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## Effect of provitamin A-biofortified maize diet on the consumer acceptability of chicken meat

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# Background

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- ❖ Vitamin A is a fat soluble micronutrient needed for normal growth and development, reproduction, vision and immunity (Preedy, 2012).
- ❖ Vitamin A deficiency (VAD) occurs when vitamin A in the liver is below 20  $\mu\text{g/g}$  (Sommer & Davidson, 2002).
- ❖ 25% of the top 20 countries in the world affected by VAD are in the SADC region (Muthayya et al., 2013).
- ❖ VAD is prevalent among rural communities (Rocheford, 2014).
- ❖ The underlying causes of VAD in these areas are mainly due food and nutrition insecurity.

# Problem statement

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- Maize is a leading staple in southern Africa- biofortification of maize with provitamin A is being evaluated as a cost-effective strategy to address VAD.
- In southern Africa, the traditional acceptable maize type for human consumption is the white maize grain, while yellow types are used as feed
- Unfortunately, white maize grain is devoid of vitamin A
- There is low consumer acceptance of provitamin A-biofortified maize (PABM)
  - dislike the yellow colour, aroma and flavour of PABM (Pillay *et al.*, 2011; Muzhingi *et al.*, 2008).

# Provitamin A-biofortified maize



# Objective and hypothesis

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- The objective of the study was to determine the effect of PABM feed on consumer acceptability of chicken meat.
- The hypothesis tested was that PABM does not affect consumer acceptability of chicken meat.

# Materials and Methods

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- 13-week old cockerels were used
- Two maize-based diets were used
  - low vitamin A (LVA) - white maize and
  - high vitamin A (HVA) – yellow PABM
- HP326-6 maize bred by the ACCI, UKZN
- Four pens were used for each diet
- 8 birds per pen

# Indigenous chickens



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# Materials and methods...

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- After 7 weeks, four birds from each pen were slaughtered.
- The birds were scalded in hot water
- Thighs and drumsticks were stored at  $-20^{\circ}\text{C}$  for 2 weeks.
- Meat samples thawed and stored at  $4^{\circ}\text{C}$  before it was used for sensory evaluation.



# Sample Preparation for sensory evaluation

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- Meat samples were cooked according to the traditional way in Mkhambathini community.
- The meat samples were shallow fried in vegetable oil for 10 minutes.
- Water, salt and spices were added and it was cooked for another 25 minutes.
- Skin and bones from the meat samples were removed and cut into small samples of approximately 15g.
- The samples were served in a random order according to a Random permutation of Nine
- Consumer acceptability was determined using a preference test and 5-point pictorial hedonic scale

# Consumer panel and sensory tests

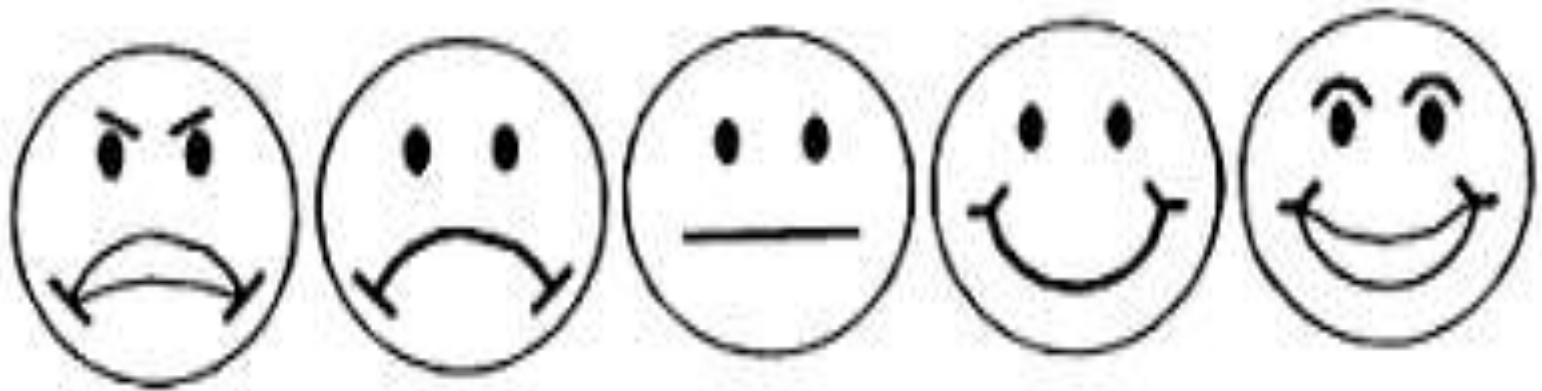
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- 60 consumer panellists were recruited from a rural community in Mkhambathini Municipality, KwaZulu-Natal province, South Africa
- Community generally of low socio-economic status, vulnerable to malnutrition, including VAD
- Community active in small-scale poultry production, largely indigenous chickens
- Participation in the study was voluntary- consent form signed
- Panellists selected on the basis that they were regular consumers of indigenous chickens
- Paired preference test and 5-point pictorial hedonic scale used

