

Report of nitrate monitoring results
concerning Regulation EU 466/2001.

The Netherlands 2004

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SUMMARY

General

In the year 2004 181 samples, 98 head lettuce, 42 iceberg lettuce and 41 spinach samples, all vegetables subjected to EU Regulation 466/2001, were analysed for nitrate.

The EU nitrate limits for lettuce are in force in the Netherlands. However, in the year 2000 the Netherlands successfully applied for a derogation of the nitrate limits for spinach. Since 2000 the Netherlands has been permitted to apply limits for nitrate in fresh spinach, higher than the EU limits. If stated that a sample does (not) comply with the relevant limits, we mean EU limits for lettuce and Dutch derogation limits for spinach.

- ? Generally, the nitrate levels of lettuce and spinach are in good compliance with the EU limits for lettuce and with the Dutch derogation limits for spinach, respectively.
- ? Iceberg lettuce appeared to contain remarkably less nitrate than the other varieties of lettuce. These conclusions are the same as in former years.
- ? The tendency of decreasing nitrate levels in spinach, observed since 2001, seems to be stopped.

Nitrate levels compared to EU and Dutch derogation limits

Comparing the data of the 98 head lettuce samples with the EU limits, 7 samples (7.1 %) exceeded the EU limits.

None of the 42 iceberg lettuce samples exceeded the EU limit for nitrate.

None of the 41 spinach samples exceeded the Dutch derogation limits, while 11 Dutch samples (33.3 %) exceeded the relevant EU nitrate limits.

Only 7 samples of head lettuce exceeded the limits, thus the exceeding percentage for the whole set of 181 samples is 3.9 %. This percentage is remarkably lower than the exceeding percentages in former years, namely 11.4 %, 5.8 %, 6.3 % and 8.4 % in 2003, 2002, 2001 and 2000, respectively.

Highest concentrations

The highest nitrate concentration in head lettuce was a Dutch sample taken in October, containing 4460 mg nitrate per kg (EU limit is 4500 mg/kg).

The highest nitrate concentration in iceberg lettuce was a foreign open air sample taken in December, with a nitrate concentration of 1480 mg nitrate per kg (limit is 2000 mg/kg).

The highest nitrate concentration in fresh spinach was a Dutch sample taken in March, containing 4020 mg nitrate per kg (EU/NL limits are 3000/4500 mg/kg).

Summer and winter levels

The violations of the relevant EU-limits in 2004 are concentrated in the summer period from April to and including August, as in 2003. In these 5 months we observed 6 of the total of 7 head lettuce violations.

Domestic and foreign samples

Most of the samples not in compliance with the nitrate EU Regulation were of Dutch origin, namely 5 of a total amount of 7 head lettuce violations, appr. the same result as in 2003.

1. INTRODUCTION

One of the main tasks of the Dutch Inspectorate for Health Protection and Veterinary Public Health is the enforcement of compliance of foodstuffs with several Dutch food safety laws, of which the Dutch Food and Commodity Act is the main law, covering a broad field of foodstuffs and commodities. The monitoring and the enforcement of compliance of the nitrate levels of lettuce and spinach, both regulated by EU Regulation 466/2001, is combined with the enforcement of compliance of nitrate levels in endive and beetroot, since the Dutch regulation on food contaminants also includes nitrate limits for endive and beetroot.

The EU and Dutch regulatory limits for lettuce, spinach (both subjected to an EU limit), and for endive and red beetroot (both only subjected to a Dutch limit), arranged per month of sampling, are given in Tables 1 and 2. The EU has allowed several countries to impose higher limits for local production for the local market (so called derogation). The Netherlands applied for such derogation in the year 2000 for nitrate in spinach. Those Dutch derogation limits for spinach have been the same since the year 2000. For deep frozen spinach a general limit of 2000 mg/kg exists.

Table 1. The EU and Dutch regulatory limits in mg/kg for nitrate in spinach (EU and Dutch derogation limits, NL), endive and red beetroot, all grown under glass, in force since 2002.

| harvesting months | spinach | endive | red beetroot |
|-------------------|-----------|--------|--------------|
| | EU/NL | NL | NL |
| 1 - 3 | 3000/4500 | | 3500 |
| 1 - 4 | | 3500 | |
| 4 - 6 | | | 4000 |
| 4 - 10 | 2500/3500 | | |
| 5 - 10 | | 2500 | |
| 7 - 12 | | | 3500 |
| 11 - 12 | 3000/4500 | 3500 | |

Table 2. The EU regulatory limits in mg/kg for nitrate in lettuce and iceberg lettuce, in force in 2003 and since May 2003, respectively.

| harvesting months | EU - lettuce | | EU - iceberg lettuce | |
|-------------------|--------------|----------|----------------------|----------|
| | glass | open air | glass | open air |
| 1 - 3 | 4500 | 4000 | 2500 | 2000 |
| 4 - 9 | 3500 | 2500 | 2500 | 2000 |
| 10 - 12 | 4500 | 4000 | 2500 | 2000 |

2. SAMPLING

Sampling is done in the marketing chain of vegetables and fruit from the field to the consumer. The three main routes in the Netherlands are:

- From grower to auction and further via wholesale trade and retail shops, what happens especially for the leafy vegetables.
- From grower to processing industry (contract growing). Special attention has been paid to deep-frozen spinach.
- Import from member states of the EU and from third countries.

Since most of the Dutch products enter the consumers market from the auction system, sampling of domestic products mostly takes place in this system.

The vegetables subjected to the nitrate regulation are mainly from Dutch production, with some import from southern EU-countries in the period of the year when growing in the Netherlands is difficult.

Since at the moment of sampling no information is available about the nitrate content, the samples are considered representative for the products brought to the market. A disadvantage of the system is that obtaining samples from a suspected grower is difficult, since they bring their products to the market irregularly.

The samples are taken by 5 regional inspectorates and transported to Amsterdam to be analysed. All sampling is performed according to the EC-directive 79/700 with the addition that at least ten items of lettuce have to be taken. The samples are stored frozen prior to analysis.

3. ANALYSIS AND QUALITY CONTROL

The analytical method for the determination of nitrate was a continuous flow system with reduction of nitrate to nitrite using a cadmium-column catalyst followed by colorimetric detection of nitrite. This method has been tested collaboratively according to the IUPAC/ISO protocol (7.2). The laboratory took part in the FAPAS proficiency-testing scheme.

The laboratory has a quality assurance system complying with ISO 17025 and has been accredited since 1998.

The limit of detection of the analytical method mentioned is 50 mg nitrate per kg. This limit is sufficiently low since the nitrate content of vegetables contributing considerably to the nitrate intake, is usually much higher than 50 mg nitrate per kg.

4. REGISTRATION AND COMPILATION OF DATA

The Inspectorates for Health Protection and Veterinary Public Health have available the Information System Inspection, a data-system for the storage of sample data and analytical results. The nitrate data for this report were collected using a data-extraction procedure. Statistical data are given along with data on individual samples.

5. MONITORING RESULTS

The nitrate data arranged for the month of sampling and for the nitrate concentration range are given for head lettuce, iceberg lettuce and spinach in Tables 3, 4 and 5, respectively.

Table 6 gives the lettuce and spinach data with number of violations of samples of Dutch and foreign origin. Table 7 gives the statistical data of the lettuce and spinach data, total and split per summer and winter period.

Results of the individual samples of head lettuce, iceberg lettuce and spinach are given in the annex I, II and III, respectively.

Table 3. The nitrate data of 98 **head lettuce** samples. Data are classified per month, grown under glass or in open air and of domestic or foreign origin. Of a total of 98 head lettuce samples 7 (7.1 %) violated the relevant EU nitrate limit. Of those 7 violations 1 of 50 (2.0 %) concerned the glass limit, and 6 of 46 (13.0 %) concerned the open air limit, while of those total of 7 violations 5 of 73 (6.8 %) concerned domestic samples and 2 of 25 (8.0 %) concerned foreign samples.

| head lettuce 2004 | | | | number of samples with nitrate content (mg/kg) in the range | | | | | | | | | number of violations, | | | |
|--------------------------|----|-------|---------|---|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------------|-----------------------|----------|-----|-----|
| month | nr | gl/oa | dom/for | 0-1500 | 1500-2000 | 2000-2500 | 2500-3000 | 3000-3500 | 3500-4000 | 4000-4500 | 4500-5000 | EU limit, gl/oa | gl/oa | dom/for | | |
| 1 | 14 | 10/4 | 12/2 | 0 | 1 | 1 | 1 | 3 | 7 | 1 | 0 | 4500/4000 | 0/1 | 1/0 | | |
| 2 | 3 | 2/1 | 1/2 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 4500/4000 | 0/0 | 0/0 | | |
| 3 | 21 | 7/14 | 15/6 | 4 | 1 | 2 | 9 | 3 | 2 | 0 | 0 | 4500/4000 | 0/0 | 0/0 | | |
| 4 | 21 | 10/11 | 15/6 | 2 | 5 | 3 | 4 | 5 | 2 | 0 | 0 | 3500/2500 | 1/3 | 3/1 | | |
| 5 | 16 | 14/2 | 14/2 | 2 | 0 | 4 | 9 | 1 | 0 | 0 | 0 | 3500/2500 | 0/0 | 0/0 | | |
| 6 | 7 | 2/5 | 5/2 | 0 | 3 | 0 | 3 | 1 | 0 | 0 | 0 | 3500/2500 | 0/2 | 1/1 | | |
| 7 | 5 | 0/5 | 2/3 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 3500/2500 | 0/0 | 0/0 | | |
| 8 | 2 | 0/2 | 2/0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 3500/2500 | 0/0 | 0/0 | | |
| 9 | 1 | 1/0 | 1/0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 3500/2500 | 0/0 | 0/0 | | |
| 10 | 4 | 3/1 | 4/0 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 4500/4000 | 0/0 | 0/0 | | |
| 11 | 2 | 1/1 | 1/1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 4500/4000 | 0/0 | 0/0 | | |
| 12 | 2 | 0/2 | 1/1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 4500/4000 | 0/0 | 0/0 | | |
| 98 | | | | 50/48 | 73/25 | 13 | 14 | 13 | 27 | 16 | 12 | 3 | 0 | sum = 98 | 1/6 | 5/2 |

