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IS THERE VALUE FOR CULTIVATION AND USE OF PROVITAMIN A-BIOFORTIFIED GREEN MAIZE IN KWA-ZULU NATAL SOUTH AFRICA?

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Provitamin A-biofortified maize



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INTRODUCTION

- Maize (*Zea mays L.*) is the most produced and preferred staple food with consumption >100 kg/capita-/yr in Southern Africa.
- Despite its popularity and versatility of maize to complement various food items, maize on its own has limited nutritional content.
- As in other sub-Saharan African regions, malnutrition, including **vitamin A deficiency (VAD)** is prevalent in Southern Africa
- HarvestPlus (2006) has identified maize as a good candidate for biofortification with provitamin A to combat VAD in Southern Africa.

PROBLEM STATEMENT

- Compared to white maize, provitamin A-biofortified maize is less preferred by consumers in sub-Saharan Africa
- This is due to its unfamiliar sensory properties- yellow colour, and strong aroma and flavour(Pillay et al 211)
- However, consumer acceptability studies so far used products processed from dry grain of the biofortified maize
- Yet, maize is also consumed in its fresh form in most sub-Saharan African countries
- Therefore, this study investigated consumer acceptability of fresh biofortified maize

AIM, OBJECTIVES & HYPOTHESIS

- **Aim:** To assess the acceptability of boiled or roasted fresh provitamin A-biofortified (PVBA) maize in the KwaZulu-Natal province of South Africa.
- **Objective:** To determine consumer acceptability of boiled or roasted fresh PVBA maize compared to corresponding white maize
- **Hypothesis:** Consumer acceptability of fresh PVAB maize is the same or more than that of white maize

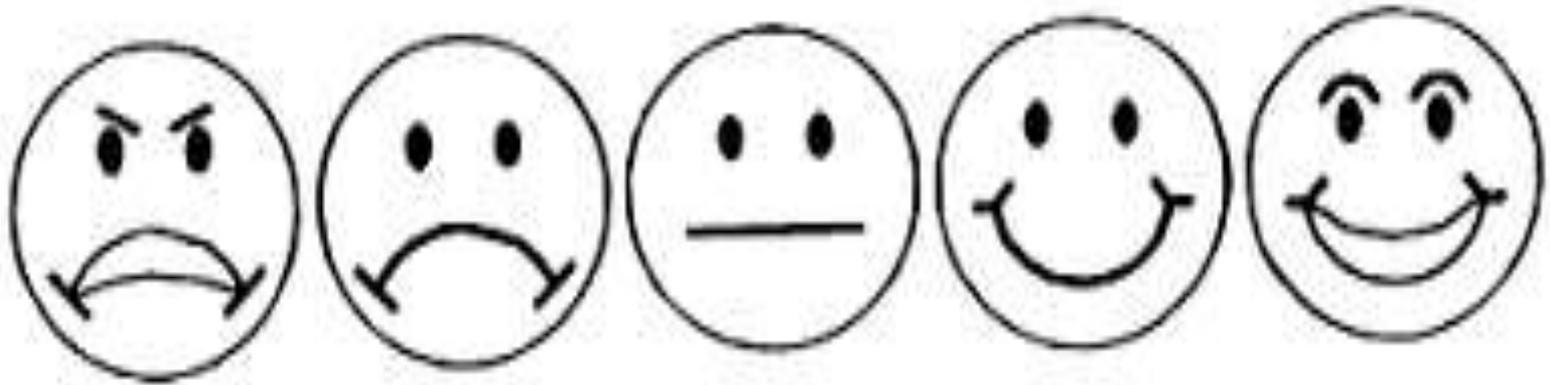
MATERIALS AND METHODS...

- A volunteering (signed consent form) 64-member consumer panel was recruited from the study area (Jozini)
- Roasted and boiled samples of both PVAB and white maize were randomly labelled with 3-digit codes
- Warm cobs of: boiled PVAB and white maize, and roasted PVAB and white maize were served to the panellist in separate sessions
- Each sample was rated for acceptability in terms colour, aroma and flavour using a 5-point pictorial hedonic scale where, 1 = like very much , 2= like, 3 = neither like nor dislike, 4= dislike , 5 = dislike very much.