# Definition of attributes for sensory analysis of chicken legs from Ovambo chicken fed biofortified provitamin A maize and white maize

Attribute	Definition
Taste 1 = very bad; 2= bad; 3= average; 4 = good; 5= very good	Typical cooked chicken meat taste
Texture 1=very bad; 2= bad; 3= average; 4 = good; 5= very good	Typical cooked chicken meat texture
Aroma 1 = very bad; 2= bad; 3= average; 4 = good; 5= very good	Typical cooked chicken meat aroma
Colour 1 = very bad; 2= bad; 3= average; 4 = good; 5= very good	Typical acceptable cooked chicken meat colour 4 = good; 5= very good
General acceptability 1 = very bad; 2= bad; 3= average; 4 = good; 5= very good	Overall likeness of the cooked chicken meat

# Pictorial 5-point hedonic scale



Very bad

Bad

Average

Good

Very good

# Statistical analysis

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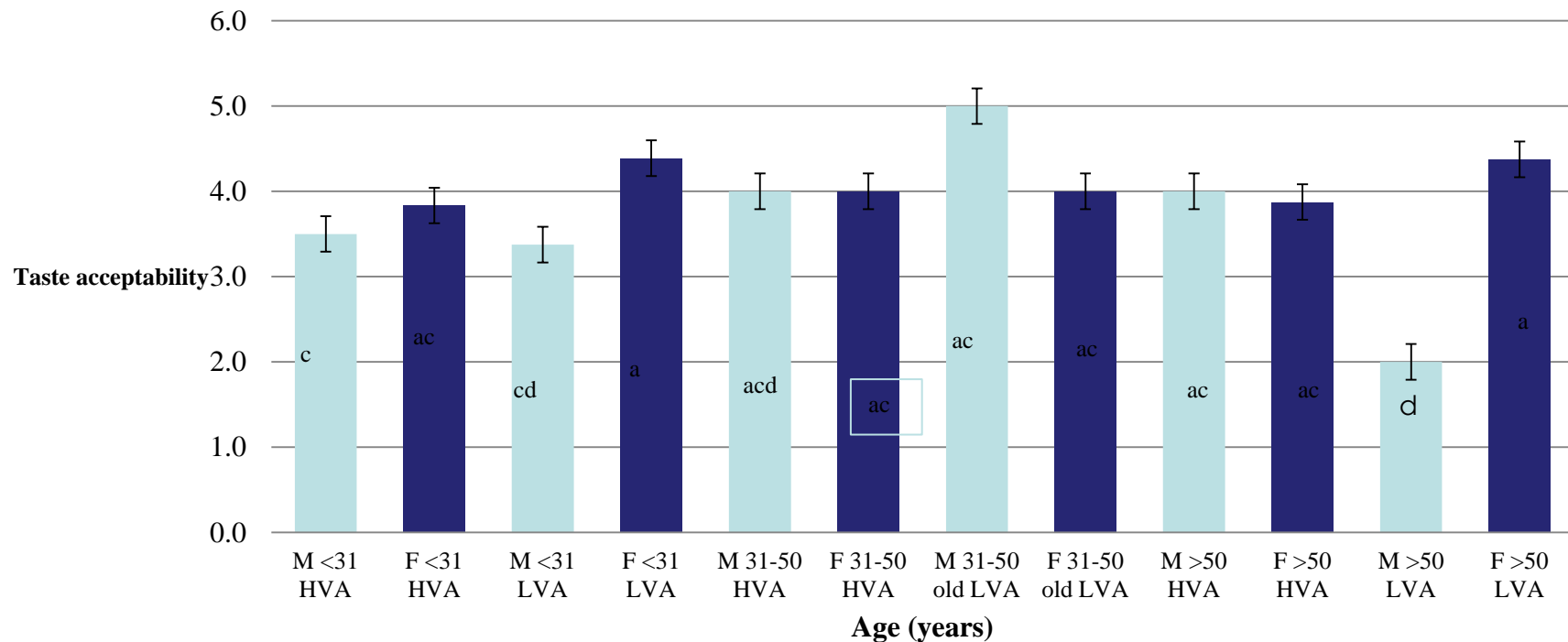
- The statistical analyses of the parameters, sensory characteristics were analyzed by multivariate of General linear Model (GLM).
- Least Significant Difference (LSD) was used for comparison of means.
- All statistical analyses were made using SAS software (SAS 9.2).

