# New Project Summary Report for FV 398a: Field storage techniques for carrots

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| **Project Number** | 31303981 |
| **Title** | Carrots: identifying novel field storage techniques |
| **Short Title** | FV 398a |
| **Lead Contractor** | Vegetable Consultancy Services |
| **Other Contractors** | |
| **Start & End Dates** | 31 March 2013 - 31 January 2014 |
| **Industry Representative** | Mr Rodger Hobson, Hobson Farming Ltd |
| **Project Budget** | £11,440 |
| **AHDB Contribution** | £11,440 |

**The Problem**

UK industry practice is to store carrots for winter / spring marketing in-situ, typically covered with a thick layer of straw (+/- polythene) to provide insulation against frost damage during the winter and to prevent warming and re-growth in the spring. However, field storage using straw (either with or without polythene) is becoming increasingly challenged as a sustainable technique – largely due to the high cost and volatile availability of straw, but also due to agronomic issues such as nutrient lock-up from the decomposition of incorporated straw after carrot harvest. With the continued development of straw-fired biomass plants, increasing pressure on cereal farmers to re-incorporate organic matter rather than remove it as straw, the volatility of the cereal market and the effects of climate change, supplies of straw are likely to become both more expensive and erratic in future years.

Therefore, carrot growers urgently need to examine and evaluate alternative options to current practice – either by moving from field storage to the more continental European refrigerated storage methodology or finding alternative strategies for in-situ field storage. With existing refrigerated storage techniques requiring considerable adaptation and evolution to fit the UK requirements, the best short-term option for carrot growers is to examine and evaluate alternative in-situ field storage options.

**Aims and Objectives**

**Project aim:**
This project aims to identify a range of novel techniques for in-situ field storage of carrots that can be advanced to field trials in 2014.

**Project objectives:**

1) Establish and document the heat transfer and light exclusion principles critical for field storage of carrots.
2) Benchmark the heat transfer and light exclusion characteristics of current straw (+/- poly) techniques to compare to novel methods.
3) Identify novel techniques for replacing or reducing straw usage with alternative insulators or methods.
4) Evaluate the potential efficacy and cost of the identified techniques compared to straw systems.
5) Compile and present a list of the most promising techniques to BCGA R&D committee for discussion and selection for potential field trials 2014.
6) Report and disseminate results to the carrot industry

**Approach**

This project is largely desk-based, with a degree of travelling to speak to experts and industry representatives and a small amount of in-field measurements.

The initial part of the project will focus on establishing the principles of thermodynamics and light exclusion that are applicable to field storage of carrots under straw with the aim of increasing understanding of the specific requirements of any straw substitute material and its inherent limitations. This work is largely a desk-based study with inputs from experts in heat transfer and insulation also involved. It is also intended to measure (or at least reliably estimate) the heat transfer and light exclusion properties of straw-based techniques using a suitable methodology.

The second part of the work involves seeking novel alternative techniques and methods from a wide range of sources (including but not limited to agriculture, construction and chemical industries). All materials and techniques that may achieve the relevant properties of straw-based methods will be identified and the practical aspects of storage, application and disposal will be evaluated (including costings). This work will be partly desk-based, but will involve visits to representatives and industry experts.

All identified techniques, their anticipated costs and pros/cons will be documented for presentation to the carrot industry (through the BCGA R&D committee at the January 2014 meeting). It is intended that this list will provide the basis for future field-based trialling in the winter of 2014, based on guidance from the BGCA.