

# **Conveying health benefits of Australian vegetables**

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Plant & Food Research Australia Pty Ltd

Project Number: VG12043

## **VG12043**

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**Service Providers:** Plant and Food Research, Australia; MacTavish West Pty. Ltd.



**Veggycation.com.au**  
*loving the health benefits*

**Healthy Skin**  
Eat lots of veg like capsicum and snow peas.

**Healthy Brain**  
Peas and mushrooms are high in B vitamins which are good for your brain.

**Healthy Eyes**  
Orange vegetables are all high in vitamin A, great for eyesight.

**Hydration**  
Drinking water and eating veg like lettuce and cucumber will help keep your body working properly.

**Healthy Heart**  
All vitamin and mineral rich veg are good for a healthy heart.

**Healthy Digestion**  
Eat veg like beetroot and beans every day, and drink lots of water to keep your tummy feeling great.

**Energy**  
Starchy veg like sweetcorn and potatoes are great for energy.

**Healthy Immunity**  
Eats lots of broccoli and peas – packed with Vitamins A & C for all-round protection.

**Healthy Bones**  
Vitamin K is great for bones, so eat veg like celery and cabbage every day.

**Find out more about healthy veg with fun facts, recipes and jokes just for you.**

HAL Project Number: VG12043 (31 July 2014)

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## Contents

<b>Abbreviations</b> .....	<b>1</b>
<b>Media Summary</b> .....	<b>2</b>
<b>Technical Summary</b> .....	<b>3</b>
<b>1 Introduction</b> .....	<b>4</b>
<b>2 Materials and Methods</b> .....	<b>5</b>
2.1 Working partnership with key stakeholders.....	5
2.2 Scientifically valid nutrition and health information.....	5
2.2.1 Assemble nutrient and health claim database for Australian-grown vegetables.....	5
2.2.2 Consumer-relevant health benefits .....	6
2.3 Delivering Veggycation®.....	6
2.3.1 A portal to access valid nutrition and health information .....	6
2.3.2 Guidelines for use of nutrition and health information .....	7
2.4 Consumer Insights – nutrition and health benefit understanding.....	8
<b>3 Results</b> .....	<b>9</b>
3.1 Working partnership with key stakeholders.....	9
3.2 Scientifically valid nutrition and health information.....	9
3.2.1 Searchable nutrient and health claim database for Australian-grown vegetables.....	9
3.2.2 Nine consumer-relevant health benefit areas .....	10
3.3 Delivering Veggycation® .....	10
3.3.1 Guidelines for use of nutrition and health information .....	10
3.3.2 Workshops .....	13
3.3.3 Nutrition and Health Articles.....	13
3.3.4 Presence at Key Stakeholder Conferences .....	13
3.4 The Website: <i>www.veggycation.com.au</i> .....	14
3.4.1 Open Public Homepage .....	14
3.4.2 Veggycation® Grower Page .....	15
3.4.3 Website activity .....	16
3.4.4 Search Engine Optimisation.....	16
3.5 Consumer Insights – nutrition and health benefit understanding.....	16
3.6 Intellectual Property.....	19
<b>4 Technology transfer</b> .....	<b>20</b>
<b>5 Discussion</b> .....	<b>20</b>
<b>6 Recommendations</b> .....	<b>25</b>
<b>7 Acknowledgements</b> .....	<b>26</b>
<b>Appendices</b> .....	<b>27</b>
<b>Appendix 1 – Levy-paying Australian-grown vegetables</b> .....	<b>27</b>
<b>Appendix 2 – VG12043 Project Deliverables</b> .....	<b>28</b>





## **Abbreviations**

DI – daily intake

EFSA – European Food Safety Authority

FSANZ – Food Standards Australia New Zealand

NIP – nutrition information panel

NPSC – nutrition profiling scoring criterion

NQA – nutrient quality assurance

NUTTAB – Australian NUTrient TABLEs

RDI - recommended dietary intake



## Media Summary

The project, Veggycation<sup>®</sup>, is an innovative communication campaign that aims to simplify the complexity of food standards and enable greater use of relevant nutrition and health labelling for fresh vegetables. Labelling fresh vegetables with nutrition and health claims has until now been seriously limited by the complexity of the food standards framework. A range of media were used to communicate vegetable nutrition and health benefit messages: a website with downloadable content and links has been particularly well received

Engagement with key stakeholder groups (including growers, industry associations, grower associations, wholesalers/markets, retailers, educators, public and community health groups, food writers and chefs) was integral to the projects' success. The information in the website ([www.veggycation.com.au](http://www.veggycation.com.au)) is based on pre-approved nutrition and health claims from Food Standards Australia & New Zealand (FSANZ) Standard 1.2.7, and nutritional data from the Australian Nutrient Tables (NUTTAB). The Veggycation<sup>®</sup> team translated pre-approved FSANZ nutrition and health claims into 'Health Benefits' language. We discovered that this ensured that information was more easily understood by all, from the growers to the consumers. A database (searchable by vegetable, by nutrient and by health benefit), can be accessed from the web portal: guidelines for using the information are provided in a range of different formats (including a 'HOW TO GUIDE', Case Studies for root, fruit and leafy vegetables, standardised Nutrient Information Panels (NIPs), images of whole vegetables and serving size amounts, posters suitable for application in health and education) plus nine health benefit icons are freely available to the fresh vegetable sector for marketing their vegetable foods.

Veggycation<sup>®</sup> has increased Australian consumer awareness of the health benefits that vegetables offer and this is expected to translate to increased consumption of Australian-grown vegetables. The primary step was to engage key stakeholder groups in order to develop a shared nutrition and health language. Veggycation<sup>®</sup> provides information and tools that vegetable growers and marketers can use to promote their vegetables.

The project was funded by Horticulture Australia using the vegetable levy and matched funds from the Australian Government.

## Technical Summary

The Veggycation<sup>®</sup> project targets increased consumer awareness of why vegetables are healthy with a view to increasing the consumption of Australian-grown vegetables. Recent changes in food standards, have paved the way to make nutrition and health claims on vegetable foods. FSANZ have recognised the science behind key vitamins and minerals in terms of human health, and pre-approved over 200 general level health claims, many of which are relevant to vegetables (FSANZ Standard 1.2.7). Many vegetables have vitamins and minerals present at 'source' level (10% of the recommended daily intake) in one serve, and thus their consumption to support many different functions of human health can be promoted.

Veggycation<sup>®</sup> aligns the legally pre-approved health claim legislation from FSANZ with food composition data from accredited sources including Australian Nutrient Tables (NUTTAB), making this information available (and searchable) for the wider population including those who grow vegetables, those interested in the health attributes of vegetables and those who just love eating vegetables.

The Veggycation<sup>®</sup> team developed rationale linking pre-approved health claims to consumer-relevant health benefits: "Healthy Heart", "Healthy Vision", "Healthy Immune System", "Healthy Bones & Joints", "Healthy Skin", "Healthy Brain & Nervous System", "Healthy Digestion", "Energy & Metabolism", "Hydrate Yourself". Growers can use this information to promote vegetables, with on-pack nutrition and health benefit claims that consumers understand. In essence, Veggycation<sup>®</sup> facilitates communication of robust, credible information in a consumer-friendly manner.

Veggycation<sup>®</sup> provides a toolkit that the vegetable industry can use to promote the nutrition and health benefits of vegetables. Nutrition and health information is searchable through a web portal ([www.veggycation.com.au](http://www.veggycation.com.au)): searching for a specific nutrient reveals the relevant vegetables that can supply that nutrient and consequential health benefit, similarly searching for a specific vegetable finds the relevant health benefits that consuming one serve of that vegetable will support. Visual icons for the health benefit areas have been developed: using these in combination with legally approved health claim statements enables rapid on-pack recognition. Guidelines for development and use of nutrition and health benefit claims are available in a range of different formats (including "HOW TO GUIDE"; Nutrient Information Panels (NIPs); case studies; images of whole vegetables and in a serving size format; print-ready posters suitable for use in education or health (or home) arena).

The project team has also communicated nutrition and health benefit messages in writing (via print media and digital articles) and in person (at workshops and in webinars and videos).

Veggycation<sup>®</sup> provides a veritable treasure trove of consumer-friendly, vibrant, informative and relevant resources for everyone from kids to vegetable lovers, from teachers to doctors, from dietitians to produce marketers. This information could be further developed into targeted resources for teachers, dietitians, wholesalers and retailers that profile nutrition and health benefits of vegetables, supporting a move from the monologue '*vegetables are good for you*' to a dialogue with today's tech-savvy consumers who seek to understand '*why vegetables are really good for me*'.

The project was funded by Horticulture Australia using the vegetable levy and matched funds from the Australian Government.

## 1 Introduction

The project, Veggycation<sup>®</sup>, is an innovative campaign that aims to simplify the complexity of food standards and enable greater use of relevant nutrition and health labeling for fresh vegetables. At the same time Veggycation<sup>®</sup> will help educate consumers, assisting them to make more informed food choices and increase their vegetable intake. Labelling fresh vegetables with nutrition and health claims has until now been seriously limited by the complexity of the food standards framework. To capitalise on the opportunity now offered by the change in food standards, effective communication of nutrition and health benefit messages about (levied) vegetables to diverse vegetable industry stakeholders was needed. A range of media were used including presentations, articles and a web presence with downloadable content and links.

The information in [www.Veggycation.com.au](http://www.Veggycation.com.au) is based on pre-approved nutrition and health claims from Food Standards Australia & New Zealand (FSANZ) Standard 1.2.7, labelling requirements from FSANZ Standard 1.2.8 and nutritional data from the Australian Nutrient Tables (NUTTAB). The Veggycation team has translated pre-approved FSANZ health claims into nine consumer-friendly 'Health Benefits'. This makes knowledge more accessible and easily understood by all, from growers through consumers. The team has developed a database (searchable by vegetable, by nutrient and by health benefit) that is accessed from a web portal ([veggycation.com.au](http://veggycation.com.au)) with guidelines on use of the information including a 'HOW TO GUIDE', three Case Studies (one each for a root, fruit and leafy vegetable), a series of standardised Nutrient Information Panels (NIPs) for the top 20 vegetables (by sales volume, 2014), images of the top 20 vegetables including serving size images, and three posters for application in health and education sectors. We have trademarked Veggycation<sup>®</sup> and developed nine health benefit icons that are freely available to the fresh vegetable sector for marketing their products.

Veggycation<sup>®</sup> has been designed to increase Australian consumers' awareness of why vegetables are healthy, with a view to increasing the consumption of Australian-grown vegetables.

## 2 Materials and Methods

### 2.1 Working partnership with key stakeholders

Our stakeholder engagement plan was developed in consultation with key industry advisors (Houston's Farm, who are the industry liaison for this project, plus AUSVEG and HAL) and vegetable stakeholders (including growers, industry associations, grower associations, wholesalers/markets, retailers, educators, public and community health groups, food writers and chefs). As part of our planning, we undertook an on-line survey (<https://www.surveymonkey.com/s/HealthyAussieVeg>) that identified the most engaged industry contacts who were ready and willing to implement changes in their businesses and use nutrition and health claims to market vegetable foods. The survey also provided us with key opportunities for scheduling workshops and making presentations to the wider stakeholder group, including health and nutrition specialists (e.g. dietitians).

### 2.2 Scientifically valid nutrition and health information

Valid nutrition and health information was generated for Australian-grown levy-paying vegetables by undertaking a series of staged actions that allowed us to develop evidence-based knowledge on health benefits of vegetables.

#### 2.2.1 Assemble nutrient and health claim database for Australian-grown vegetables

The Veggycation<sup>®</sup> Nutrient Database was compiled by the Plant & Food Research (PFR) team from food composition data, primarily NUTTAB<sup>1</sup> because this contains Australian data. Where there were gaps in this information, data were sourced from the New Zealand Food Composition database (<http://www.foodcomposition.co.nz/>) and the United States Department of Agriculture National Nutrient Database for Standard Reference (<http://ndb.nal.usda.gov/>). Information from these databases was also used to quality check the NUTTAB data as some vegetables had limited Australian sourced data. The data for relevant nutrients and phytonutrients have been tabulated based on the "amount per 100g" and "amount per serve" basis. Serving sizes reflect the Australian Dietary Guidelines and what common sense tells us are achievable levels in a normal diet. For most vegetables a standard serving size of 75 g (½ cup) has been used.

Valid information for vegetable phytonutrients was obtained from scientific papers. Information assembled also included scientific names, vegetable descriptions, plus postharvest technologies to maximise nutritional quality, vegetable usage hints and tips.

Vegetable management recommendations have been developed for growers and the broader industry based on the known impact of agronomic and postharvest practices on levels of nutrients.

The impact of storage and cooking on nutrient content and bioavailability has also been assessed and collated in brief form for each vegetable page, e.g. "*carotenoid rich vegetables are best cooked and served with a source of fat*". A sister project to the initial Veggycation<sup>®</sup> project is making these data searchable for cooked, canned and frozen vegetables, as well as providing online cooking demonstrations for Asian vegetables to maximise nutrient content (VG13087). The information from VG13087 will also be hosted on the Veggycation<sup>®</sup> website.

Health benefit information has been collated from a range of sources, primarily the scientific literature but also FSANZ, European Food Safety Authority (EFSA), food composition databases, Dietitians Association of Australia, Heart Foundation, Cancer Council and Australian National Preventative Health Agency. Where there is growing scientific evidence for a potential

<sup>1</sup> (<http://www.foodstandards.gov.au/science/monitoringnutrients/nutrientables/nuttab/Pages/default.aspx>)

health benefit from ingesting phytonutrients, this information has been included in the database, although it is noted on the website that formal claims in relation to these phytonutrients cannot be made at present. To limit misuse of this information, information relating to phytonutrients is more general and levels of the compounds are not provided.

### **2.2.2 Consumer-relevant health benefits**

Our primary focus was to ensure that messages were robust and allowable under FSANZ legislation. A review was conducted of all the FSANZ 200+ pre-approved claims and we extracted only those that had relevance to the nutrients present in vegetables. These were catalogued following a review of the nutrient composition of vegetables (section 2.1.1), recommended dietary intake requirements for key nutrients, and allowable pre-approved claims<sup>2</sup>. Aligning the compositional information (for each of the levied vegetable) with relevant and allowable nutrition and health benefit messaging has identified a series of legitimate claims that we grouped into nine consumer health benefit areas. These were made identifiable by linking them to something consumers can understand (i.e. body parts) – for example, we talk about the “brain” rather than “psychological function”. Qualifying criteria were set for each of the health benefit areas to ensure that robust health claims would be made (e.g. to use the “Bone & Joint” claim a vegetable must contain one nutrient from the list permitted for bone claims and one nutrient from the list permitted for joint claims). This ensures the consumer will receive greater than the minimum level required of a relevant nutrient, and mitigates the risk of nutrient levels falling below the threshold required to make claims because of the natural variation associated with different varieties, growing seasons and processing methods.

## **2.3 Delivering Veggycation®**

### **2.3.1 A portal to access valid nutrition and health information**

The Veggycation® website converts a high volume of numerical and text data relating to the nutritional content and management of vegetables into a format that allows unskilled users to screen for levels of nutrients in specific vegetables which deliver a specific health benefit. The searchable requirement required a dynamic database-driven website, since this allowed the most efficient use of data with minimum duplication of data entry while providing a high level of scope for functional enhancement over the lifespan of the website. This is very different from a standard ‘WordPress’-style text based website, with a much higher level of complexity behind the scenes.

Our starting point was the input spreadsheet used to collate the scientific data on nutritional content. The spreadsheet needed to be structured so that it was both human-readable to allow data to be easily entered off-line and able to be processed by software scripts to extract the information into machine-readable data. Excel was selected as the most suitable and readily available tool for producing this spreadsheet.

Plant & Food Research generated the input spreadsheet, and MacTavish West Pty Ltd designed the SQL database structure required to provide search functionality and data flexibility required. Key aspects of database design were distribution of data over several table records to reduce the amount of data repetition and to allow easy access of related records across these tables as one-to-one, one-to-many, and many-to-many record associations were required.

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<sup>2</sup> Claims cannot be made for non-core nutrients (i.e. those compounds that do not have a recommended daily intake, RDI, such as the phytonutrients). Therefore we have based the claims for levied vegetables on the core nutrients (vitamins and minerals) that are present and for which claims can be made under FSANZ (e.g. “10% RDI of vitamin C to support immunity”), and suggested an approach that layers the non-core nutrients on top (so called phytonutrients, e.g. “and contains phenolics”).

With the database structure finalised, extraction scripts were developed to convert the Excel spreadsheet into data structures suitable for insertion into a database structure. The spreadsheet is initially broken into sheets and then processed by a number of php script files for loading into an intermediate database structure for checking and verification. This intermediate database is then exported from a local server and imported onto the live web server for use by the website. Although some of this process is partially automated through the use of scripts, it still requires care and effort to ensure that the input data are correctly formatted and manipulated to generate the correct output files.

In parallel with the design of the database the presentation side of the Veggycation® website was implemented in collaboration with a specialist web designer. The design process was similar to that used for most websites with the graphical 'storyboard' and overall structure being developed first, followed by the detailed design of data presentation and more bespoke operations required by the site (such as the secure login sections which required customisation of existing code modules to provide the desired functionality).

The Veggycation® website consists of two classes of page: static and dynamic. The static pages are used to present fixed information about the project, site resources etc.: in general most aspects of these pages are manageable via a standard CMS interface. The dynamic pages present information autogenerated 'on-the-fly' using scripts that interrogate the SQL database sitting behind the website and containing all the hard data related to the vegetables, nutrients, health benefits, etc. This means that only one source page is authored for each class of page output (i.e. vegetable page, nutrient page, vegetable management page etc.) with the specific data required for each individual instance of vegetable, nutrient and health benefit being populated from the database by the scripts. As an example: for vegetables, one scripted page generates over 90 specific vegetable pages rather than 90 separate pages being individually authored.

This combination of static and flexible pages allows the site to be maintained and added to (i.e. addition or removal of vegetables) without needing to make any website code changes, rather by modifying the database that sits behind it. It also allows highly flexible interpretation of the data held in the database to permit searches of the type of '*which vegetable is a source of ...*' and '*what can ... be found in ...*' or exposing additional levels of information such as the relative amounts of nutrients in vegetables by changing only the database and the page scripts rather than having to modify 90 individual webpages.

Due to the complexity of the data contained within the database and the relational nature of the data the designed update method is to regenerate complete datasets when changes are required. This update mechanism is preferable to maintaining individual records since it removes the need for evaluating the scope of data changes within the excel spreadsheet across the database tables.

