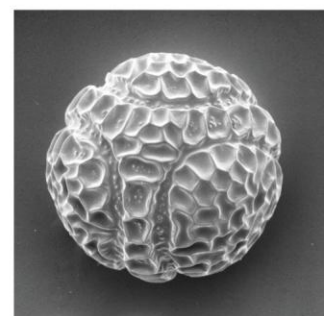
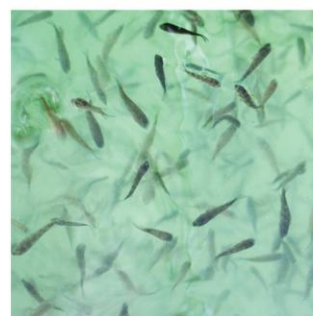
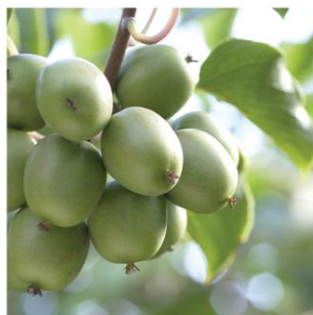
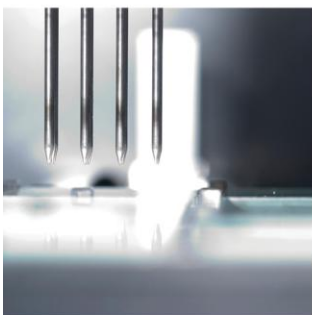
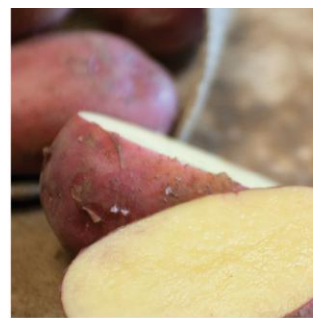
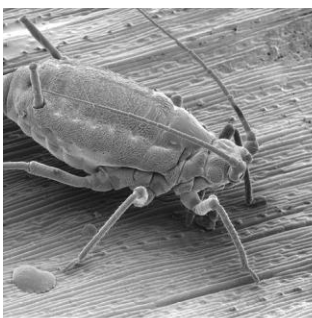


PFR SPTS No. 11380

Quality testing of compost samples

Mike Spiers

April 2015



Confidential report for:
Plateau Bark Limited

DISCLAIMER

Unless agreed otherwise, The New Zealand Institute for Plant & Food Research Limited does not give any prediction, warranty or assurance in relation to the accuracy or fitness for any particular use or application of, any information or scientific or other result contained in this report. Neither Plant & Food Research nor any of its employees shall be liable for any cost (including legal costs), claim, liability, loss, damage, injury or the like, which may be suffered or incurred as a direct or indirect result of the reliance by any person on any information contained in this report.

LIMITED PROTECTION

This report may be reproduced in full, but not in part, without prior consent of the author or of the Chief Executive Officer, The New Zealand Institute for Plant & Food Research Ltd, Private Bag 92169, Victoria Street West, Auckland 1142, New Zealand.

CONFIDENTIALITY

This report contains valuable information in relation to the Plateau Bark Ltd. Information in this report should be treated as "Confidential Information" in accordance with the Plant & Food Research Agreement with Plateau Bark Ltd.

PUBLICATION DATA

Mike Spiers. April 2015. Quality testing of compost samples. A Plant & Food Research report prepared for: Plateau Bark Limited. Milestone No. 61723. Contract No. 31858. Job code: P/342052/01. PFR SPTS No. 11380.

Report approved by:

Mike Spiers
Scientist, Biological Control & Natural Products
April 2015

Bob Fullerton
Science Group Leader, Bioprotection – Plant Pathology
April 2015

This report has been prepared by The New Zealand Institute for Plant & Food Research Limited (Plant & Food Research).
Head Office: 120 Mt Albert Road, Sandringham, Auckland 1025, New Zealand, Tel: +64 9 925 7000, Fax: +64 9 925 7001.
www.plantandfood.co.nz

CONTENTS

Executive summary	1
1 Introduction	3
2 Materials and Methods	4
3 Results	5
4 Discussion	6
5 Recommendations	6

EXECUTIVE SUMMARY

Quality testing of compost samples

Mike Spiers
Plant & Food Research, Ruakura

April 2015

A trial was undertaken by Kawerau-based Plateau Bark to see if compost could be made using reject fruit (and associated debris) mixed with pulp waste from the Norske Skog Tasman Ltd pulp and paper mill.

Compost made from a mix of reject kiwifruit and paper mill fibre was evaluated by The New Zealand Institute for Plant & Food Research Limited in a series of tests.

No kiwifruit seeds germinated in the compost in a likely plant propagule test, although one pasture weed germinated.

No Psa-V was detected in the compost in a test conducted by Verified Lab Services.

A plant growth study showed that a growing mix made from a blend of kiwifruit, paper mill fibre, greenwaste composts and vermicast (called Plateau KGV Compost) and coarse pumice performed well when compared with a mix made from a commercial compost and coarse pumice. Nutrient concentrations in the Plateau KGV Compost were suitable for plant growth.

The Plateau KGV Compost is suitable for use in horticulture. On-going testing for kiwifruit seeds and Psa-V should be carried out to ensure quality is maintained.