Table 4. The nitrate data of 42 **iceberg lettuce** samples. Data are classified per month, grown under glass or in open air and of domestic or foreign origin. There were no violations of the EU regulation.

| iceberg lettuce 2004 | | | | number of samples in the range (mg/kg) | | | | EU limit ¹ , gl/oa | number of violations, gl/oa dom/for | |
|-----------------------------|-------|---------|------------|--|---------------|---------------|-------|----------------------------------|--|---------|
| month nr | gl/oa | dom/for | 0- 1500 | 1500- 2000 | 2000- 2500 | 4000- 4500 | gl/oa | | gl/oa | dom/for |
| 1 | 2 | 0/2 | 0/2 | 2 | 0 | 0 | 0 | 4500/4000 | 0 | 0 |
| 2 | 2 | 0/2 | 0/2 | 2 | 0 | 0 | 0 | 4500/4000 | 0 | 0 |
| 3 | 7 | 4/3 | 0/7 | 7 | 0 | 0 | 0 | 4500/4000 | 0 | 0 |
| 4 | 7 | 0/7 | 2/5 | 7 | 0 | 0 | 0 | 3500/2500 | 0 | 0 |
| 5 | 2 | 1/1 | 1/1 | 2 | 0 | 0 | 0 | 2500/2000 | 0 | 0 |
| 6 | 5 | 0/5 | 5/0 | 5 | 0 | 0 | 0 | 2500/2000 | 0 | 0 |
| 7 | 4 | 2/2 | 4/0 | 4 | 0 | 0 | 0 | 2500/2000 | 0 | 0 |
| 8 | 0 | 0/0 | 0/0 | 0 | 0 | 0 | 0 | 2500/2000 | 0 | 0 |
| 9 | 3 | 0/3 | 3/0 | 3 | 0 | 0 | 0 | 2500/2000 | 0 | 0 |
| 10 | 5 | 1/4 | 2/3 | 5 | 0 | 0 | 0 | 2500/2000 | 0 | 0 |
| 11 | 4 | 1/3 | 1/3 | 4 | 0 | 0 | 0 | 2500/2000 | 0 | 0 |
| 12 | 1 | 0/1 | 0/1 | 1 | 0 | 0 | 0 | 2500/2000 | 0 | 0 |
| 42 | 9/33 | 18/24 | 42 | 0 | 0 | 0 | | | 0 | 0 |

1: In May 2002 the new Regulation EU 563/2002, amending Regulation EU 466/2001, came into force, imposing new nitrate limits on iceberg lettuce, from under glass/open air = 4500/4000 to 2500/2000.

Table 5. The nitrate data of 33 **fresh spinach** samples. Data are classified per month, grown under glass or in open air and of domestic or foreign origin. None of the 33 samples violated the Dutch derogation limit, while 11 samples violated the EU limit.

| fresh spinach 2004 | | | | | | | | | | | | |
|--|---------|-----|------|-------|-------|-------|-------|-------|-------|-------|-----------------------|--------------------------------------|
| number of samples with nitrate content (mg/kg) in the range: | | | | | | | | | | | | |
| month | | | 0- | 1500- | 2000- | 2500- | 3000- | 3500- | 4000- | 4500- | Dutch deroga- | number of violations |
| nr | dom/for | | 1500 | 2000 | 2500 | 3000 | 3500 | 4000 | 4500 | 5000 | tion limit / EU limit | of Dutch derogation limit / EU limit |
| 1 | 1 | 0/1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4500 / 3000 | 0 / 0 |
| 2 | 0 | 0/0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4500 / 3000 | 0 / 0 |
| 3 | 9 | 6/3 | 3 | 0 | 0 | 1 | 2 | 2 | 1 | 0 | 4500 / 3000 | 0 / 5 |
| 4 | 3 | 1/2 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 3500 / 2500 | 0 / 1 |
| 5 | 7 | 6/1 | 6 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 3500 / 2500 | 0 / 0 |
| 6 | 2 | 2/0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 3500 / 2500 | 0 / 0 |
| 7 | 0 | 0/0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3500 / 2500 | 0 / 0 |
| 8 | 1 | 1/0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 3500 / 2500 | 0 / 1 |
| 9 | 4 | 4/0 | 0 | 0 | 1 | 1 | 2 | 0 | 0 | 0 | 3500 / 2500 | 0 / 3 |
| 10 | 3 | 3/0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 3500 / 2500 | 0 / 1 |
| 11 | 3 | 1/2 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 4500 / 3000 | 0 / 0 |
| 12 | 0 | 0/0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4500 / 3000 | 0 / 0 |
| 33 | 24/9 | | 19 | 2 | 8 | 4 | 5 | 2 | 1 | 0 | sum = 33 | 0 / 11 (all Dutch) |