### **2.3.2 Guidelines for use of nutrition and health information**

Information extracted from FSANZ Standards 1.1.1, 1.2.7 and 1.2.8 is embodied in the following resources: a "HOW TO Guide" for nutrition and health labelling of vegetable foods; three case studies: images of the top 20 vegetables (based on sales volume, 2014) including serving size pictorials; posters for health and education professionals; and an array of website summaries to guide those wishing to label vegetable foods. The "HOW TO Guide" was presented to stakeholders at industry events: a video of this presentation can be downloaded from [www.veggycation.com.au](http://www.veggycation.com.au).

## 2.4 Consumer Insights – nutrition and health benefit understanding

The design for the consumer study was based on qualitative and quantitative research which was undertaken using an online survey method. This work was conducted by a PhD student at the University of Sydney, Reetika Rekhy, at the Faculty of Agriculture and Environment, The University of Sydney, under the guidance of Assoc. Prof., Dr. Robyn McConchie (The University of Sydney) and Dr. Aila Khan (University of Western Sydney).

The sample size was 1000 adult respondents (18 years and above) from across all Australian states. The services of the online market research panel, Nine Rewards, were used to script, design and host the survey on a software program called 'Qualtrics'. The online survey questionnaire was designed by researchers in the Faculty of Agriculture and Environment, The University of Sydney (Rekhy et al., 2014a) and approved by the Human Ethics Committee at the University of Sydney. The survey took each respondent approximately 20 minutes to complete. The survey questions investigated:

- the perceived importance of vegetables in the daily diet;
- daily consumption levels of vegetables;
- knowledge and views about health related benefits for specific vegetables;

The scope of the research covered the top 20 ranking vegetables in Australia based on sales volume in 2014 (except potatoes and onions): asparagus; French beans; beetroot; bok choy; broccoli (whole head); cabbage (savoy); red capsicum; carrot; cauliflower; celery; choy sum; cos lettuce; sweet corn; Chinese cabbage (wombok); butternut pumpkin; radish (daikon); sweet potato (orange); spinach (mature leaf); snow peas (sugar snap peas); and zucchini.

## **3 Results**

### **3.1 Working partnership with key stakeholders**

A survey of stakeholders groups (including growers, industry associations, grower associations, wholesalers/markets, retailers, educators, public and community health groups, food writers and chefs) was undertaken in order to identify the most attractive theme for a communication campaign, and to identify the most effective format for successful delivery of health information to consumers. We designed an online survey that was taken by 111 stakeholders covering grower, marketer, retail, health industry groups. The survey asked the respondents how important they thought health benefit information on pack was. The majority of industry respondents believed that health benefit promotion was crucial (53%). Of the three campaigns we initially designed:

- “Veggycation” was preferred (45% all stakeholders).
- “Ministry of Natural Goodness” was preferred by 31% but was seen as ambiguous and seemed unrelated to vegetables, some respondents suggested it required a female presence.
- “Nature’s Yummy Bits” was preferred by 25% of respondents. In general, the nudity in this campaign was considered to be too confronting, although, it was found to be attention-grabbing.

The three communication themes were also presented to the AUSVEG Design Team and HAL: the preferred strategy for a communications campaign was Veggycation®.

We focused on presenting a non-moralistic approach, with a light hearted feel – to enable a memorable web portal to be developed which could provide information at many levels for different target audiences (different ages, genders and education levels) in the future. After discussions with the AUSVEG and HAL teams and the stakeholders, Veggycation® was protected by trademark (now approved and transferred to HAL) and the domain name purchased. The design concepts and website were further developed taking into consideration feedback from the online surveys and workshops. Veggycation® focuses on the health benefits of vegetables, but does so in a vibrant, fresh and fun way so that people enjoy using the website “Have you been Veggycated yet?”

### **3.2 Scientifically valid nutrition and health information**

#### **3.2.1 Searchable nutrient and health claim database for Australian-grown vegetables**

Evidence-based knowledge on the health benefits of vegetables was collated and incorporated into a searchable electronic database. The health benefit information was sourced from FSANZ, European Food Safety Authority (EFSA), food composition databases and the scientific literature. The information is searchable via three different routes:

- Vegetables – using common name(s) and scientific name;
- Nutrient content;
- Health benefits.



The searchable vegetables include all levy-paying Australian-grown vegetables (Appendix 1<sup>3</sup>). “Nutrient” refers to both core and non-core nutrients. The database provides further explanation about each nutrient (core nutrients and classes of non-RDI nutrients (e.g. the phytochemicals like phenolics), each health benefit area, and each vegetable in terms of claimable nutrients and health benefit areas.

### 3.2.2 Nine consumer-relevant health benefit areas

The health benefit claims (listed below) take into account the quantity of a nutrient (the amount per 100g and per serve) in relation to the recommended daily intake (RDI) for that nutrient. FSANZ have developed over 200 pre-approved health claims. Within these we focused on the health claims relevant to vegetables and to the whole population. We have simplified the allowable FSANZ claims into nine health benefit areas:

1. Healthy Bones & Joints
2. Healthy Brain & Nervous System
3. Healthy Digestion
4. Energy & Metabolism
5. Hydrate Your Body
6. Healthy Vision
7. Healthy Heart
8. Healthy Immune System
9. Healthy Skin



### 3.3 Delivering Veggycation®

#### 3.3.1 Guidelines for use of nutrition and health information

Guidelines for use of nutrition and health claim information have been developed. These project deliverables formed the primary education parameters for the Veggycation® workshops and are available as downloads from the Veggycation® website.

**HOW TO GUIDE** – We developed a step-by-step guide for making nutrition and health claims for vegetable-based foods. The guide steps readers through product format, serving size, key nutrients, testing for nutrients, nutrition profiling scoring criterion (NPSC), health claim messaging, developing a novel health claim, nutrition information panel (NIP), ingredients list and allergen labelling, and nutrient quality assurance (NQA) practices. It is also a quick reference for daily intake (DI) and recommended dietary intake (RDI) values and provides links to the FSANZ standards. We have also made this available as a video.

<sup>3</sup> There was not sufficient nutrient data to support vegetable pages for some of the levied vegetables, e.g. salsify, snake beans.

**CASE STUDIES** – Case studies using carrots, red capsicum and cos lettuce were developed to provide examples of situational use of the nutrition and health claims for a root, fruit and leafy vegetable. The case studies were designed and used to enable greater engagement of end users in the use of health claim information in the workshops (Lister, 2013 a, b, c).

**NIP BROCHURES** – standardised NIPs were developed for the top 20 vegetables (by sales volume). The NIPs were included in brochures that provided a context for when and how they should be used in the marketing of vegetable-foods in a retail environment.

**MEDIA PACK** – We developed a suite of downloadable brochures, posters and flashcards to help educate a wide range of stakeholders about the nutrition and health benefits of consuming vegetables.

- *Vegetable imagery* – key images for all of the vegetables that are in the searchable database were developed to help consumers identify them in retail stores.
- *Serving size images* – images of what a single serving size (75g in most cases) looks like for each vegetable were developed. The feedback we received from key stakeholders, including dietitians and the Stephanie Alexander Kitchen Garden Foundation, was particularly positive towards the serving size images.
- *Flashcards* – vegetables and vitamins. We incorporated flashcards into a downloadable game called “What’s in this vegetable?” The game was developed from an activity undertaken at workshops.
- *Banners* – two banners were designed and printed for use at industry conferences.
- *Flyers* – a two-sided postcard size flyer was developed for the conferences containing the website address and context for Veggycation<sup>®</sup>.
- *Video Workshop* – the Adelaide workshop was filmed and subsequently edited into a series of videos with cut aways to the Powerpoint presentation. These videos are available for viewing and/or downloading from the Veggycation<sup>®</sup> website for those who could not attend the workshops and provide a resource for those who want to referesh their knowledge. They cover specific parts of the workshop presentation including the nutritional content of vegetables, what one serve looks like, and the HOW-TO-Guide.
- *Posters* – three print-ready posters for use in homes, schools, offices and in waiting rooms targeting community members such as teachers, child carers, dietitians, doctors etc were developed.
  - Education Poster (cover image)
  - Health Poster (see below)
  - Serving Size Poster (see Discussion section)

**Veggycation.com.au**  
*loving the health benefits*

Healthy Brain  
Hydration  
Healthy Digestion  
Healthy Skin  
Healthy Immunity  
Healthy Eyes  
Healthy Heart  
Healthy Bones  
Energy

**Want to keep Healthy?  
Just eat more  
vegetables,  
every day**

**"A diet  
containing  
a high intake of  
fruit and vegetables  
reduces the risk of  
coronary heart disease"**

**For more information check out  
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**HAL**  
Horticulture Australia  
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the vegetable levy and matched funds from  
the Australian Government

### **3.3.2 Workshops**

The Veggycation® workshops addressed the new food standard, nutrients and phytochemicals, serving size, and provided the 10-step “HOW-TO-Guide” to making a nutrition and health claim with examples drawn from three case studies. We undertook nine industry workshops in five states, reaching 125 key stakeholders from grower, wholesale, retail, education and health organisations<sup>4</sup>.

1. Brisbane Markets, 24th September 2013
2. Gatton, 24th September 2013
3. Cranbourne, 25th September 2013
4. Melbourne Wholesale Fruit Vegetable and Flower Market, 26th September 2013
5. Woolworths, Sydney, 27th September 2013
6. Longford, Tasmania, 2nd October 2013
7. Sydney Markets, 3rd June 2014
8. The Mawson Lakes Hotel & Function Centre, Adelaide, 4th June 2014
9. Fresh Ideas Centre at Market City, Perth, 5th June 2014

Workshop materials included a Powerpoint (tailored to the audience), posters of the website pages, flashcards (vegetables, nutrients, phytochemicals, serving size), and printed copies of the three case studies and ‘HOW-TO GUIDE’ for participants to take home with them. The workshops were well received and we got very positive and constructive feedback from the participants that allowed ongoing improvements.