# Results and Discussion

**Table 1. Demographic profile of the consumer panel**

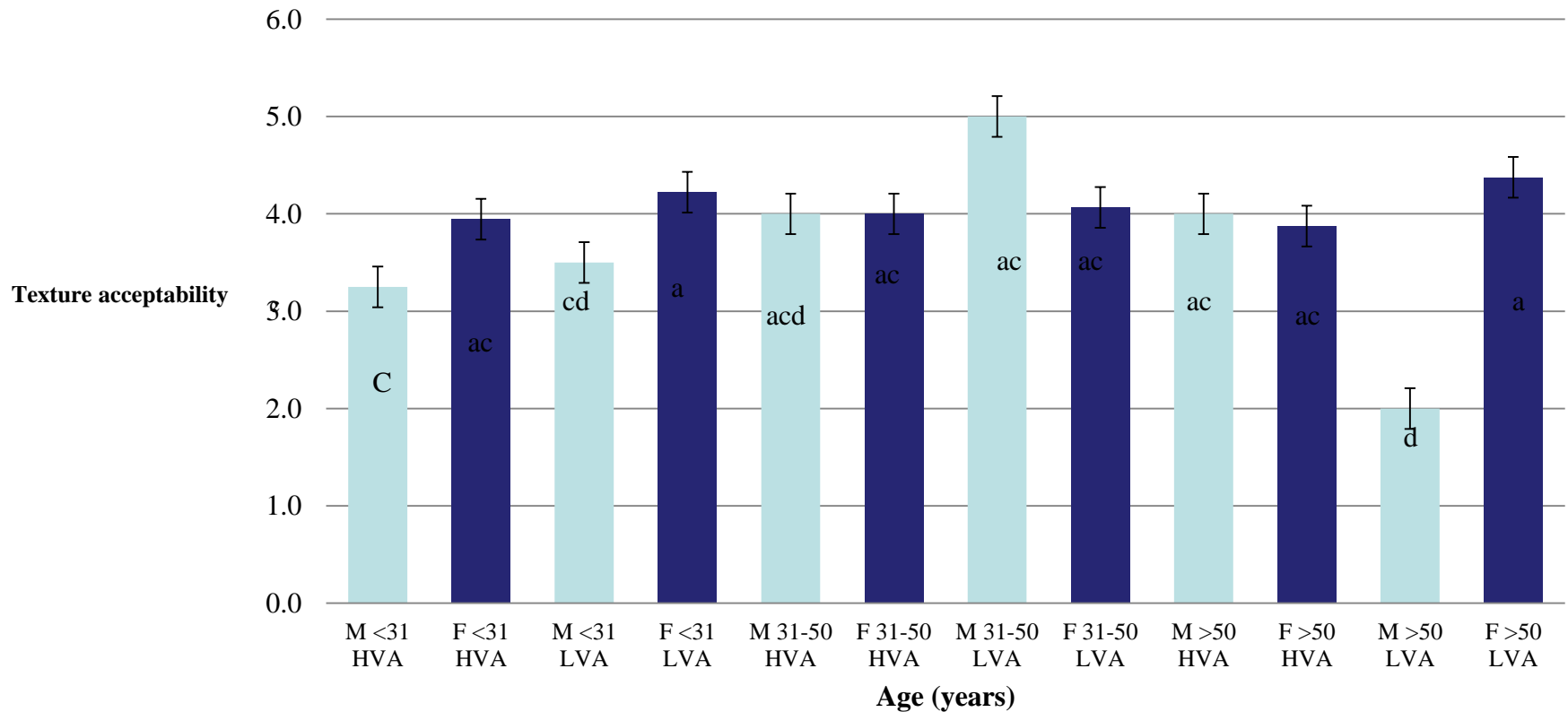
	<b>Characteristics</b>	<b>Percentage (%)</b>
<b>Sex</b>	Male	78.8
	Female	21.2
<b>Age</b>	<31 years old	50.0
	30-50 years old	30.8
	>50 years old	19.2

# