Whole almond consumption is associated with better diet quality and intermediary cardiovascular disease risk factors in the UK adult population: National Diet and Nutrition Survey (NDNS) 2008-2017

Vita Dikariyanto*, Sarah E. E. Berry, Lucy Francis, Leanne Smith, Wendy L. Hall*
Diet and Cardiometabolic Health Research Group, Department of Nutritional Sciences, Faculty of Life Sciences and Medicine, King’s College London, London SE1 9NH, UK.
*Correspondence: vita.dikariyanto@kcl.ac.uk, wendy.hall@kcl.ac.uk; Tel.: +44 020 78484301/+44 020 78484197

Supplement

Appendix A: Market analysis of almond snacks

Table 1. Whole almond kernel portion in mixed nut or mixed nut and fruit products in the UK supermarkets

| Type                        | Supermarket name | Total weight of the product | Total weight of whole almond kernels | % of whole almond kernels in the product | Mean value of % whole almond kernels |
|-----------------------------|------------------|----------------------------|-------------------------------------|------------------------------------------|--------------------------------------|
| Mixed roasted unsalted nuts| Waitrose         | 50.1                       | 9.7                                 | 19.4                                     | 28.5                                 |
|                             | M&S              | 173.9                      | 41.7                                | 24.0                                     | 30.5                                 |
|                             | Co-op            | 30.5                       | 7.4                                 | 24.3                                     |                                       |
|                             | Sainsbury’s      | 203.0                      | 48.8                                | 24.0                                     | 30.5                                 |
|                             | Tesco            | 201.0                      | 56.6                                | 28.2                                     |                                       |
|                             | Asda             | 201.0                      | 102.2                               | 50.8                                     |                                       |
|                             | Morrisons        | 224.9                      | 80.2                                | 35.7                                     |                                       |
|                             | Lidl             | 200.7                      | 42.8                                | 21.3                                     |                                       |
| Mixed roasted salted nuts   | Waitrose         | 175.1                      | 54.4                                | 31.1                                     | 30.5                                 |
|                             | M&S              | 177.0                      | 46.0                                | 26.0                                     |                                       |
|                             | Sainsbury’s      | 201.2                      | 59.3                                | 29.5                                     |                                       |
|                             | Tesco            | 203.1                      | 72.3                                | 35.6                                     |                                       |
| Mixed nuts and fruits       | Sainsbury’s, Product 1 | 201.6                  | 13.7                                | 6.8                                      |                                       |
|                             | Sainsbury’s, Product 2 | 200.0                  | 25.3                                | 12.7                                     |                                       |
|                             | Tesco            | 251.5                      | 25.4                                | 10.1                                     | 18.0                                 |
|                             | Asda, Product 1  | 250.0                      | 45.7                                | 18.3                                     |                                       |
|                             | Asda, Product 2  | 200.0                      | 62.6                                | 31.3                                     |                                       |
|                             | Morrisons        | 200.3                      | 35.3                                | 17.6                                     |                                       |
|                             | Lidl             | 200.3                      | 58.3                                | 29.1                                     |                                       |
Appendix B: Diet quality scores

Table 1. Original and modified Mediterranean Diet Score (MDS) and its scoring system [30]

| Food group          | Original MDS          | Modified MDS        | Scoring*          |
|---------------------|-----------------------|---------------------|-------------------|
| Cereals             | Cereals               | >median             | 1 (else: 0)       |
| Vegetables          | Vegetables            | >median             | 1 (else: 0)       |
| **Fruits and Nuts** | **Fruits**            | >median             | 1 (else: 0)       |
| Legumes             | Legumes               | >median             | 1 (else: 0)       |
| Fish                | Fish                  | >median             | 1 (else: 0)       |
| Meat                | Meat                  | <median             | 1 (else: 0)       |
| Dairy products      | Dairy products        | <median             | 1 (else: 0)       |
| Ratio of unsaturated to saturated fats | >median | 1 (else: 0) |
| Alcohol             | Alcohol               | 10-50 g/d for men   | 1 (else: 0)       |
|                     |                       | 5-25 g/d for women  | 1 (else: 0)       |

*Except alcohol, scoring of each food group is based on population and sex-specific median.

Table 2. Original and modified Healthy Diet Score (HDS) and the cut-off values for scoring [31]

| Index item                          | Cut-off values | HDS – modified based on current UK recommendations | Index item                          | Cut-off values |
|-------------------------------------|----------------|-----------------------------------------------|-------------------------------------|----------------|
|                                     | Score 1 | Score 0 |                                   | Score 1 | Score 0 |                                   | Score 1 | Score 0 |
| Saturated fatty acids (% energy intake) | 0-10     | >10     | Saturated fatty acids (% energy intake) | 0-11ₐ | >11     |
| Polyunsaturated fatty acids (% energy intake)ₐ | 6-10     | <6 or >10 | Polyunsaturated fatty acids (% energy intake) | 6-10 | <6 or >10 |
| Protein (% energy intake)            | 10-15   | <10 or >15 | Protein (% energy intake) | 9-15 | <9 or >15 |
| Total carbohydrate (% energy intake)ₐ | 50-70   | <50 or >70 | Total carbohydrate (% energy intake) | 50ₐ-70 | <50 or >70 |
| Dietary fiber (g)ₐ                   | 18-32   | <18 or >32 | Dietary fiber (g) | 18-32 | <18 or >32 |
| Fruits and vegetables (g)            | ≥400     | <400    | Fruits and vegetables (g) | ≥400ₐ | <400    |
| Pulses and nuts (g)                 | ≥30      | <30     | Pulses (g) | ≥30 | <30     |
| Total non-milk extrinsic sugar (% total energy intake)ₐ | 0-10     | >10     | Total non-milk extrinsic sugar (% total energy intake) | 0-5ₐ | >5     |
| Cholesterol (mg)ₐ                    | 0-245    | >245    | Trans-fatty acids (% energy intake) | ≤2ₐ | >2     |
| Fish (g)                             | ≥32      | <32     | Fish (g) | ≥40ₐ | <40    |
| Item                                | ≤90 | >90 | ≥20 | <20 | ≥700 | <700 | ≥700 | <700 | ≤2400 | >2400 |
|-------------------------------------|-----|-----|-----|-----|------|------|------|------|-------|-------|
| Red meat and meat processed products (g)* |     |     |     |     |      |      |      |      |       |       |
| Calcium (mg)*                       | ≥700| <700|     |     |      |      |      |      |       |       |
| Oil fish (g)                        | ≥20 |     |     |     |      |      |      |      |       |       |
| Red meat and meat processed products (g) |     |     | ≤70 |     | >70  |      |      |      |       |       |
| Calcium (mg)                        | ≥700|     |     |     |      |      |      |      |       |       |
| Sodium (mg)                         | ≤2400|     |     |     | >2400|      |      |      |       |       |

* Items based on advice on healthy eating as recommended by the UK Committee on Medical Aspects of Food Policy (COMA) [31]

- Based on NDNS Results from Years 7 and 8 (combined) of the Rolling Program (2014/2015 – 2015/2016) [29], UK Government Dietary Recommendations by Public Health England (2016) [32], Cardiovascular Disease Outcomes Strategy by UK Department of Health (2013) [33] and Draft report: Saturated fats and health by Scientific Advisory Committee on Nutrition (SACN) 2018 [35]
- Based on UK Government Dietary Recommendations by Public Health England (2016) [32]
- Based on UK Government Dietary Recommendations by Public Health England (2016) [32]
- Based on UK Government Dietary Recommendations by Public Health England (2016) [32] and Scientific Advisory Committee on Nutrition (SACN) Report 2015 on Carbohydrates and Health [36]
- Based on NDNS Results from Years 7 and 8 (combined) of the Rolling Program (2014/2015 – 2015/2016) [29] and The Eatwell Guide by Public Health England (2016) [34]