An additional piece of work enabled stakeholders who could not attend the workshop to access information online. We filmed the Adelaide workshop and edited the workshop into a series of videos with cut aways to the Powerpoint presentation. These videos are available for viewing and/or downloading from the Veggycation® website.

### **3.3.3 Nutrition and Health Articles**

Further communication with the vegetable industry and wider stakeholder groups was achieved through written articles (see Technology Transfer Section 5, and Project Deliverables, Appendix 2), facebook, twitter and blogs. We were also involved in a live web chat about kale with dietitian Emma Stirling’s #eatkit.

### **3.3.4 Presence at Key Stakeholder Conferences**

We attended conferences that provided outreach into the key stakeholder groups. Our stands at each of the conferences (AusVeg – 300 delegates, Dietitians – over 600 delegates, PMA Australia & New Zealand – over 1000 delegates) provided participants with access to the Veggycation® website, plus a chance to investigate the information, discuss its relevance to their businesses and learn more about the ease of application of nutrition and health benefit claims to vegetable foods (see Technology Transfer Section 4, and Project Deliverables, Appendix 2).

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<sup>4</sup> Including but not limited to participants from: AusVeg, Cancer Council, Catering, Chamber of Fruit and Vegetables, CSIRO, Department of Agriculture and Food, Diabetes, Dietitians, Education, Green Grocer, Grower, HAL, Heart Foundation, Retail, Vegetable Seed Producer, Vegetable Market, Wholesale organisations.

### 3.4 The Website: [www.veggycation.com.au](http://www.veggycation.com.au)

We designed and developed a vibrant logo and web portal hosting a complex searchable database with vivid imagery, downloadable documents and pages of relevance to growers (and industry), kids (and teachers), vegetable lovers ('the great Aussie public'). The website is a repository for downloadable nutrition and health benefit information which can be accessed in different ways for different purposes by growers/industry, consumers and children/teachers.

One feature we felt very important was information that was ready for use and understandable for kids and teachers. To this end we undertook a photo shoot to obtain suitable pictures. We then created statements that were potentially understandable by literate 7-year-old children about each of the specific health benefit areas, linked them with relevant vegetables, and put them into pop-up boxes arranged around the Veggycation® girl.

The website is hosted at [www.veggycation.com.au](http://www.veggycation.com.au). We anticipate the database may need to be updated annually to keep abreast of new pre-approved FSANZ claims, particularly as the new regulations came into force only in January 2013.



#### 3.4.1 Open Public Homepage

The homepage is accessible to all and includes a searchable database with pull-down menus/tabs to allow consumers (vegetable lovers; kids and teachers) to further investigate the nutrients and health benefits of vegetables. In addition to the composition information, a photograph, description, and scientific name of each vegetable is given to help educate the consumer and ensure vegetables are correctly identified. 'Did you know' facts also engage the general public.

There is additional information for consumers on 'How much to eat'. This provides a visual indication as well as information about appropriate serving sizes for different groups of vegetables.

A Glossary of Terms and Abbreviations is provided to assist the industry and consumers develop a common shared language for nutrition and health.

A 'Downloads' tile provides access to additional project deliverables (e.g. posters, serving size images, flashcards, game): a variety of "fun facts" have been collated and pop up on the website pages to capture the attention of readers.

The website will be extended to provide a portal for accessing the deliverables of a second HAL funded project (VG13087) which is investigating the nutrient content of cooked, canned and frozen Asian vegetables.

### 3.4.2 Veggycation® Grower Page

The private, log-in part of the website hosts detailed information for vegetable growers and companies to use for develop nutrition and health claims for their vegetable products. Currently AusVeg approves members who can access the log-in part of the website.

Each **vegetable** (searchable using common names) has a page that supports further information, including:

- Common and scientific names.
- Serving size.
- Claimable nutrients – per 100g and per serving size.
- Relevant phytonutrients e.g. glucosinolates, anthocyanins (i.e. non-core nutrients).
- Relevant health benefits associated with eating a single serve of the vegetable.
- Factors affecting nutrients (specific details relevant to production provided for vegetable industry only).

Each **nutrient** (core and non-core nutrients, including relevant phytonutrients) has a page that supports further information, including:

- Recommended daily intake.
- Relevant health benefits gained from ingesting the nutrient.
- How much is enough to provide a benefit (recommended daily intake).
- The science that justifies the health benefit.
- The impact of production, processing, shelf-life, and cooking on nutrient stability.
- Relevant vegetables.
- Other food sources.
- Nutrient content per serve for specific vegetables (vegetable industry only).

Each **health benefit** has a page that supports further information, including:

- The health benefit with the icon.
- Related nutrients.
- Related vegetables.
- Relevant FSANZ pre-approved claims (vegetable industry only).
- Further information about the nutrients that support a health benefit (vegetable industry only).
- Eligibility criteria for making specific health benefit claims (vegetable industry only).

The 'Downloads' tile provides access to a range of project deliverables (e.g. NIP brochures, posters, HOW TO GUIDE, case studies, fliers, serving size images, flashcards, workshop videos).

### **3.4.3 Website activity**

Since November 2013 there have been a total of 6483 visits to the website, of which over 4638 were new visits (i.e. not people visiting multiple times). On average, people viewed between 5 and 10 pages, and spent between 4 and 20 minutes on-site. In May 2014 there were a total of 1310 visits to the website, of which over 1016 were new visits. In June 2014, 866 visits (584 new) coincided with increased promotional activities (stakeholder conferences, workshops etc.). As of 8 July 2014, there were 160 total user account applications registered for the login only section of the growers (and industry) page of which 146 have been approved.

### **3.4.4 Search Engine Optimisation**

In order to improve visibility of the Veggycation® website through standard web searches, a degree of search engine optimisation has been performed. This includes ensuring that the site is 'index friendly' from the perspective of automatic search engine robots; some keyword optimisation; and additional use of incoming link references from other websites (e.g. Nutrition Professionals Australia). The effects of search engine optimisation are not fully persistent but as of 10 July 2014, a Google search with terms 'Australia vegetable benefits' returned Veggycation on page one of the results, as did 'Australia vegetable health benefits'. Searching for 'veg lovers' returned Veggycation as the first result. Continued use (and linking by third parties to the site) will assist in enhancing and maintaining this search engine visibility.

## **3.5 Consumer Insights – nutrition and health benefit understanding**

We investigated the top-of-mind health benefits that consumers perceive vegetable consumption provides them with. We specifically investigated:

- the perceived importance of vegetables in the daily diet;
- daily consumption levels of vegetables;
- knowledge and views about health related benefits for specific vegetables;

The demographic profile of respondents (i.e. ethnicity, gender, age and place of residence) had a major influence on how the respondent rated the importance of vegetables in their daily diet. The importance of daily vegetable consumption was ranked higher by females than males, by those aged 45 years and over compared to younger people, and by those living in non-metropolitan areas compared with metropolitan areas. The respondents who rated the importance of vegetables in their diet as high also consumed more vegetables in terms of the daily number of serves.

When unaided, consumers suggested a number of health benefits related to the consumption of specific vegetables (e.g. eyesight for carrots, healthy skin for zucchini, energy for sweet potato, digestion for cabbage, sweet corn and celery, 'blood related' for beetroot and spinach). Not all of their suggestions were valid, and over half of the respondents clearly were unsure about the health benefit they would get from eating specific vegetables.

When asked to rank a series of valid health benefits for specific vegetables, the respondents provided some interesting insights (Table 1). Carrots were clearly recognised for healthy vision. Asparagus, Chinese cabbage, pumpkin, bok choy, peas and capsicum were recognised for heart and immunity benefits. These two benefits tended to be linked by the consumers. Cauliflower, beans and Chinese broccoli were all recognised for digestive health, and sweet potato was recognised for providing energy and metabolism. The nutrient content of spinach means it aligns with eight health benefit areas. However, in the survey consumers did not recognise or rank any of the benefits for Spinach as a stand out. This is perhaps a caution to

the vegetable industry regarding choice and complexity – there is a need to make claims simple and relevant to consumers. If there are too many claims they may not be believable.

Consumers recognised the term 'nutrient' and used it widely, suggesting the health benefits of sweet potato, beans, bok choy, spinach, broccoli, capsicum were linked with beneficial nutrients, although their understanding of what those nutrients were tended to be limited to certain terms – 'antioxidants', 'carotene', 'carbs'. There did not appear to be a good understanding of vitamins, their unique presence in vegetables and their health-giving benefits. There is a significant opportunity to increase consumer understanding of nutrients (i.e. vitamins and minerals). Visual icons and other initiatives that educate consumers (for example smart phone apps linked to Veggycation) may enhance the uptake of this knowledge by the general population.

The key finding from this work is that knowledge of the specific health benefits from consuming vegetables is low. There is limited consumer knowledge of how vegetable consumption supports human health. Consumers trust that vegetables are good for health and understand vegetables contain nutrients. An initial step to improve the value of vegetables may be achieved simply by talking about the vitamins and minerals present, and evolving this over time into specific health benefit claims. The challenge for the vegetable industry is to develop consistent nutrition and health messages, as there is a high risk of causing confusion if health claims are not well aligned across the market.



**Table 1. Consumer perceptions of nutrition and health benefits gained from consuming vegetables.**

Vegetable	Free Elicitation Health Benefit	Frequency by which a specific health benefit was ranked first choice by survey respondents							
		Unsure <sup>a</sup> (%)	No. health benefits	Healthy Heart	Healthy Immune System	Healthy Vision	Healthy Digestion	Energy & Metabolism	Total
Asparagus		51	5	72	70				203
Beans	Nutrients <sup>b</sup>	50	3				133		204
Beetroot <sup>f</sup>	Blood related (12%)	55							N/A
Bok Choy	Nutrients	57	4	73	68				202
Broccoli	Nutrients	49	4		81				196
Cabbage	Digestion (19%)	55	4	89					195
Capsicum	Nutrients	52	4	62	76				196
Carrot	Eyesight (55%)	22	6			128 <sup>c</sup>			200 <sup>c</sup>
Cauliflower		63	6				108		203
Celery <sup>f</sup>	Digestion (15%)	41							N/A
Chinese Broccoli	Nutrients	57	6				80		195
Chinese Cabbage	Digestion (11%)	57	4	74	73				203
Cos Lettuce		56	5	56					196
Daikon <sup>f</sup>		72							N/A
Peas		63	5	61	55				195
Pumpkin		53	5	68	66				204
Spinach <sup>e</sup>		33	8	45			65		202
Sweet Corn	Digestion (10%)	63	2	122					195
Sweet Potato	Nutrients	49	6					105 <sup>d</sup>	200 <sup>d</sup>
Zucchini <sup>f</sup>	Skin (11%)	60							N/A

<sup>a</sup> the percentage of those surveyed who stated they were unsure of the health benefits linked with consuming certain vegetables

<sup>b</sup> many vegetables were recognised for containing 'good' nutrients, although further understanding was limited.

<sup>c</sup> average across 5 subsets of data

<sup>d</sup> average across 2 subsets of data

<sup>e</sup> Spinach – none of the eight health benefit areas were ranked 'first choice' at a frequency greater than 'not selected'

<sup>f</sup> Celery, Daikon, Beetroot and Zucchini were used in the free-elicitation but were not included in the second part of the survey.

### 3.6 Intellectual Property

The information for health benefit claims is publically available. The team applied for three trademarks (words) in the fresh vegetables category prior to making the online survey live:

- “veggycation”
- “ministry of natural goodness”
- “natures yummy bits”

This initial assessment lodges all three marks for demonstrating ‘priority’ and protects them for future use, although only Veggycation® has been taken to full registration, and the trademark has recently been re-assigned to HAL.



The team bought six domain names to secure them for future use:

- veggycation.com
- veggycation.com.au
- ministryofnaturalgoodness.com
- ministryofnaturalgoodness.com.au
- naturesyummybits.com
- naturesyummybits.com.au

The health benefit areas are depicted in a series of nine icons. These are free to download by vegetable industry members with access to the website’s login portal. Guidelines for their use are provided in vegetable NIP brochures, ‘HOW TO GUIDE’ and a series of three case studies.



## 4 Technology transfer

The key vegetable industry stakeholders were engaged in the project activities through a planned communication campaign. While for most industry stakeholders, Veggycation® is a website portal, awareness of its existence has been raised through online surveys, workshops, industry articles, stakeholder conferences and media (radio, TV, and the more viral media of twitter and blogging). A comprehensive list of project deliverables can be found in Appendix 2.

## 5 Discussion

### ***Accessible, scientifically valid nutrition and health information***

FSANZ has recognised the science behind key vitamins and minerals in terms of human health, and pre-approved hundreds of general level health claims. For example, that foods providing a source (10% of the recommended daily intake) of Vitamin C contribute to many things including normal immune system function, normal neurological function, and a reduction in tiredness and fatigue. The breadth of health claims associated with vitamins and minerals found in vegetables at levels above 10% of the RDI in one serve is huge, at over 200. Many vegetables have multiple vitamins and minerals present at the source level or above in one serve.

Veggycation® correlates the legally pre-approved health claim legislation from FSANZ with data from accredited sources including NUTTAB, and makes this information searchable targeting people who love vegetables, kids (next-generation purchasers and influencers of parents purchasing decisions), and vegetable growers/marketers who wish to promote the health benefits of consuming vegetable foods on-pack. The focus is on robust, accessible data, with credibility and integrity, presented in a consumer-friendly format.

### ***Development of consumer-relevant health benefit statements***

There are very good reasons why the vegetable industry should start talking about nutrition and health of vegetables. Health and wellness is one of the megatrends in food and a major driver for new product development (e.g. drinks, cereals, chocolate). Vegetables have two competitive advantages over other foods, firstly they are inherently healthy with no artificial components, and secondly supermarkets use fresh fruit and vegetables to showcase the entrance to the store and they promote these offers to get people through the door. The challenge for the industry is to deliver relevant messages to the consumers on the health benefits of eating vegetables.

With over 200 pre-approved general level health claims that could be relevant to vegetables, all written in scientific language, their relevance to consumers is often difficult to spot. The Veggycation® team took an approach that grouped and defined the preapproved claims into consumer-relevant health benefit areas: “Healthy Heart”, “Healthy Vision”, “Healthy Immune System”, “Healthy Bones & Joints”, “Healthy Skin”, “Healthy Brain & Nervous System”, “Healthy Digestion”, “Energy & Metabolism”, “Hydrate Your Body”. The team condensed the extensive scientifically accredited information on the nutrient content of over 100 levied vegetables into these nine health benefit areas, so that when people make a search of a specific nutrient they find the relevant health benefit area(s), and when they search for a specific vegetable, they find the health benefit area(s) that are delivered in one serve of that vegetable. The team developed icons for the health benefit areas which, in combination with legally approved health claim statements, provide rapid on-pack visualisation. This is the first step of the journey towards raising awareness of why vegetables are healthy. Veggycation® helps consumers connect to nutrition and health information with the expectation that more connected consumers who value vegetable foods more will result in more sales; greater consumption; healthier people.

### ***Just Eat More***

Veggycation<sup>®</sup> developed simple images to help educate the wider population on how big a serve is. It is generally recognised by most Australians that vegetables are healthy and most people, if pushed, could probably say how many serves they **should** eat each day based on something they have read in the paper or a magazine, or heard from others. Surveys repeatedly find people report actually eating less than half the required daily amount, and our consumer work is consistent with this finding. In addition, we know that people do not accurately report their behaviour. Their knowledge of how big one serve actually is is low, thus they are typically eating even less than they state, and some groups, particularly children and men, actually eat significantly less than half of the required amount.

One serve of most vegetables is 75g, according to the Australian Dietary Guidelines which equates, in many cases, to a large handful. In order to educate people beyond “vegetables are good for me” (the current position), we need to be more specific about the benefits that can arise from eating vegetables. All nutrition and health claim messages are linked to the quantity of vitamins and minerals found in one serve. Veggycation<sup>®</sup> has developed impressive imagery about what one serve looks like for over 20 vegetables, promoted it to relevant stakeholders, and made this imagery available as downloads. We have had particularly good feedback from dietitians and the Stephanie Alexander Kitchen Garden about these images and the posters they are used in.

Our message is simple “Just eat more vegetables”. Veggycation<sup>®</sup> has been investigating opportunities to eat more – e.g. snacks and included hints on the ‘Veg Lovers’ page to encourage consumers to “Just eat more vegetables every day, and eat more at each sitting”.

### ***Consumer insights***

There are specific recommendations from FSANZ about how to use health claims, for example it is important to link the **amount** of food required (“one serve of carrots, 75g”) with the **nutrient** (“a good source of Vitamin A”) and the **health benefit** (“contributes to normal vision”). For most vegetables, there are usually a range of different claims that can be made: for example, consuming a serve of carrot supports healthy vision, a healthy immune system, healthy skin, healthy heart, healthy brain and nervous system, and healthy bones and joints. Stating all of this on a pack, however, provides a level of unnecessary confusion for consumers of carrots.

