



Grower Summary

FV/PE 455

**Determining the basis of
variation in herb flavour**

Year 2 Annual report 2020

Project title: Determining the basis of variation in herb flavour

Project number: FV/PE 455

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Report: Annual report, July 2020

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Location of project: University of Reading

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The results and conclusions in this report are based on an investigation conducted over a one-year period. The conditions under which the experiments were carried out and the results have been reported in detail and with accuracy. However, because of the biological nature of the work it must be borne in mind that different circumstances and conditions could produce different results. Therefore, care must be taken with interpretation of the results, especially if they are used as the basis for commercial product recommendations.

AUTHENTICATION

We declare that this work was done under our supervision according to the procedures described herein and that the report represents a true and accurate record of the results obtained.

Professor Carol Wagstaff

Principal Investigator, Head of School Chemistry, Food and Pharmacy

University of Reading

Signature  Date 17th July 2020.....

Report authorised by:

[Name]

[Position]

[Organisation]

SignatureDate

GROWER SUMMARY

Headline

Sensory analysis of fresh samples of three culinary herbs (rosemary, coriander and basil) from a range of UK locations and production systems provided initial evidence of factors that may affect the perception of flavour for the different herb species.

Background

Herb flavour can vary in its composition as well as intensity. This variation can happen as a result of different cultivars, agronomic practices, season and climate. The consumption of culinary herbs has increased due to pressure to reduce salt content in foods whilst retaining a flavourful eating experience, such that flavour is a key attribute of herbs. Therefore, understanding how flavour varies in composition and abundance within a herb species as a result of different production systems and climate conditions, and how these differences are perceived by consumers, will help growers to adjust their practices to enable the industry to deliver a more consistent and acceptable product.

The overall aim of this 4-year PhD study is to elucidate the chemical profile of commercially important culinary herb crops and understand how season, agronomic practice, cultivation system and environment interact with this. The focus of work in this project year was to investigate sensory perception of three key herb species.

Summary

Three different herbs were selected for study by the project steering group as being of the greatest commercial relevance and covering both annual, perennial, soft and woody herbs: basil, coriander and rosemary. The variety selected was consistent for basil and coriander, but less so for rosemary. The steering group provided a number of sites giving rise to a breadth of production methods that were sampled from West Sussex, Lincolnshire, and York. These sites provided samples covering herbs produced in protected conditions under glasshouse, grown in pots (Pots), soil (Soil) or hydroponic system (Hydroponics). Samples grown on outside fields (Field) were also provided for analysis. Not all the production types were analysed for each of the three herbs, as this was dependent on what was available at the collaborating sites. Table 1 shows which production types were analysed for each of the herbs and the corresponding geographical location.

Table 1. Sampling sites for three culinary herb species and associated production systems

	Rosemary	Coriander	Basil
West Sussex	Pots	Pots, Field	Pots, Hydroponics
Lincolnshire		Pots	Pots
York	Soil, Field	Field	

Initial sampling of the three herbs provided baseline data of the key flavour volatiles found in each crop type. For all the three herbs, the main compounds mentioned in the literature as contributing to flavour, were detected in all the samples. In the case of rosemary these compounds were alpha-pinene, camphene, beta-pinene, 1,8-cineole, linalool, camphor, alpha-terpineol and verbenone, described as giving a wood, pine, camphor, menthol aroma. For coriander, the compounds provided a soapy, waxy, citrus, fruity aroma, and this was due to the presence of E-2-undecenal, dodecanal, E-2-dodecenal and E-2-decenal. Basil's main compounds were 1,8-cineole, linalool, methyl chavicol and eugenol, providing an aroma described as sweet, herbal, menthol, floral and spicy.

The same samples provided for the volatile analysis were also used for sensory analysis in 2019. Tasting sessions were conducted using a trained panel (n=11), and an average of 27 herb flavour attributes describing appearance, aroma, taste, flavour, mouthfeel and after-effects were included. Fresh samples were assessed by the panellists (in duplicate) at individual booths at the Sensory Science Centre at the University of Reading. Rosemary was described as being bitter and having a pine and menthol aroma and taste, which corresponds with the compounds found in these samples. Coriander was scored as being salty and bitter which describes the characteristics of the compounds found in its samples. Basil samples were described as sweet and with a flavour of cloves and menthol, agreeing with some of the compounds found in the same samples.

Basil samples showed some significant differences ($p < 0.05$) that were influenced by the geographic location (or environmental conditions). There were also some basil attributes where the significant differences ($p < 0.05$) were determined by the type of production (hydroponics vs pots). In the case of rosemary, type of production did not seem to affect the

sensory profile, however, there were some significant differences ($p < 0.05$) which were clearly influenced by the different varieties of the rosemary samples included. Coriander significant differences ($p < 0.05$) were largely determined by the type of production (field vs pots), where field samples were scored higher for a range of sensory attributes compared with pot samples.

Financial Benefits

This project will provide UK herb growers with information to help them understand better the variations in their product, and in doing so, help to deliver a more consistent product throughout the year.

Action Points

None to date.