

Application for use of Red Algae paste or aqueous extract from the micro algae *Rhodomonas salina* as a source of colour in food in Australia/New Zealand



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EXECUTIVE SUMMARY

Introduction

The need for protein for human nutrition is the primary driver of food production from the land, the seas and from animals. Increasingly, we are realising that the raising and slaughter of animals for human food is not environmentally sustainable and that the utilisation of plants as human food will need to become the major source of proteins and other essential nutrients.

v2food is founded on this understanding, that to feed the growing global population sustainably, we will need to produce food differently and yet provide the same desirable flavour, appearance and functional performance as traditional animal based meat products.

Modern cropping production has the capacity to supply the nutritional needs of the projected global human population, with less land than is currently farmed. In addition, there is the huge potential for food production from underutilized marine and aquatic phytoplankton, in particular micro algae species, that form the base of the food chain in aquatic eco-systems.

v2food, with research partners at CSIRO and UTS, have developed the technology to produce micro algae (specifically *Rhodomonas salina*) in sustainable continuous culture, yielding a valuable source of natural pigmentation phycoerythrin, which can be incorporated into foods (initially into plant based meat products) at up to [REDACTED] of the freeze dried aqueous extract. Phycoerythrin imparts a pink-red colouration to the product with the functionality of a change in colouration at the typical cooking temperature of meat.

A closed photobioreactor production process has been developed to produce the *Rhodomonas salina* in continuous culture, with growing conditions that optimise the production of the natural "heme like" pigment phycoerythrin, and a [REDACTED]

The safety of the *Rhodomonas salina* for human use has been demonstrated by the conduct of appropriate toxicity testing (including micronucleus and reverse mutation studies and subchronic rodent feeding studies according to international protocols), supported by gene sequencing analysis for the potential for allergen or toxin production.

This application seeks approval for the use of Red Algae Paste (the whole biomass from the micro algae *Rhodomonas salina*) or an aqueous extract, as a colourant and nutritional food ingredient for general use in foods (initially in plant based meat products),

Purpose of the application

The purpose of this application is to amend the Australia New Zealand Food Standards Code (the Code) to permit the inclusion of micro algal paste or aqueous extract from *Rhodomonas salina* as new/novel food ingredient in Australia and New Zealand.

The Red algae paste or aqueous extract is intended to be used as source of colour in a range of food applications, particularly plant based meats, where the natural colour change functionality upon cooking is desired by consumers.

Throughout this dossier, the substance to be registered can be referred to as "micro algal paste, Red Algae, Red Algae Paste, Algal paste, micro algae paste, Red algae extract, Aqueous extract, etc.". These terms are used interchangeably.

The world's population is projected to increase within the next few decades from 6 billion to 9 billion by 2050 (The World Population Prospects, 2015). Consequentially, demand for foods and in particular high quality proteins will increase. There will not be enough land available for the livestock to meet the increasing demand for animal proteins. At the same time, the carbon footprint needs to be lowered to mitigate the impact on global warming due to our agricultural output. A common understanding is that plant-based rather than animal-based proteins will be more sustainable and therefore favorable for human consumption.

The development of plant based meat alternative products that change colour in a similar way to traditional animal meats upon cooking, will enhance consumer appeal and acceptance. The novel use of the natural (non-GM) micro algal pigment Phycoerythrin with “heme-like” colour change functionality, will be a further attraction for the plant based meat alternative products.

The Australia Institute of Food Science and Technology similarly identified these consumer trends on "flexitarianism and alternate protein sources" in an article "Top Four Trends for 2018". New protein sources are becoming increasingly important as more consumers make a conscious decision to eat less meat (Hyland, n.d.).

All information provided in this application, to the best of our abilities, has been obtained, described and referenced as indicated in "Section E.1 Data Requirements of the FSANZ Application Handbook (FSANZ, 2019)" and in accordance with the items provided in Checklist For General Requirements (3.1.1) and Checklist for applications for New Foods, Novel Foods (3.5.2) provided in the Application Handbook.

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