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Presentation title:

Using Molecular Gastronomy for Good:
Innovative foods with a bite, developed with and for older people affected by dysphagia

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Abstract:

Our paper details the consumer-oriented food product development approach, qualitative and quantitative research outcomes, and new molecular gastronomy foods to improve food experiences of older people in aged care, particularly those with swallowing problems.

Some people may think of posh restaurants or celebrity chefs when the term “Molecular Gastronomy” is used (Vega & Ubbink, 2008). However, in recent years molecular gastronomy is increasingly being used for food innovation outside the restaurant industry (e.g. Guiné et al., 2012; Rodgers, 2016). What if molecular gastronomy would also be applied in Aged Care? There is a need for change and innovation in food services in aged care, with rates of malnutrition of residents up to be 50% (Marshall et al., 2015). Particularly people with swallowing difficulties, called dysphagia, are at risk as they need to eat texture modified foods that may look like this:



From Australian Standards for Texture Modified Foods and Fluids

Molecular gastronomy, also referred to as multi-sensory cooking, is promising because the cooking technique does not require to blend foods into purees with a uniform flavour and texture (Reilly et al., 2013). Barossa Village, a not-for-profit aged care facility in South-Australia, recognized the potential of molecular gastronomy to produce sensory-appealing texture modified foods and vastly improve food experiences for older people with dysphagia. However, clearly the application and “customers” are noticeably different in Aged Care compared to restaurants. The project objective was therefore to follow a consumer-oriented approach to develop new molecular gastronomy recipes suitable for Aged Care, which addresses both functional and emotional consumer needs.

Our approach was inspired by “design thinking” (Olsen, 2015) and consisted of consecutive steps to move from consumer insights to new products with involvement of all relevant stakeholders: residents, family, staff and experts. We first obtained a real-world understanding of residents’ food experiences by observations during meal and snack times. The observations were done over a period

of 6 days, reflecting week/weekend days and different wings of the aged care facility. This was followed by interviews with family members and residents (n=25), which included people on texture modified diets. Due to cognitive decline of most of the residents, the interviews were informal but generally covered: background and life story of the person, the role of food in their lives, favourite or memorable foods, the transition into residential aged care and/or to different types of foods, experiences and satisfaction with current foods and menu. Combined with information from literature and experts involved (speech pathology, dietetics, nursing, consumer research) this led to a user-need product development framework for foods in Aged Care. Key need themes to be addressed by new foods are related to SENSORY, PRODUCT and PERSON factors:

- *Sensory Pleasure*: flavour intensity, texture quality, heterogeneity in flavours/textures
- *Product Variety*: more product options, surprise products
- *Person Empowerment*: inclusion, personalization, independency, transition, recognition

Particularly the final PERSON theme is important as it recognizes older people's emotional needs, especially for those with eating difficulties: real foods, independent eating, and sharing the same foods or experiences are very important for empowerment. This theme clearly goes beyond "eating for survival" and a focus on sensory properties, as suggested in a framework by Sorensen et al. (2012).

Subsequently we held expert meetings and a co-creation workshop with residents, family and staff in order to create ideas and specify concepts relevant to the local setting. The workshop generated a large number of ideas along different personas reflecting healthy older persons to people with diminished cognitive, swallowing and motor skills. Ideas such as "high tea fingerfoods", "a dagwood dog with edible stick", "eating dirty together" with look-a-like shrimps or chicken wings were visualized by a designer and discussed in the group. The group highlighted that texture modified finger foods and mid-meal snacks are the most urgent development areas. Molecular gastronomy could make a real difference because there are currently very limited options for a textured modified snack other than sweet desserts such as custard. Barossa Village therefore focussed on development of mid-meal snacks using gelification techniques. In iterative cycles, a range of sweet and savoury texture modified mid-meal snacks were developed. Molecular gastronomy enabled the development of innovative texture modified foods with "a bite", which dissolve in the mouth and are therefore safe to swallow. In contrast to pureed foods, they have a relative firm texture, with a real food appearance and with layers of different tastes and textures such as a snack with salmon, cheese and tomato. In addition, the new menu items have a higher nutrient density (kJ and proteins) compared to current options.

FOOD CONSUMPTION TEST COMPARING CURRENT TO NEW MOLECULAR GASTRONOMY SNACKS FOR PEOPLE WITH DYSHAGIA	
CURRENT	NEW
	
Per 100 g: 327 kJ, 2.7 gram protein Per portion 80 g: 262 kJ, 2.2 gram protein	Per 100 g equals a portion: 1106 kJ and 5.5 gram protein

Finally the new mid-meal snacks were implemented and tested by residents with dysphagia in Barossa Village. Because it is not possible nor valid to ask people with dementia or other cognitive decline to rate their liking of foods, we used the strongest measure for acceptance: the actual amount of food consumed (Pouyet et al., 2014). We therefore did a plate waste study (pre-post design, total duration 28 days, n=23 residents) to compare food intake of current mid-meals snacks with the new snacks. The results obtained by multi-variate statistics showed that the new snacks were very acceptable. Moreover, residents consumed significantly more energy and protein during morning/afternoon tea with these new menu items (average 907 kJ and 5.7 g protein) compared to the regular offer (average 535 kJ and 3.5 g protein).

Staff also recorded how residents responded to the new foods, which highlights lost food experiences were restored:

"...the looks on the residents faces as they tried new foods all in a positive way. It was great to see some of them picking it up with their fingers....A resident said the food was "bloody beautiful" "I haven't had tomato for ages!"

In conclusion, novel molecular gastronomy foods have enormous potential to improve food enjoyment and intake of older people, particularly those with swallowing difficulties. Adjustments and tools are needed for its application in Aged Care, as currently under development by Barossa Village. Our approach also shows that involving aged care residents, family and non-food staff in new food product development is challenging but possible and desirable for change in aged care food services.

References

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