Table 6. Number of violations of the relevant EU nitrate limits for lettuce and of the relevant Dutch derogation limits and EU limits for fresh spinach, classified for samples of **domestic** and **foreign** origin.

| 2004 | | number of samples - violations | | % of violations | | |
|--|--------|--------------------------------|----------------|-----------------|---------|-------|
| lettuce, EU limit | number | Dutch origin | foreign origin | Dutch | foreign | total |
| head lettuce | 98 | 73 - 5 | 25 - 2 | 6.8 | 8.0 | 7.1 |
| iceberg lettuce | 42 | 18 - 0 | 24 - 0 | 0 | 0 | 0 |
| total lettuce | 140 | 91 - 5 | 49 - 2 | 5.5 | 4.1 | 5.0 |
| spinach, derogation vs EU limit | | | | | | |
| derogation limit | 33 | 25 - 0 | 9 - 0 | 0 | 0 | 0 |
| EU limit | 33 | 24 - 11 | 9 - 0 | 45.8 | 0 | 33.3 |
| total samples: lettuce (EU limits) + spinach (EU or Dutch derogation limit) | | | | | | |
| derogation limit | 181 | 123 - 5 | 58 - 2 | 4.1 | 3.4 | 3.9 |
| EU limit | 181 | 123 - 16 | 58 - 2 | 13.0 | 3.4 | 9.9 |

Table 7. Statistical data for nitrate levels in lettuce and fresh spinach in 2004. The data are given, if applicable, split in samples harvested in summer and winter.

| head + iceberg, 140 samples | nr | average | SD | CV(%) | highest | lowest |
|--|-----|---------|------|-------|---------|--------|
| head + iceberg, summer ¹ + winter ¹ | 140 | 2073 | 1096 | 53 | 4460 | 60 |
| head + iceberg, only summer | 73 | 1894 | 987 | 52 | 3730 | 230 |
| head + iceberg, only winter | 67 | 2269 | 1180 | 52 | 4460 | 60 |
| head lettuce, 98 samples, in mg/kg | | | | | | |
| head lettuce, summer ¹ + winter ¹ | 98 | 2566 | 937 | 37 | 4460 | 60 |
| head lettuce, only summer | 52 | 2323 | 835 | 36 | 3730 | 280 |
| head lettuce, only winter | 46 | 2841 | 979 | 34 | 4460 | 60 |
| iceberg lettuce, 42 samples, in mg/kg | | | | | | |
| iceberg lettuce, summer ¹ + winter ¹ | 42 | 924 | 249 | 27 | 1480 | 230 |
| iceberg lettuce, only summer | 21 | 831 | 262 | 32 | 1200 | 230 |
| iceberg lettuce, only winter | 21 | 1016 | 201 | 20 | 1480 | 230 |
| fresh spinach samples, 33 samples, in mg/kg | | | | | | |
| spinach, summer ² + winter ² | 33 | 2139 | 985 | 45 | 4020 | 930 |
| spinach, only summer | 20 | 2014 | 855 | 42 | 3500 | 980 |
| spinach, only winter | 13 | 2467 | 1138 | 46 | 4020 | 930 |
| deep frozen spinach samples, 8 samples, in mg/kg | | | | | | |
| spinach, deep frozen | 8 | 898 | 295 | 33 | 1390 | 490 |

¹: summer: months 4 up to and including 9; winter: months 10 up to and including 3.

²: summer: months 4 up to and including 10; winter: months 11 up to and including 3.

6. DISCUSSION AND CONCLUSIONS

6.1 Nitrate levels compared to EU and Dutch derogation limits

Comparing the data of the 98 head lettuce samples with the EU limits, 7 samples (7.1 %) exceeded the EU limits.

None of the 42 iceberg lettuce samples exceeded the EU limit for nitrate.

None of the 33 fresh spinach samples exceeded the Dutch derogation limits, while 11 Dutch samples (33.3 %) exceeded the relevant EU nitrate limits.

Only 7 samples of head lettuce exceeded the limits, thus the exceeding percentage for the whole set of 181 samples is 3.9 %. This percentage is remarkably lower than the exceeding percentages in former years, namely 11.4 %, 5.8 %, 6.3 % and 8.4 % in 2003, 2002, 2001 and 2000, respectively.

6.2 Highest concentrations

The highest nitrate concentration in head lettuce was a Dutch sample taken in October, containing 4460 mg nitrate per kg (EU limit is 4500 mg/kg).

The highest nitrate concentration in iceberg lettuce was a foreign open air sample taken in December, with a nitrate concentration of 1480 mg nitrate per kg (limit is 2000 mg/kg). The highest nitrate concentration in fresh spinach was a Dutch sample taken in March, containing 4020 mg nitrate per kg (EU/NL limits are 3000/4500 mg/kg).

6.3 Summer and winter levels

Tabel 8. Summer- and winter nitrate levels over the last 5 years.

| year | average nitrate concentration, mg/kg | | |
|------|--------------------------------------|------------------------------------|----------------------------------|
| | head lettuce summer - winter | iceberg lettuce summer - winter | fresh spinach summer - winter |
| 2000 | 2358 - 3214 | 874 - 967 | -- |
| 2001 | 2514 - 3084 | 1020 - 843 | 2352 - 3601 |
| 2002 | 2505 - 2962 | 814 - 1138 | 1964 - 2519 |
| 2003 | 2410 - 2548 | 893 - 1059 | 1487 - 1816 |
| 2004 | 2323 - 2841 | 831 - 1016 | 1695 - 2467 |

The violations of the relevant EU-limits in 2004 are concentrated in the summer period from April to and including August, as in 2003. In these 5 months we observed 6 of the total of 7 head lettuce violations.

6.4 Domestic and foreign samples

Most of the samples not in compliance with the nitrate EU Regulation were of Dutch origin, namely 5 of a total amount of 7 head lettuce violations, about the same result as in 2003.

6.5 General

- ? Generally, we conclude that the nitrate levels of lettuce and fresh spinach are in good compliance with the EU limits for lettuce and with the Dutch derogation limits for spinach, respectively.
- ? Iceberg lettuce appeared to contain remarkably less nitrate than the other varieties of lettuce. These conclusions are the same as in former years.
- ? The tendency of decreasing nitrate levels in fresh spinach, observed since 2001, seems to be stopped.

7. LITERATURE

- 7.1 Schee, H van der. 2003. *Nitrate content of primary agricultural products of the Dutch market*. De Ware(n)-Chemicus 2003(3), 152-168.
- 7.2 Beljaars PR, van Dijk R & Horst GM van der. 1994. *Determination of Nitrate in Vegetables by Continuous Flow*. Collaborative Study. JAOAC, 1994, 77, 1522.

8. MAILING LIST

- European Commission
- Website VWA

Annex I. Head lettuce data

Member state: The Netherlands

Year: 2004

Head lettuce
(*Lactuca sativa capitata*)

| Date of sampling | Variety or type of lettuce | Country of origin | Method of production (glass/open air) | Nitrate content (mg/kg) | Sample identification |
|------------------|----------------------------|-------------------|---------------------------------------|-------------------------|-----------------------|
| 8-03-04 | Lettuce | The Netherlands | glass | 3580 | 47183022 |
| 8-03-04 | Lettuce | The Netherlands | glass | 3850 | 47183014 |
| 23-03-04 | Lollo rossa | Spain | open air | 950 | 48344488 |
| 15-04-04 | Curly lettuce | Belgium | open air | 1550 | 48380271 |
| 27-04-04 | Lollo rossa | Spain | open air | 1590 | 48453163 |
| 18-05-04 | Lettuce | The Netherlands | glass | 2663 | 47997488 |
| 18-05-04 | Lettuce | The Netherlands | glass | 2493 | 47997461 |
| 18-05-04 | Lettuce | The Netherlands | glass | 2985 | 47997453 |
| 18-05-04 | Lettuce | The Netherlands | glass | 2503 | 47997445 |
| 8-06-04 | Lettuce | The Netherlands | glass | 2560 | 47743133 |
| 8-06-04 | Lettuce | The Netherlands | glass | 2760 | 47743222 |
| 13-10-04 | Lollo rossa | The Netherlands | open air | 2280 | 47817692 |
| 14-01-04 | Lettuce | The Netherlands | glass | 3850 | 46431529 |
| 14-01-04 | Lollo rossa | France | glass | 1700 | 46431472 |
| 20-01-04 | Lettuce | The Netherlands | open air | 3630 | 47182824 |
| 20-01-04 | Lettuce | The Netherlands | open air | 4200 | 47182816 |
| 20-01-04 | Lettuce | The Netherlands | open air | 3330 | 47182735 |
| 20-01-04 | Lettuce | The Netherlands | glass | 3560 | 47182603 |
| 20-01-04 | Lettuce | The Netherlands | glass | 3490 | 47182581 |
| 20-01-04 | Lettuce | The Netherlands | glass | 3920 | 47182565 |
| 20-01-04 | Lettuce | The Netherlands | glass | 3670 | 47182557 |
| 20-01-04 | Lettuce | The Netherlands | glass | 3300 | 47182549 |
| 20-01-04 | Lettuce | The Netherlands | glass | 3560 | 47182638 |
| 20-01-04 | Lettuce | The Netherlands | glass | 2780 | 47182522 |
| 20-01-04 | Lettuce | The Netherlands | glass | 3740 | 47182514 |
| 22-01-04 | Lettuce | Italy | open air | 2030 | 48271421 |
| 4-02-04 | Lollo rossa | France | open air | 1670 | 48361978 |
| 11-02-04 | Lollo rossa | France | glass | 2340 | 46515366 |
| 11-02-04 | Lettuce | The Netherlands | glass | 4440 | 46515307 |
| 2-03-04 | Lettuce | France | glass | 1500 | 46516699 |
| 2-03-04 | Lettuce | Italy | glass | 450 | 46516664 |
| 2-03-04 | Lettuce | Italy | glass | 60 | 46516877 |
| 2-03-04 | Lollo rossa | The Netherlands | open air | 2520 | 34581258 |
| 2-03-04 | Lettuce | The Netherlands | open air | 2750 | 34581401 |
| 24-03-04 | Lollo rossa | Spain | glass | 1910 | 46530632 |
| 24-03-04 | Oakleaf lettuce | Spain | glass | 2450 | 46530624 |
| 29-03-04 | Lettuce | The Netherlands | open air | 2740 | 47997216 |
| 29-03-04 | Lettuce | The Netherlands | open air | 2980 | 47997208 |
| 29-03-04 | Lettuce | The Netherlands | open air | 2390 | 47997186 |
| 29-03-04 | Lettuce | The Netherlands | open air | 3280 | 47997178 |
| 29-03-04 | Lettuce | The Netherlands | open air | 3000 | 47997151 |
| 29-03-04 | Lettuce | The Netherlands | open air | 3130 | 47997119 |

