JUNE 2017

A New Look at Carrot Waste

EPA Green Enterprise funded project update

In January 2017, CyberColloids began a second EPA funded project aimed at furthering our work to develop new food fibre ingredients from Irish vegetable processing and supply chain waste. The focus this time is on out-graded carrots and waste from the carrot processing industry.

In our previous Green Enterprise funded project – Vegetable Waste as a Rich Resource – we successfully demonstrated the potential for the development of new food fibres from carrot processing waste and their application in simple model food systems. In this project we aim to take this research further and to bring the new carrot fibres closer to market ready status. We have also extended the research focus to include the use of whole carrots as we are aware that Ireland still faces a big challenge when it comes to underutilised fruit and vegetable produce.

An estimated 3,000 to 5,000 tonnes of carrots remain on Irish farms as waste each year, either as out-grades or surplus to market requirements. This equates to a potential 300-500 tonnes of carrot fibre. Food fibre ingredients made from fruit and vegetable resources are currently in the global market place and sell for €4.5-€7.5/kg. Our approach therefore represents a significant opportunity to generate additional income for the Irish fruit & vegetable supply chain - as well as reducing the waste burden.

Cyber COLLOIDS LTD

Contact Us

For more information about this project, our other re-search and how we could work with you, please visit our website

www.cybercolloids.net

or contact

Dr Mariel Brooks:

mariel@cybercolloids.net

Tel: +353 (0) 214375773

This research was supported by

EPA Green Enterprise funding

epa

and Meadowfresh Foods Ltd., Tallow, Waterford County

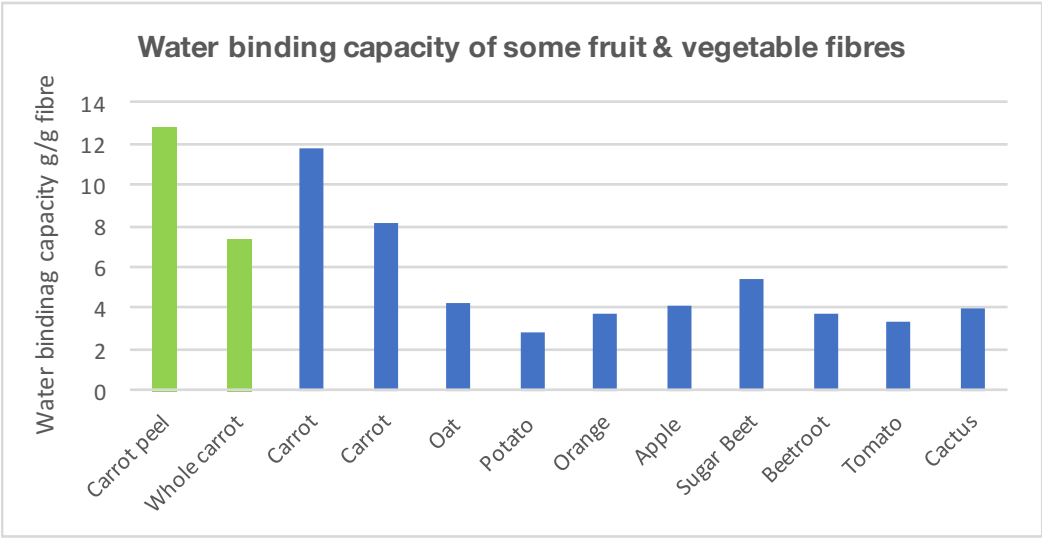
Meadowfresh Foods

From a texture perspective, fibre functionality essentially stems from a capacity to hold or bind water, which in turn provides viscosity & texture.

Carrot fibres have good water binding properties. Water binding capacity is quantified in g/g terms i.e. g water bound per g of fibre (where "fibre" refers to the product itself and not the fibre content of the product). Standard fruit and vegetable fibres that are currently in the market place typically bind about 2 to 10 times their own weight in water i.e 2-10 g/g.

Fibres that have been functionalised i.e. processed in some way in order to promote their water binding capacity, can bind water up to 20 times their own weight. Some citrus fibres, in particular, fall into this category. Highly functionalised fibres made from cellulosic resources e.g. wood pulp can have a water binding capacity of <40g/g. These highly functional fibres bind so much water that they can be used to form a gel structure with the appearance and sensory properties of fat. Thus, they are used as fat mimetics.

We have evaluated the water binding capacity of simple carrot fibres made from carrot peels and whole carrots, without any further functionalisation and compared this to the water binding capacity of a range of commercially available fibres from fruit, vegetable and cereal resources - even cactus fibres. The results (below) show that even without processing, our new carrot fibres (in green) have comparable water binding capacity to commercially available carrot fibres and much higher water binding capacity than fibres from other sources. We are currently working on the evaluation of our new functionalised carrot fibres which we expect to have even higher water binding capacity. Look out for these results and other regular updates on the project progress a bit later in the year.



The next stage of this work is to evaluate the new fibres in a range of food products. We will look at application in cookies, beef burgers and vegetarian burgers. These are all foods where fibres are used and where good water binding or gelling behaviour is important.

Gelling functionality is important too

Carrots contain pectin - a natural gelling agent that used in a variety of food applications such as sauces, jams & jellies. Typically pectin is extracted from limes & lemons and purified for use in the food industry. We have produced new carrot fibres from both carrot peels and whole carrots and in which the gelling action of the pectin has been promoted. These fibres will also be evaluated in different food products including those listed above but also in canned foods and restructured foods *e.g.* onion rings where the gelling functionality is essential. The photo on the right shows a gel made with carrot peel fibre.