For further information please contact:

Mike Spiers
Plant & Food Research Ruakura
Private Bag 3230
Waikato Mail Centre
Hamilton 3240
NEW ZEALAND
Tel: +64 7 959 4430
DDI: +64 7 959 4557
Fax: +64 7 959 4431
Email: mike.spiers@plantandfood.co.nz

1 INTRODUCTION

Plateau Bark processes wastes from the forest industry, including bark and pulp mill waste, and converts these materials into compost for horticultural and agricultural markets. In addition, garden waste (greenwaste) is converted into compost.

An opportunity has arisen to utilise reject kiwifruit from packhouses in Bay of Plenty, mix the fruit with other waste streams, compost the mixture and sell the resulting product to kiwifruit orchards.

This project has several benefits:

- Reject kiwifruit is removed from the growing region (processing would be conducted in Kawerau) and so would not be available for consumption by birds. This would reduce the problem of germination of seeds from bird droppings that results in weed kiwifruit plants in the district's gullies, bush margins and production forests.
- Organic waste from the kiwifruit industry would be utilised to improve the soil quality of kiwifruit orchards, which is a desirable outcome under GAP regulations.
- The kiwifruit industry would have an assured market for their reject kiwifruit.

This project aims to evaluate the quality of compost made with reject kiwifruit as a component. The tests include:

- A growth study, comparing the growth of plants in the test compost in comparison with a commercial compost, to ensure the product is nutritionally valuable
- A weed germination test to ensure that no viable kiwifruit seeds are present in the compost
- A Psa-V test to ensure no pathogen is present in the compost.

2 MATERIALS AND METHODS

A test batch of compost utilising kiwifruit was made by Plateau Bark at their site in Kawerau. The recipe was one part kiwifruit fruit to three parts paper mill fibre (KPF compost). The pile was turned regularly and the temperature was monitored to ensure composting was thorough. On 29 January 2015, a representative sample of this compost was taken to the Plant & Food Research laboratory at Ruakura, Hamilton, for testing.

The unamended KPF compost was tested for the likely presence of plant propagules using the method in the New Zealand Standard for Composts, Soil Conditioners and Mulches (NZS 4454-2005). Five PB5 planterbags (2.5 L volume) were filled with the compost after screening through a 20 mm sieve. The planter bags were placed in a controlled temperature room at 20°C with a 16:8 hour light:dark cycle and loosely covered with a clear plastic sheet to retain moisture. The compost was checked daily and moistened if necessary for 28 days, and any weeds that germinated were noted and photographed.

A sample of the screened unamended KPF compost was sent to Verified Lab Services, Te Puke, who conducted a test for the presence of Psa-V.

A compost was prepared containing a blend of KPF compost, greenwaste compost (made from garden waste including prunings, lawn clippings, weeds, etc by Plateau Bark) and vermicast. This blend was termed Plateau KGV Compost.

A growth study was conducted using a growing mix made from Plateau KGV Compost and coarse pumice (20% by volume, added to improve physical properties and promote plant growth in containers). Seedlings of tomato were transplanted into PB3 planter bags (1.8 L volume) on 16 March 2015. There were three replicate planter bags of the potting mix containing the test mix and three of a commercial compost (Gardeners Choice) purchased from a local Garden Centre and mixed 80:20 with coarse pumice. The plants were grown in a controlled temperature room at 20°C with a 16:8 hour light:dark cycle. Growth was assessed visually on 14 April 2015.

A sample of the screened Plateau KGV Compost used in the growth study was sent to Hill Laboratories, Hamilton, who conducted tests for total nutrients.

3 RESULTS

No kiwifruit seedlings emerged during the plant propagule test and only one weed seed germinated (Figure 2). This was identified as either scrambling speedwell or buttercup, common pasture weeds.



Figure 2. The weed that germinated during the likely plant propagule test.

The test for Psa-V was negative.

Growth of tomato seedlings was better in the compost based potting mix than in the commercial compost mix (Figure 1).



Figure 1. Tomato seedlings grown in Plateau KGV Compost based potting mix (left) or commercial compost mix (right).

Results of the Plateau KGV Compost nutrient analyses are given in Table 1.

Table 1. Nutrient analysis of the compost sample.

	Plateau KGV Compost
Organic matter, %	23
Total carbon, %	13
Total nitrogen, %	0.9
Carbon:Nitrogen ratio	15:1
Total phosphorus, %	0.21
Total potassium, %	0.55

4 DISCUSSION

The growing mix made from Plateau KGV Compost performed better than that from the commercial compost. The reason for the good performance of the Plateau KGV Compost blend was most likely the low C:N ratio of 15:1, which ensures that nutrients are not immobilised and are available for plant growth. The amount of other nutrients (phosphorus and potassium) was also reasonably high, contributing to the good performance.

No kiwifruit seeds germinated from the KPF compost and no Psa-V was detected. The single weed seed that did germinate was probably blown into the finished compost pile by wind from the surrounding pasture area. It should be noted that these tests are indicative only, and no guarantee can be given that this result will always be obtained.

5 RECOMMENDATIONS

It is recommended that the tested formulation of Plateau KGV Compost containing kiwifruit, paper mill fibre, greenwaste compost and vermicast be used for commercial purposes.

It is also recommended that weed germination and Psa-V tests be conducted on a representative sample of each batch of compost produced, prior to it being supplied to customers. The temperature of the compost pile should be monitored to ensure that enough heat (>50°C for 3 days) is generated to kill weed seeds.



DISCOVER. INNOVATE. GROW.