| Date of sampling | Variety or type of lettuce | Country of origin | Method of production (glass/open air) | Nitrate content (mg/kg) | Sample identification |
|------------------|----------------------------|-------------------|---------------------------------------|-------------------------|-----------------------|
| 29-03-04 | Lettuce | The Netherlands | open air | 2900 | 47997097 |
| 29-03-04 | Lettuce | The Netherlands | open air | 3430 | 47997046 |
| 29-03-04 | Lettuce | The Netherlands | open air | 2820 | 47997038 |
| 29-03-04 | Lettuce | The Netherlands | open air | 2510 | 47997011 |
| 29-03-04 | Lettuce | The Netherlands | open air | 2860 | 47997003 |
| 14-04-04 | Curly lettuce | Belgium | glass | 3340 | 46529448 |
| 14-04-04 | Lettuce | The Netherlands | glass | 3040 | 45090256 |
| 15-04-04 | Lettuce | The Netherlands | open air | 2410 | 48380263 |
| 15-04-04 | Lettuce | The Netherlands | open air | 3370 | 48380115 |
| 26-04-04 | Lettuce | The Netherlands | glass | 3730 | 48448976 |
| 26-04-04 | Lettuce | The Netherlands | glass | 2930 | 48448909 |
| 26-04-04 | Lettuce | The Netherlands | glass | 3240 | 48448895 |
| 26-04-04 | Lettuce | The Netherlands | glass | 2470 | 48448852 |
| 26-04-04 | Lettuce | The Netherlands | glass | 2770 | 48448887 |
| 26-04-04 | Lettuce | The Netherlands | glass | 2970 | 48448844 |
| 26-04-04 | Lettuce | The Netherlands | glass | 2790 | 48448968 |
| 26-04-04 | Lollo rossa | The Netherlands | glass | 2340 | 48448941 |
| 26-04-04 | Lettuce | The Netherlands | open air | 1550 | 48448879 |
| 27-04-04 | Lettuce | The Netherlands | open air | 1820 | 48460186 |
| 27-04-04 | Curly lettuce | The Netherlands | open air | 1770 | 48460321 |
| 27-04-04 | Oakleaf lettuce | unknown | open air | 6750 | 48460305 |
| 27-04-04 | Lollo rossa | The Netherlands | open air | 3250 | 48460313 |
| 27-04-04 | Lettuce | Spain | open air | 3690 | 48453155 |
| 27-04-04 | Curly lettuce | Spain | open air | 960 | 48453147 |
| 27-04-04 | Curly lettuce | Spain | open air | 430 | 48453112 |
| 11-05-04 | Curly lettuce | The Netherlands | open air | 1150 | 45091104 |
| 11-05-04 | Lettuce | The Netherlands | glass | 2650 | 47742269 |
| 12-05-04 | Lettuce | Spain | glass | 1000 | 46376323 |
| 12-05-04 | Oakleaf lettuce | The Netherlands | glass | 2770 | 46376277 |
| 12-05-04 | Lettuce | The Netherlands | glass | 3000 | 46376269 |
| 12-05-04 | Lollo rossa | The Netherlands | glass | 2960 | 46376242 |
| 18-05-04 | Lettuce | The Netherlands | glass | 3024 | 47183197 |
| 18-05-04 | Lettuce | The Netherlands | glass | 2596 | 47183189 |
| 18-05-04 | Lettuce | The Netherlands | glass | 2219 | 47997259 |
| 18-05-04 | Lettuce | The Netherlands | glass | 2137 | 47997232 |
| 18-05-04 | Lettuce | The Netherlands | glass | 2749 | 47997267 |
| 25-05-04 | Lollo rossa | Germany | open air | 2124 | 47742692 |
| 1-06-04 | Lollo rossa | The Netherlands | open air | 1960 | 48438482 |
| 22-06-04 | Lollo rossa | The Netherlands | open air | 1840 | 46039106 |
| 22-06-04 | Lettuce | The Netherlands | open air | 3040 | 46038983 |
| 22-06-04 | Oakleaf lettuce | Belgium | open air | 1780 | 47743567 |
| 22-06-04 | Lollo rossa | Belgium | open air | 2760 | 47743559 |
| 8-07-04 | Lollo rossa | The Netherlands | open air | 1590 | 46427122 |
| 8-07-04 | Lettuce | Belgium | open air | 770 | 46427149 |
| 8-07-04 | Lettuce | Italy | open air | 280 | 46427009 |
| 20-07-04 | Leaf lettuce | Belgium | open air | 1610 | 47741017 |
| 20-07-04 | Lollo rossa | The Netherlands | open air | 990 | 47741033 |
| 3-08-04 | Lettuce | The Netherlands | open air | 2480 | 46378628 |
| 12-08-04 | Lollo rossa | The Netherlands | open air | 1840 | 48622429 |
| 28-09-04 | Lettuce | The Netherlands | glass | 3480 | 44103176 |

