Results for today **Ideas for tomorrow**

Consumer Sensory Preferences for Macadamia Nuts

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Introduction

The delicate flavour, versatility and texture of macadamia nuts has increased their popularity on a global-scale over the past number of years. Macadamias are indigenous to Australia and Australia is currently the worlds leading producer. To date, the Australian macadamia industry has been challenged to obtain reliable sensory quality measurements (hedonic and diagnostic) that could be linked to processing and other quality criteria. This study investigated Australian consumer sensory preferences for macadamia nuts subjected to a number of size, ageing, processing and source treatments.

Methods

- Macadamia were subject to three main treatments:
  - *Size (3 levels)*
  - *Ageing (3 levels)*
  - *Roasting (5 levels)*
- Macadamia originated from nine sources:
  - *region/site/cultivar combinations*
- A sensory panel (n=9) was trained to provide diagnostic measures of sensory character.
- Appropriately screened (demographic, psychographic) consumers (n=162) were used to provide hedonic measurements.
- A factorial design in incomplete blocks was used to allocate macadamia to trained panellists and consumers. The source treatment was examined at a split-plot level.
- Data analysis was carried separately (trained panel and consumer) using non-orthogonal split-plot models.
- Trained panel descriptive information was combined with consumer preference data to determine sensory drivers of consumer preference.
- The peroxide value (PV) of macadamia oil from each treatment was calculated to provide a quality measurement representative of that currently used to assess the quality of retail kernel.

Results

- A 40 attribute descriptive vocabulary was generated (defined & referenced) by the trained panel to describe and quantify the odour, appearance, flavour, texture and aftertaste of macadamia kernel.
- The trained panel successfully discriminated levels of each product treatment (roast, ageing, size, and source) in terms of sensory character. Interactions were not identified between treatments.
- Two levels of roast treatment, varying in temperature and time (135°C for 18min or 155°C for 8min) had a similar effect on the sensory character of macadamia kernel (Figure 1).
- Differences in kernel ageing (0-14 weeks) were attributed to a *stale/rancid* odour, flavour and aftertaste.
- Overall, consumers preferred roasted macadamia and the level of roast (temperature x time) was an important means of controlling preferred odour and colour characteristics (Figure 2).
- Consumers discerned differences in the odour quality of fresh and aged kernel. While the PV of both the fresh and aged kernel was within the range of commercially acceptable sample, such differences were related to the *stale/rancid* attribute.
- Specific attributes of odour, appearance, flavour, texture and aftertaste that drive consumer preference were identified by combining trained panel diagnostic assessments with consumer preference judgements.

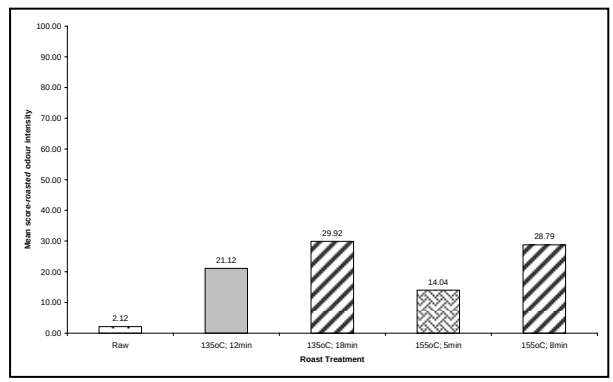

Fig 1: Influence of roasting treatment on *'roasted'* odour intensity

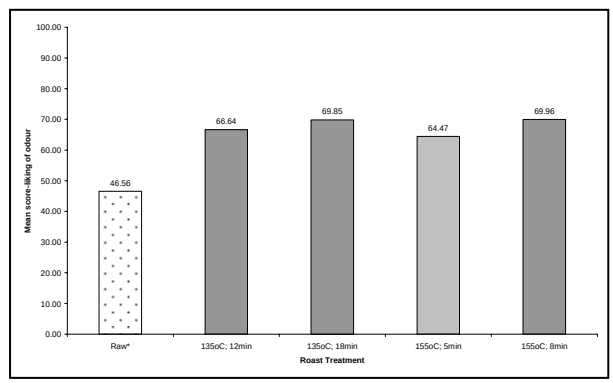

Fig 2: Mean liking score for the odour of roasted macadamia

Conclusions

Future research should avail of trained panels as a means of establishing an objective link between product and consumer. The effect of rancidity on consumer acceptability should be studied in more detail with trained panel, PV and volatile assessments as interpretative tools. While the Australian macadamia market currently lacks the maturity to provide clear market-oriented direction there is a requirement to develop the market through education and consumer exposure to a broader range of macadamia sensory experiences.

Acknowledgments

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