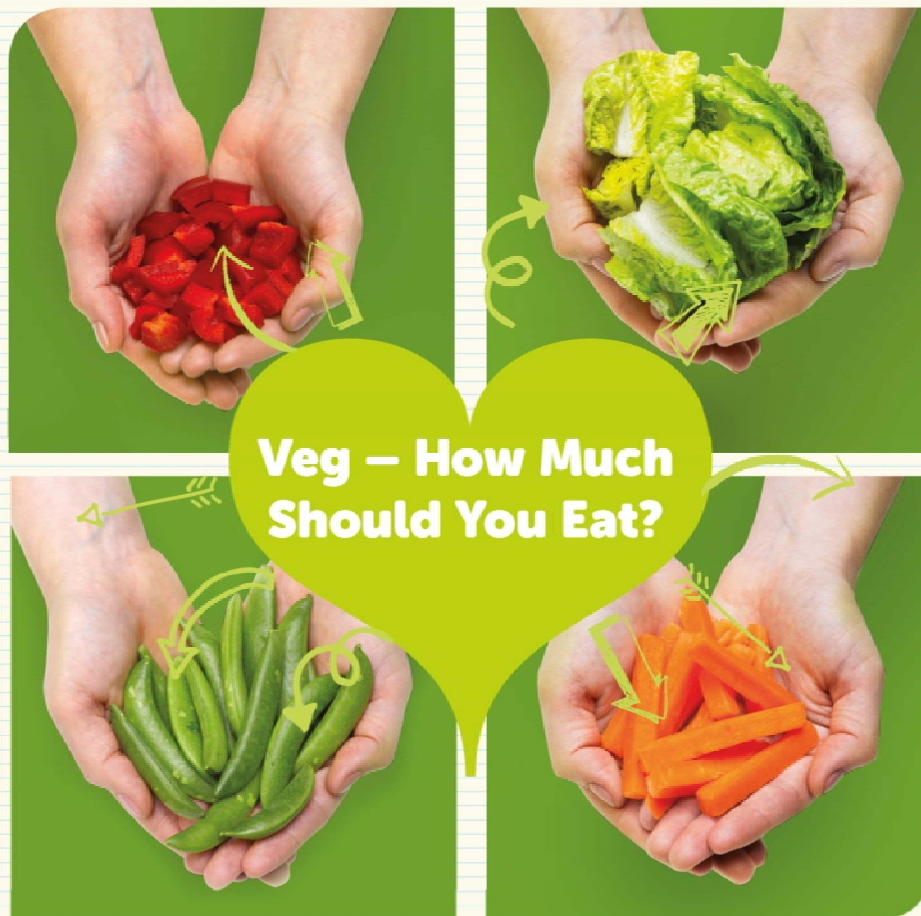
Our research showed that consumers have a very low baseline understanding of the health benefits of vegetables, and where they had some knowledge it was related to the nutrient content. The only standout was that over half of those surveyed linked carrots with healthy vision. Therefore, for Australian consumers a healthy vision claim will resonate for carrots. We feel that as an industry, it would be wise for producers of one product type, e.g. carrots, to talk about the same health benefits, rather than each marketer picking a different health benefit which would only serve to confuse the customer and perhaps devalue the benefit able to be derived from any claim.

Further consumer education is required for nutrient and health benefits of eating specific vegetables. Education linked with consumer research will ensure the use of health claims that are relevant to the product and the consumer.



# Veggycation.com.au

*loving the health benefits*



**One serving is approximately one handful. This means 75g for most vegetables and 50g for leafy salad vegetables.**

**Serving sizes are based on Australian Dietary Guidelines**



Funded by Horticulture Australia Ltd. using the vegetable levy and matched funds from the Australian Government

**For more information check out [veggycation.com.au](http://veggycation.com.au)**

### **A toolkit for key vegetable industry stakeholders**

Part of the aim of this project was to provide a toolkit for industry to use to profile nutrition and health benefits of vegetables. To this end, we have provided extensive information, interpretation and guidelines for use of FSANZ Standard 1.2.7 (Appendix 2). We have responded to stakeholder feedback provided at workshops, meetings and via online surveys, to create a portal ([www.veggycation.com.au](http://www.veggycation.com.au)) and a communication theme which is vibrant, lively, relevant and engaging to a wide population demographic.

As part of our workshop programme, we were asked to make an exclusive presentation to Woolworths. This led to the agreement from nutritionists within Woolworths that NUTTAB data, accessed via Veggycation<sup>®</sup>, was sufficient for commodity produce such as carrots to bear a health claim and that additional individual analysis was not required by the growers. This was a major breakthrough in the industry's understanding and application of the food standard. Subsequently, we have worked with Woolworths teams to use Veggycation<sup>®</sup> information for promotion of vegetables, complementing the Jamie Oliver campaign.

Feedback has been excellent<sup>5</sup>, with frequent emails from teachers, dietitians, growers and consumers about the website and the tools on it. We know that the Stephanie Alexander Kitchen Garden is considering using some of these resources in their teaching plans for teachers throughout primary school (they reach almost 500 schools across Australia).

### **The Veggycation<sup>®</sup> website and intellectual property**

Keeping the information fresh, up to date and relevant to a wide range of the population is challenging: at the moment this is being assisted by the developments from the sister project on cooking, and the uploading of documents, images and videos from the recent activities. The Veggycation<sup>®</sup> trademark is protected. All resources on the website have been made freely available to approved registered users, and some information is freely available to any user including the general public. The claims and health benefit icons only benefit Australian and New Zealand growers, as they are aligned to pre-approved claims made by FSANZ. They are not useful to growers in Europe, or Asia or companies wanting to export to Europe or Asia, as different legislation applies in different territories.

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<sup>5</sup> "I love the veggycation website! I sent the link on to my mother who's a primary school teacher and she was very impressed". Jemma O'Hanlon, Senior Project Officer – Workplace, Business Development and Marketing, Nutrition Australia Victorian Division

"And a very good result – looks excellent and I am sure will be a great tool for educators and the industry alike". MICHAEL WORTHINGTON, Chief Executive Officer, PMA Aus NZ.

"That is an excellent website Hazel. Aside from the great information (which I assume is down to your good self); whoever put it together understands both the technical aspects of websites and graphical integrity! Great work". Roni at Calco UK Ltd (web designer)

"Well done Hazel I have passed on to about a hundred people today. Love it' and later: 'a few people e-mailed back to me today and were very impressed with the concept and site, well done". Ray Butcher.

In conclusion, the quintessential things that need to be done to increase vegetable consumption are to make vegetables:

- Available
- Convenient
- Taste great
- Relevant

We must continue educating consumers about why eating vegetables is relevant to their health. Veggycation<sup>®</sup> assists this process by providing a veritable treasure trove of consumer-friendly, vibrant, informative and relevant resources for everyone from kids to vegetable lovers, from teachers to doctors, from dietitians to produce marketers. We encourage the vegetable industry continue to work to develop targeted resources for teachers, dietitians, wholesalers and retailers to help raise the profile of the health benefits of vegetables, and move from the monologue “*vegetables are good for you*” to a dialogue with today’s tech-savvy consumers that helps them to investigate and understand “*why vegetables really are good for me*”.

## 6 Recommendations

Veggycation® is a veritable treasure trove of consumer-friendly, vibrant, informative and relevant resources for everyone from kids to vegetable lovers, from teachers to doctors, from dietitians to produce marketers. We believe the industry should continue to develop targeted resources for teachers, dietitians, wholesalers and retailers to help raise the profile of the health benefits of vegetables, and move from an monologue of “vegetables are good for you” to a dialogue of more specific information which today’s consumers can seek out and use that answers their question “So why are vegetables so good for my health?”.

To this end, we recommend ongoing management of the website and extension activities that will continue to educate and promote the nutrition and health benefit messages of vegetables:

- 1. Veggycation® Website Management.** The website should be refreshed annually to update and add content relating to nutrition and health benefit claims.
  - Improving and extending links to other valid information sources and HAL-funded nutrition and health media, reports, projects.
  - Scientific database updated annually to keep abreast of new pre-approved FSANZ claims, and new vegetable composition data.
  - Extension of the database to a wider range of vegetables that consumers are eating.
  - Support to encourage and manage new registrations for the login part of the [www.veggycation.com.au](http://www.veggycation.com.au) website.
- 2. Actively Educating Consumers**
  - Veggycation® as a branded activity is suitable for promoting increased consumption of vegetables to raise the profile and value of vegetables as part of a healthy diet.
  - We suggest continued activity with groups such as Nutrition Australia, Dietitians, the Stephanie Alexander Kitchen Garden Foundation, Healthy Children Initiative, etc. to develop more targeted resources for specific demographics, e.g. pre-school children, the elderly.
- 3. Positively leveraging all HAL-funded nutrition and health work**
  - Active engagement with related HAL projects will ensure the wealth of resources that is being developed for and by the vegetable industry in the nutrition and health space are linked and leveraged for maximum effect.
  - It is critical to ensure we are not distributing conflicting messages to the key stakeholders.
- 4. Resource development for different retail environments**
  - Our experience with the vegetable industry suggests that ongoing dialogue with retailers and wholesalers, assisting in development of resources for promoting loose vegetables and vegetable consumption, is of value. Joint activities may include the development of apps linked with consumer benefits, and new tools for use in different retail environments (e.g. greengrocers).
- 5. Vegetable recipe development – cooked and fresh**
  - We have been continually asked for usage and recipes relating to vegetables. An active role linking dietary approved recipes from other sources is an opportunity for Veggycation®. The Veggycation work should focus on balanced nutrition and enhanced bioavailability of nutrients.



- Interaction with media related to cooking, with an aim to raise the dialogue about vegetables, to being more than a garnish on the side would be of value in promoting the consumption of vegetables.
- We also suggest extending the vegetable cooking project (VG13087) to encompass a wider variety of vegetables with different nutrient profiles to provide valid information about nutrient losses during cooking.

## **6. Improving Australian vegetable composition data**

- In compiling the Veggycation<sup>®</sup> database, we observed that there were some vegetables where nutrition composition data were lacking and/or there were questions over the accuracy of the data in NUTTAB. This was particularly true for certain Asian vegetables; in addition, the NUTTAB data are generic rather than variety specific for vegetables and data for certain key vitamins, such as vitamin K, are not available. This highlights the need for further work to collect relevant nutrient data and ensure all vegetable composition data are sourced from Australian produce. The vegetable industry could take the lead and identify priority vegetable foods for analysis.
- To future proof the application of nutrition and health claims for vegetable foods, the Australian nutrition database should also compile valid phytochemical information
- We suggest that provision of guidelines to scientists to ensure that they collect nutrition data in a credible way that can be used by the industry is also a valid activity.

## **7 Acknowledgements**

The project was funded by Horticulture Australia using the vegetable levy and matched funds from the Australian Government.

## Appendices

### Appendix 1 – Levy-paying Australian-grown vegetables

There is not a definitive list of levy-paying vegetables, rather it is all vegetables excluding in particular asparagus, onions, potatoes and tomatoes as well as herbs, melons and mushrooms as per the following from the Levy Revenue Service website (retrieved from <http://ausveg.com.au>, 15 March 2013).

*Levy is payable on vegetables produced in Australia and either sold by the producer or used by the producer in the production of other goods. Export charge is payable on vegetables produced in and exported from Australia.*

**NO** Export Charge is payable if domestic levy has already been paid on the Vegetables to be exported.

**Note:** Vegetable levy and export charge is **not** payable on: Asparagus, garlic, **\*\*hard onions, herbs (other than fresh culinary shallots and parsley), melons, **\*\*mushrooms, **\*\*potatoes (other than sweet potatoes), seed sprouts or tomatoes.******

Therefore, the National Vegetable Levy applies to all vegetables with the following exceptions:

- (a) asparagus; or
- (b) garlic; or
- (c) hard onions (being bulbs of the species *Allium cepa*); or
- (d) herbs (other than fresh culinary shallots and parsley); or
- (e) melons; or
- (f) mushrooms; or
- (g) potatoes (other than sweet potatoes); or
- (h) seed sprouts; or
- (i) tomatoes; or
- (j) vegetables of a kind for which the following rates of levy or charge are not applicable:
  - (i) a rate of levy for subclause 4 (3) of Schedule 15 to the Excise Levies Act; or
  - (ii) a rate of charge for subclause 3 (5) of Schedule 10 to the Customs Charges Act.

Note 1: Vegetables to which Part 17 of Schedule 10 to the Customs Charges Regulations applies are chargeable horticultural products — see that Part.

Note 2: Vegetables to which Part 17 of Schedule 15 to the Excise Levies Regulations applies are leviable horticultural products — see that Part.

Note 3: Hard onions, mushrooms and potatoes are levied separately.

#### Vegetable Groupings

- **Asian Vegetables** – bok choy, choy sum, gai lan, Chinese cabbage, Chinese broccoli, water chestnut
- **Salad vegetables** – endive, kale, lettuce, raddiccio, rocket, salsify, witloof
- **Herbs** – chives, parsley, shallots
- **Processed vegetables** – beans (french and runner), tomato, sweetcorn, potato, pea
- **Vegetable crops that the National Vegetable levy does not apply** – asparagus, melons, mushroom, onion, potato, seed sprouts, tomato
- **Vegetable crops that collect separate levies** – hard onions, mushrooms and potatoes (these are levied separately).

**Domestic Vegetable Industry** – vegetable crops that AUSVEG collects data for (i.e. number of growers, area planted, production, yield, gross value, gross unit value, farm gate value):

- |                      |              |                            |
|----------------------|--------------|----------------------------|
| 1. Asian gourd       | 16. Choi Sum | 32. Radish                 |
| 2. Artichokes        | 17. Chilli   | 33. Raddiccio              |
| 3. Bean              | 18. Chives   | 34. Rocket                 |
| a. Broad bean        | 19. Cucumber | 35. Rhubarb                |
| b. Butter bean       | 20. Eggplant | 36. Salsify                |
| c. French bean       | 21. Endive   | 37. Shallots               |
| d. Runner bean       | 22. Fennel   | 38. Silverbeet             |
| 4. Beetroot          | 23. Gai Lan  | 39. Snake beans            |
| 5. Bok Choy          | 24. Kale     | 40. Spinach                |
| 6. Broccoli          | 25. Leeks    | 41. Spring onion/shallot   |
| 7. Brussels Sprout   | 26. Lettuce  | 42. Swede                  |
| 8. Cabbage           | 27. Okra     | 43. Sweetcorn              |
| 9. Capsicum          | 28. Parsley  | 44. Sweet potato           |
| 10. Carrots          | 29. Parsnip  | 45. Turnip                 |
| 11. Cauliflower      | 30. Pea      | 46. Water chestnut         |
| 12. Celery           | a. Pea       | 47. Witloof                |
| 13. Celeriac         | b. Snow      | 48. Zucchini/Butter squash |
| 14. Chinese Cabbage  | c. Sugarsnap |                            |
| 15. Chinese Broccoli | 31. Pumpkin  |                            |

## Appendix 2 – VG12043 Project Deliverables

### *Project Deliverables*

1. AusVeg Design Panel – The Veggycation Team made a presentation to Design Panel on 12 February 2014.
2. Eason J (2013) VG12043 Project Milestone Report 102. Milestone report accepted 12 June 2013.
3. Eason J (2013) VG12043 Project Milestone Report 103. Delivered to Philippa Lorimer 9 June 2013, acceptance on decision to proceed granted.
4. Eason J (2013) VG12043 Project Milestone Report 104.
5. Eason J (2013) VG12043 Project Milestone Report 105. Delivered Accepted by HAL 15 May 2014
6. Eason J, Lister C, MacTavish-West H. September 2013. HOW TO GUIDE: Nutrition and health claims for vegetable-based foods. A report prepared for: the Horticulture Australia Ltd., Client Project VG12043 – Conveying the health benefits of Australian Vegetables. PFR Contract No. 29469. PFR SPTS No. 8990.
7. Eason J, MacTavish-West H (2013) Start of Project Communications Summary. VG12043, Conveying Health Benefits of Australian Vegetables. Submitted to HAL 7 May 2013
8. Eason, MacTavish-West, Lister (2013) Veggycation – loving the health benefits. Powerpoint presentation for workshops.
9. Education poster
10. Flashcards – vegetables
11. Flashcards – vegetables, nutrients/phytonutrients. The flashcards were used for workshops and copies were provided to some of the participants who found them useful for their educational interactions with children and other consumers.
12. Flashcards – vitamins
13. Health Benefit Icons. Design of nine icons that represent the health benefit areas relevant to levied Australian grown vegetables.
14. Health poster
15. Levy-paying Australian-grown vegetables agreed. Retrieved from <http://ausveg.com.au>, 15<sup>th</sup> March 2013.
16. Lister C 2013. Nutritional & Health Benefit Information for Carrot. A report prepared for Horticulture Australia Ltd., Client Project VG12043 – Conveying the health benefits of Australian Vegetables. PFR Contract No. 29469. PFR SPTS No. 8380.
17. Lister C 2013. Nutritional & Health Benefit Information for Red Capsicum. A report prepared for Horticulture Australia Ltd., Client Project VG12043 – Conveying the health benefits of Australian Vegetables. PFR Contract No. 29469. PFR SPTS No. 8898.

18. Lister CE 2013. Nutritional & Health Benefit Information for Cos Lettuce. A report prepared for: Horticulture Australia Ltd., Client Project VG12043, PFR Contract No. 29469. PFR SPTS No. 8899.
19. Lister CE 2013. The new health claims legislation. New Zealand Guild of Food Writers Conference, 1-3 November 2013, Dunedin, New Zealand.
20. NIP Brochures for 20 vegetables
21. On-line survey completed May 2013 (<https://www.surveymonkey.com/s/HealthyAussieVeg>)
22. Reetika Rekhy, Aila Khan, Robyn McConchie (2014). Consumer study on health benefits of vegetables to promote consumption.
23. Serving size poster
24. Veggycation – helping Australians understand the health benefits of their vegetables. Press Release submitted to HAL/AusVeg on 6<sup>th</sup> November 2013.
25. Veggycation Banners
26. Veggycation Flyers
27. VG12043 Project Variation Request, July 2013. Request variation of contract to increase the deliverables within the communication phase of the project (July to December 2013) to include additional workshops, case studies, 9 health benefit area symbols.
28. VG12043 Project Variation Request, October 2013. Request variation of contract to meet the needs of the Vegetable Industry (additional workshops, media pack, website maintenance, ease use of scientifically substantiated health claims).
29. Web portal - [www.veggycation.com.au](http://www.veggycation.com.au)

### ***Industry Conferences***

1. AusVeg, 19-21 June, Cairns – Stand with veggycation® website access and handouts.
2. DHHS Nutrition, 5th February 2014, Tasmania – Stand with veggycation® website access and handouts.
3. Dietitians Association of Australia 15-17th May, Brisbane – Stand with veggycation® website access and handouts.
4. Dietitians Day – 14th March 2014, Brisbane – Stand with veggycation® website access and handouts.
5. Eason, MacTavish-West, Lister (2013). Presentation of project and communications themes to Design Team, AusVeg Design Team, 30 May 2013.
6. Lister (2014) Antioxidants: Fact or Fiction? What Can We Claim For Fruits and Vegetables? IHC 18-22<sup>nd</sup> August, Brisbane – keynote speaker veggycation® will be used as an example of how to use claims. We will also have flyers available and engage in discussions with interested parties attending the trade display.

7. Judith Friedlander UTS.edu.AU – Powerhouse Museum, Sydney
8. MacTavish-West (2013) Health Benefits of Vegetables: What can we say? PMA presentation, June 2013
9. MacTavish-West H, Hurst R (2013). Fresh product leading the way in health and performance. PMA conference & trade show, Sydney Convention & Exhibition Centre, 11-13 June 2013. Retrieved from <http://www.pma.com/system/files/Hazel%20MacTavish%20West.pdf>
10. PMA Fresh Connections 24-26 June 2014, Auckland – Stand with veggycation® website access and handouts.
11. MacTavish-West (2014) Veggycation® - the new online tool for talking about healthy vegetables. 5 February 2014, Tasmanian NSA Group Event, Hobart.