| Date of sampling | Variety or type of lettuce | Country of origin | Method of production (glass/open air) | Nitrate content (mg/kg) | Sample identification |
|------------------|----------------------------|-------------------|---------------------------------------|-------------------------|-----------------------|
| 11-10-04 | Lettuce | The Netherlands | glass | 2980 | 47998417 |
| 18-10-04 | Lettuce | The Netherlands | glass | 4460 | 48513344 |
| 19-10-04 | Lettuce | The Netherlands | glass | 3270 | 48610838 |
| 9-11-04 | Lettuce | The Netherlands | glass | 3168 | 44213982 |
| 23-11-04 | Lollo rossa | France | open air | 2420 | 57052694 |
| 8-12-04 | Lettuce | Spain | open air | 1280 | 46578139 |
| 8-12-04 | Lettuce | The Netherlands | open air | 3580 | 46578112 |

Annex II. Iceberg lettuce data

Member state: The Netherlands

Year: 2004

Iceberg lettuce
(*Lactuca sativa* ...)

| Date of sampling | Variety or type of lettuce | Country of origin | Method of production (glass/open air) | Nitrate content (mg/kg) | Sample identification |
|------------------|----------------------------|-------------------|---------------------------------------|-------------------------|-----------------------|
| 15-04-04 | Iceberg lettuce | Spain | open air | 1050 | 48380328 |
| 20-09-04 | Iceberg lettuce | The Netherlands | open air | 1000 | 48438571 |
| 13-10-04 | Iceberg lettuce | The Netherlands | open air | 1000 | 47817676 |
| 14-04-04 | Iceberg lettuce | Spain | open air | 950 | 48390404 |
| 20-01-04 | Iceberg lettuce | Spain | open air | 1390 | 35924027 |
| 22-01-04 | Iceberg lettuce | Spain | open air | 1230 | 48185134 |
| 4-02-04 | Iceberg lettuce | Spain | open air | 1160 | 48361943 |
| 26-02-04 | Iceberg lettuce | Spain | open air | 760 | 45105148 |
| 2-03-04 | Iceberg lettuce | Spain | glass | 890 | 46516761 |
| 2-03-04 | Iceberg lettuce | Spain | glass | 800 | 46516869 |
| 2-03-04 | Iceberg lettuce | Spain | glass | 940 | 46516672 |
| 2-03-04 | Iceberg lettuce | Spain | open air | 520 | 34581223 |
| 16-03-04 | Iceberg lettuce | Spain | open air | 1075 | 34581606 |
| 24-03-04 | Iceberg lettuce | Spain | glass | 1000 | 46516974 |
| 26-03-04 | Iceberg lettuce | Spain | open air | 1000 | 45095355 |
| 6-04-04 | Iceberg lettuce | Spain | open air | 1130 | 44040379 |
| 15-04-04 | Iceberg lettuce | The Netherlands | open air | 820 | 48380123 |
| 27-04-04 | Iceberg lettuce | Spain | open air | 740 | 47373263 |
| 27-04-04 | Iceberg lettuce | Spain | open air | 1040 | 48453104 |
| 27-04-04 | Iceberg lettuce | The Netherlands | open air | 670 | 48453201 |
| 12-05-04 | Iceberg lettuce | Spain | glass | 1000 | 46376374 |
| 13-05-04 | Iceberg lettuce | The Netherlands | open air | 1120 | 48438202 |
| 1-06-04 | Iceberg lettuce | The Netherlands | open air | 600 | 48438474 |
| 1-06-04 | Iceberg lettuce | The Netherlands | open air | 480 | 48438466 |
| 2-06-04 | Iceberg lettuce | The Netherlands | open air | 520 | 48435564 |
| 22-06-04 | Iceberg lettuce | The Netherlands | open air | 850 | 46038975 |
| 29-06-04 | Iceberg lettuce | The Netherlands | open air | 670 | 44038617 |
| 6-07-04 | Iceberg lettuce | The Netherlands | open air | 230 | 44041197 |
| 12-07-04 | Iceberg lettuce | The Netherlands | glass | 480 | 47997569 |
| 12-07-04 | Iceberg lettuce | The Netherlands | glass | 1070 | 47997542 |
| 20-07-04 | Iceberg lettuce | The Netherlands | open air | 840 | 47741084 |
| 7-09-04 | Iceberg lettuce | The Netherlands | open air | 1200 | 47766699 |
| 28-09-04 | Iceberg lettuce | The Netherlands | open air | 1000 | 44103192 |
| 12-10-04 | Iceberg lettuce | The Netherlands | open air | 1070 | 44230453 |
| 19-10-04 | Iceberg lettuce | Spain | open air | 1000 | 48610811 |
| 26-10-04 | Iceberg lettuce | Spain | glass | 1000 | 47818176 |
| 27-10-04 | Iceberg lettuce | Spain | open air | 1000 | 45245535 |
| 4-11-04 | Iceberg lettuce | Spain | open air | 1000 | 48512119 |
| 4-11-04 | Iceberg lettuce | The Netherlands | glass | 1000 | 48512291 |
| 9-11-04 | Iceberg lettuce | Spain | open air | 1000 | 57051515 |
| 10-11-04 | Iceberg lettuce | Spain | open air | 1030 | 45245985 |
| 8-12-04 | Iceberg lettuce | Spain | open air | 1480 | 46577981 |