MATERIALS AND METHODS

- One variety of PVAB maize (HP326-2) and white maize (SC701) (control) were used
- Both maize varieties were planted at Makhathini research station (270S, 320E, and 77 m above sea level) during the first week of March 2013.
- Cobs of each maize variety were divided into two sub-samples. One sub-sample was boiled and the other roasted.
- The maize samples were processed according to the traditional practices of the Zulu tribe in Jozini, KwaZulu-Natal province, South Africa.
- Acceptability evaluated using 5 point pictorial hedonic scale

Pictorial 5-point hedonic scale



Very bad

Bad

Average

Good

Very good

MATERIALS AND METHODS...

- A series of 6 focus group discussions (FGDs) were conducted immediately after sensory evaluation
- Participants of the FGDs were recruited from the consumer panel- volunteers; signed consent form
- The objective was to gain deeper insight of consumer perceptions about consumption of fresh PVAB maize
- A set of 5 guiding questions was used for the FGDs
- FGDs explored issues around experiences, perceptions and concerns of farmers/consumers about consuming fresh PVAB maize

- A trained facilitator conducted the FGDs in isiZulu, the local language.

Results and Discussion

Table 1. Proportion of the participants based on gender and age groups

Gender	n* (%)	Age	n* (%)
Female	52 (81%)	18-35	9 (14%)
Male	12 (19%)	36-60	41 (64%)
		61-75	14 (22%)