### **Articles**

1. Anne Smiley Nutrition (2013) Veggycation. Retrieved 17 July 2014 from <http://annesmileynutrition.com/2013/12/12/veggycation/>
2. AUSVEG Weekly Update (May 2013). The AUSVEG weekly update published a brief summary of the project and request for feedback on our ideas for Conveying Health Benefits Australian Vegetables.
3. Eason (2013) Conveying the health benefits of Australian vegetables. Vegetable. Industry Advisory Committee Annual Report 2012/13 p9. Retrieved from [http://cms2live.horticulture.com.au/admin/assets/library/annual\\_reports/pdfs/PDF\\_File\\_244.pdf](http://cms2live.horticulture.com.au/admin/assets/library/annual_reports/pdfs/PDF_File_244.pdf)
4. Eason (2013) Veggie-branding highlighting the health benefits of Australian vegetables. Vegetables Australia September/October 2013, p 28. Retrieved from <http://ausveg.com.au/publications/flip/VA/VA-Sep-Oct-2013/files/assets/basic-html/page28.html>
5. Hanson R (2013) Hobart food scientist Hazel helps vegucate the masses with new website. Lifestyle 14 November 2013. Retrieved 14 July 2014 from <http://www.themercury.com.au/lifestyle/hobart-food-scientist-hazel-helps-vegucate-the-masses-with-new-website/story-fnj64o6u-1226759854544>
6. Hazel MacTavish-West, Jocelyn Eason (2013) Health and nutrition message packs new punch. Produceplus+ magazine, 21 issue 10, spring 2013
7. Hazel MacTavish-West, Jocelyn Eason (2013) Health and nutrition message packs new punch. Produce Plus+ magazine, 21 issue 10, Spring 2013
8. HC Nutrition NZ (2013) Veggycation. Retrieved 14 July 2014 from <http://hcnutritionnz.com/2013/12/08/veggycation/>
9. Health Murrumbidgee Local Health District (2014) Looking for ways to promote fruits and vegetables in your classroom? Retrieved 14 July 2014 from <http://www.mlhd.health.nsw.gov.au/keepinghealthy/health-promotion/newsletters-1/looking-for-ways-to-promote-fruits-and-vegetables-in-your-classroom>
10. Jordon Brooke-Barnette (2014) Workshop to assist vegetable industry communicate health benefits. Retrieved 14 July 2014 from <http://ausveg.worldsecuresystems.com/media-release/workshop-to-assist-vegetable-industry-communicate-health-benefits>

11. MacTavish-West (2013) A shining light in the dark for carrots. Article for Might Sydney – 11/07/2013
12. MacTavish-West H, Eason J (2013) A shining light in dark for carrots (& other vegetables). Comment column for Product Plus, Spring Edition (31/7/2013)
13. MacTavish-West H, Eason J (2013) Conveying health benefits of Australian vegetables. Good Fruit & Vegetables, September edition.
14. New Vegetable health website launched, Animals Australia the voice for animals, 14 November 2014. Retrieved 14 July 2014 from [http://www.animalsaustralia.org/media/in\\_the\\_news.php?article=4815](http://www.animalsaustralia.org/media/in_the_news.php?article=4815)
15. Rachelle Williams (2013) So what vegetable is that? Food Safety Australia. Retrieved 14 July 2014 from <http://www.foodsafety.edu.au/so-what-vegetable-is-that/>
16. The Advocate (2013) Time to show veggie might: scientists. 13 June 2013. Retrieved from <http://www.theadvocate.com.au/story/1569749/time-to-show-vegie-might-scientists/?cs=130>
17. Thinkzest (2014). Campaign to convey the benefits of veg to Australians. Retrieved 14 July 2014 from <http://www.thinkzest.com/portfolio-items/veggycation-campaign/>
18. Time for Veggycation. The Australian Grower, Dec 2013/Jan 2014, p3. Retrieved from (<http://grower.realviewtechnologies.com/?iid=84918>)
19. Veg Lovers Unite, Nourish Magazine, March 2014, p14
20. Veggies make an interesting claim (2014). In Business South Australia. Retrieved 14 July 2014 from <http://www.in-business.com.au/news/story/2014-6-5/18556>
21. What is a health claim for vegetables & how do I get one? Flyer for Health Claims Workshop.
22. What is Veggycation? Brisbane Markets, March 2014

***Media relating to Veggycation website launch (selected to give indication of reach)***

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2. Ashley Walmsley (2013) Time for a Veggycation. The Land. Retrieved from <http://www.theland.com.au/news/agriculture/horticulture/general-news/time-for-a-veggycation/2678544.aspx?storypage=0>
3. Everyday 'veggycation' (11 December 2013) posted by Motherpedia. Retrieved from <http://www.motherpedia.com.au/announcement/67529/everyday-veggycation>
4. HC Nutrition NZ (8 December 2013) Veggycation. Retrieved from <http://hcnutritionnz.com/2013/12/08/veggycation/>
5. Helena Whiteman, Promoting the health benefits of vegetables. Retrieved from [http://www.vegetablesvictoria.com.au/communication/newsletters/promoting\\_the\\_health\\_benefits\\_of\\_vegetables.htm](http://www.vegetablesvictoria.com.au/communication/newsletters/promoting_the_health_benefits_of_vegetables.htm)

6. Motherpedia (2013). Everyday 'veggycation': Horticulture Australia has developed a new website to help educate Australians about the health benefits of vegetables. Retrieved 14 July 2014 from <http://www.motherpedia.com.au/announcement/67529/everyday-veggycation>
7. Promoting the health benefits of vegetables (7 October 2013). In the Field, VGA-Victoria. Retrieved from [http://www.vgavic.org.au/pdf/In-The-Field\\_07Oct13.pdf](http://www.vgavic.org.au/pdf/In-The-Field_07Oct13.pdf)
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9. Roger Hanson (14 November 2013). Hobart food scientist Hazel helps vegucate the masses with new website. Mercury. Retrieved from <http://www.themercury.com.au/lifestyle/hobart-food-scientist-hazel-helps-vegucate-the-masses-with-new-website/story-fnj64o6u-1226759854544>
10. Roger Hanson (2013). New vegie site offers food for thought. Sunday Tasmanian, November 17, 2013 p60
11. Seeing Green – why kale and green veg are hot right now #eatkit, 16 April 9pm AEST, <http://www.scoopnutrition.com/twitter-archive/>
12. Sophie Langley (9 December 2013). New website launched to 'veggycate' Australians on health benefits of vegetables. Australian Food News. Retrieved from <http://www.ausfoodnews.com.au/2013/12/09/new-website-launched-to-%E2%80%98veggycate%E2%80%99-australians-on-health-benefits-of-vegetables.html>
13. Veggycation (12 December 2013) posted by Anne Smiley Nutrition. Retrieved from <http://annesmileynutrition.com/2013/12/12/veggycation/>
14. Veggycation [Consumption & Nutrition] posted in Global info Sources by Erin Hart, Thursday 14 November 2013. Retrieved from <http://www.pma-anz.com/information-centre/2013/11/57/veggycation-consumption-nutrition>

### ***Aligned activities supporting the Australian Vegetable Industry***

1. "Seeing green – why kale and green veg are hot right now". Tweet chat #eatkit with Emma Stirling (www.ScoopNutrition.com) and Catherine Saxelby (@Foodwatch), 9-10pm Wednesday 16th April.
2. Dwayne Pitman, Imports Manager, Fresh Produce, Countdown – interest following presentation at PMA
3. Holly Nairn, Monsanto Australia & New Zealand – request for further information
4. Houston's Farm, Tasmania – industry advisory partner.
5. Interaction with Paul Costantoura (Review Partners, Sydney) about health benefits of vegetables and development of a searchable databases.
6. Judith Friedlander UTS.edu.AU, Powerhouse Museum, Sydney. Provision of material for presentation at Powerhouse Museum.
7. Judy Seal of DHHS in Tasmania has requested to use Veggycation for Eat Well Tasmania (a not for profit) to use in approaching primary producers so they can increase their networks with the primary produce sector, via their service agreement with DHHS.

8. Reetika Rekhy, Robyn McConchie (2014). Promoting consumption of fruit and vegetables for better health – have campaigns delivered on the goals. Retrieved 23/04/2014 from <http://www.sciencedirect.com/science/article/pii/S0195666314001779>
9. Rijk Zwaan – healthy salads proposal discussions
10. Stephanie Alexander Kitchen Garden Foundation (SAKGF) - Hazel has made contact with the CEO and Program Manager of Stephanie Alexander Kitchen Garden Foundation (SAKGF) Ainslie Vallance, and the Foundations curriculum writer Bev Laing. The foundation reaches into 500 schools across Australia (years 3 to 6) and has published two books “Tools for Teachers” and “Recipes for Literacy”. They are in the process of developing further curriculum and have invited the Veggycation team to assist in two new units: “You Are What You Eat” and “Fresh and Green”
11. The Healthy Children Initiative – Carolyn has had contact with Anna Huddy from the Healthy Children Initiative which works through schools and preschools to try and improve children’s nutrition and physical activity, and one of its key messages is to eat more vegetables. The initiative plans to use some of the veggycation® information and images on the website when promoting vegetables, for example in teacher and parent newsletters.
12. University of Sydney – discussions relating to a PhD project that could be aligned to VG12043
13. Veggycation Sydney Markets Workshop –FreshforKids.com.au will engage and they are inviting Department of Education
14. Woolworths, Sydney – Workshop and discussions on standardised NIPs and launch of Woolworths ‘Healthy Lunchbox’ in 100 stores, November 2013.







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