Annex III. Fresh Spinach data

Member state: The Netherlands

Year: 2004

Fresh spinach
(*Spinacia oleracea* L.)

| Date of sampling | Country of origin | Nitrate content (mg/kg) | Sample identification |
|------------------|-------------------|-------------------------|-----------------------|
| 29-01-04 | Cyprus | 1000 | 47574528 |
| 5-03-04 | Spain | 930 | 45093999 |
| 8-03-04 | The Netherlands | 3830 | 47183057 |
| 8-03-04 | The Netherlands | 3560 | 47183049 |
| 17-03-04 | Italy | 1060 | 45094715 |
| 24-03-04 | The Netherlands | 4020 | 46480481 |
| 24-03-04 | The Netherlands | 3350 | 46517008 |
| 24-03-04 | unknown | 1140 | 46516958 |
| 29-03-04 | The Netherlands | 2920 | 47996996 |
| 29-03-04 | The Netherlands | 3330 | 47997194 |
| 6-04-04 | The Netherlands | 3080 | 47372461 |
| 15-04-04 | Germany | 980 | 48102514 |
| 26-04-04 | Germany | 1630 | 48448933 |
| 11-05-04 | The Netherlands | 1000 | 45091082 |
| 12-05-04 | The Netherlands | 1000 | 46376234 |
| 13-05-04 | The Netherlands | 1330 | 48102646 |
| 13-05-04 | The Netherlands | 1000 | 48438431 |
| 13-05-04 | The Netherlands | 1000 | 48102654 |
| 18-05-04 | The Netherlands | 1203 | 47997399 |
| 25-05-04 | Germany | 2443 | 47742706 |
| 22-06-04 | The Netherlands | 1550 | 46039025 |
| 30-06-04 | The Netherlands | 2470 | 48404707 |
| 31-08-04 | The Netherlands | 2780 | 46577655 |
| 13-09-04 | The Netherlands | 2070 | 47998077 |
| 13-09-04 | The Netherlands | 3500 | 47998085 |
| 13-09-04 | The Netherlands | 3410 | 47998093 |
| 20-09-04 | The Netherlands | 2600 | 48438687 |
| 11-10-04 | The Netherlands | 2660 | 45175715 |
| 13-10-04 | The Netherlands | 2180 | 47817684 |
| 26-10-04 | The Netherlands | 2396 | 48097049 |
| 2-11-04 | Italy | 2281 | 48658385 |
| 2-11-04 | Italy | 2229 | 48658377 |
| 4-11-04 | The Netherlands | 2425 | 48512178 |

Annex IV. Deep frozen spinach data

Member state: The Netherlands

Year: 2004

Deep frozen spinach
(*Spinacia oleracea* L.)

| Date of sampling | Date of freezing in | Country of origin | Nitrate content (mg/kg) | Sample identification |
|------------------|---------------------|-------------------|-------------------------|-----------------------|
| 8-04-04 | Unknown | The Netherlands | 1000 | 44026511 |
| 8-04-04 | Unknown | The Netherlands | 1000 | 44026503 |
| 8-04-04 | Unknown | The Netherlands | 1000 | 44026481 |
| 19-04-04 | Unknown | The Netherlands | 800 | 44024845 |
| 19-04-04 | Unknown | The Netherlands | 490 | 44024853 |
| 19-04-04 | Unknown | The Netherlands | 510 | 44024837 |
| 19-04-04 | Unknown | The Netherlands | 990 | 44024829 |
| 19-04-04 | Unknown | The Netherlands | 1390 | 44024772 |