*n=64

Association between age and acceptability of PVAB maize

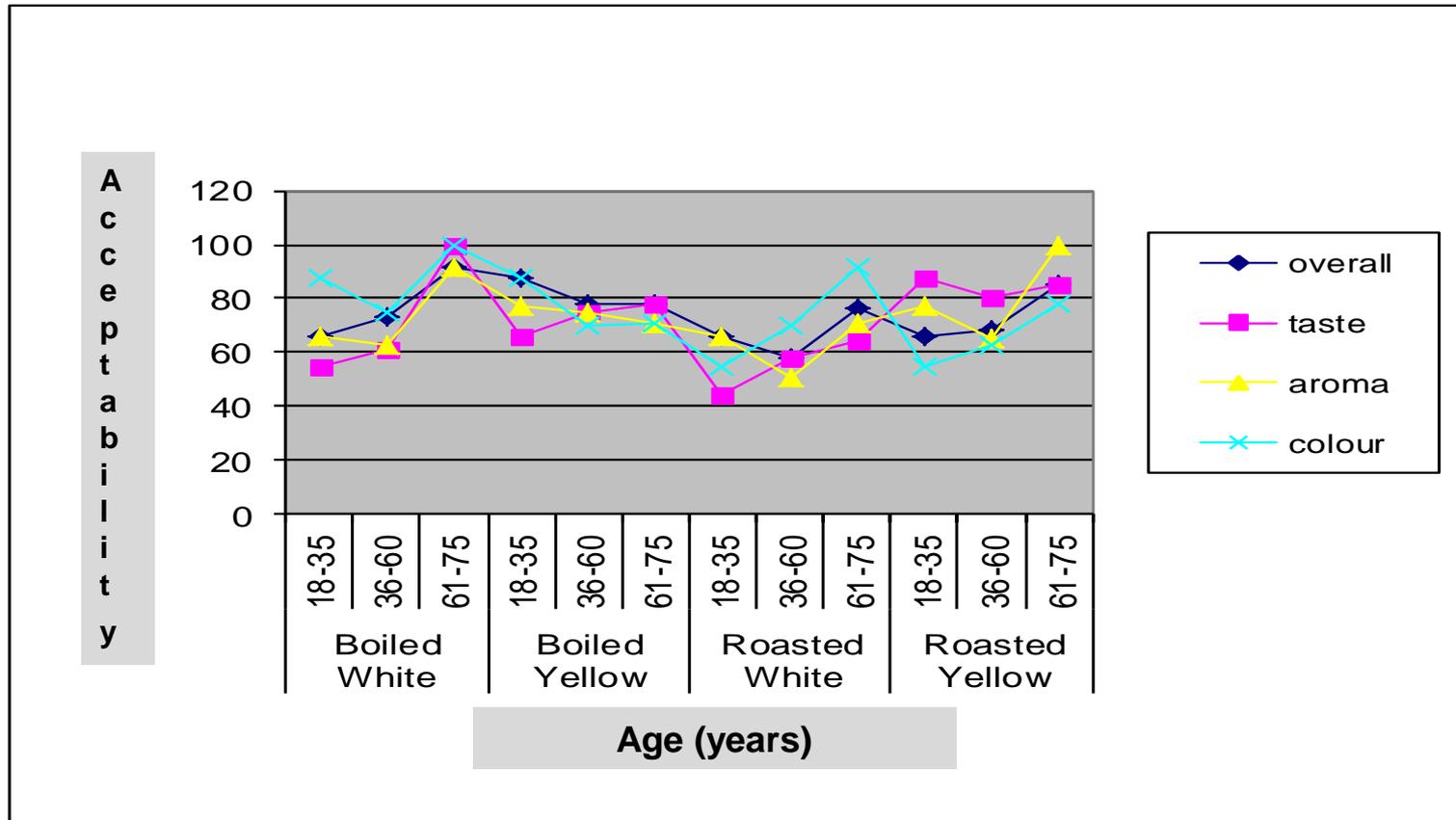


Figure 1: Acceptability of fresh maize by farmers of different age groups

Association between gender and acceptability of PVAB maize

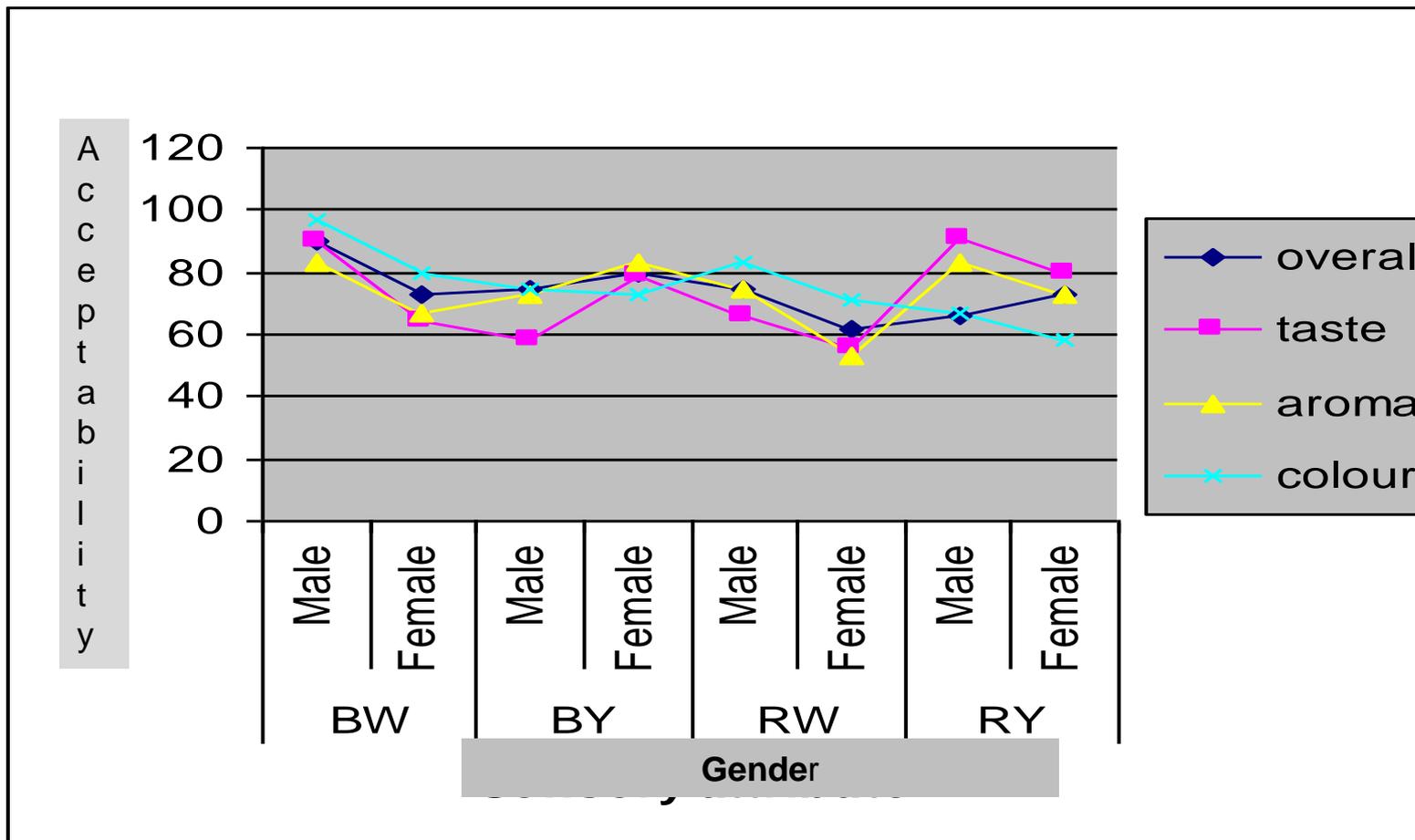


Figure 2: acceptability of fresh maize by gender

Table 4: Concerns of farmers towards pro-vitamin A maize

Theme	Concept	Issues discussed
Adaptability under local drought conditions	Resistance to heat drought	Farmers wanted PVA maize that can tolerate heat and drought. Breeding programs are required to develop varieties with heat and drought stress tolerance.
Marketability	Suitability of agronomic traits	Farmers wanted high yielding maize with huge cobs and large kernels sizes and an extended shelf life as comparable to white maize. This raises need to develop PVA maize cultivars with better agronomic traits.
Processing	Palatability	Farmers mentioned that special foods such as corn steamed bread and African beer made from yellow maize were more flavour-some compared to white maize. This poses a challenge to food and consumer scientists to generate better food products that could mask unfamiliar taste of PVA maize.
Profitability	Quality pricing	and The farmers were worried that planting PVA maize close to white maize would cause contamination due to cross-pollination thus reducing the quality and aesthetic value of white maize. These would eventually reduce the market price of white maize on the nearby fields. In South Africa yellow kernels in white maize reduces market grade (Kruger et al. 2009).
