electronic format.
4. To ensure the grower has received a copy of the results relating to his/her sample.

Quality Assurance

The study was conducted in compliance with the requirements of the Food Standards Agency, as set out in RRD27, February 2008. Sampling methodology conforms to the European Commission guidelines given in Commission Regulation EC/1882/2006 and with the quality assurance procedures adopted previously for the 2002-2018 surveys.

ADAS has its own in-house Quality Management System (QMS) developed to meet the requirements of externally accredited standards applied to parts of the business. ADAS QMS ensures that all work is controlled by documented plans, project management methodology, and carried out by properly trained staff, using suitable equipment and facilities. Business processes and routine procedures are documented in Standard Operating Procedures (SOPs) authorised by management and subject to periodic review. In-built process improvement ensures that ADAS QMS continues to improve and evolve to cover new areas of activity and to be responsive to the changing needs of customers. Compliance with QMS is monitored through formal audit by the operationally independent Quality Management Group.

Audit schedules are designed to cover all key areas of activity. Study specific audits can also be carried out by prior agreement at contract stage. ISO 9001:2000 - ADAS is registered with Lloyd's Register Quality Assurance (LRQA) for: 'Provision of independent research, consultancy and contracting services, focused primarily on environmental management, regional development, agriculture, horticulture and the food supply chain, to Government, levy bodies and private sector companies'.

Chemical analysis carried out by NRM Ltd meets the requirements of the Joint Code of Practice for Quality Assurance in Research, complies with EU retained law Regulation (EC) No 1882/2006.