Value for use	Nutritional health benefits	and Farmers wanted to know the nutritional benefits of PVA maize. Thus, the nutritional and health benefit of PVA should be emphasized during promotion, because this can be used to differentiate PVA and white maize.

Table 5: Action plan proposed by the farmers to promote pro-vitamin A maize

Themes	What should be done?	By whom?
Convincing agricultural officials	<ul style="list-style-type: none">• Extension officers to take an active role in providing seeds to farmers• Extension officers to organise demonstrations	Department of Agriculture and Environmental Affairs
Capacity building	<ul style="list-style-type: none">• Training on production and management of PVA maize	Researchers and extension officers
Communication	<ul style="list-style-type: none">• Community leaders and farmers associations must sensitise farmers and community members about PVA and its benefits	Extension officers

CONCLUSIONS

- Farmers accept PVAB maize either boiled or roasted. Females prefer boiled while males prefer roasted PVAB maize- the two options should be available in the market.
- The youth seems more optimistic about PVAB maize while elders (above 60 years) prefer white fresh maize seemingly due to culturisation.
- Farmers showed concerns over PVA maize regarding adaptability to local environments, marketability and profitability, processing, sensory and nutritional quality and health benefits- more research and technology transfer needed.
- Despite these concerns, farmers suggested a holistic multi-stakeholder approach to raise awareness and educate farmers about PVAB maize- an indicator of adoptability of PVAB.



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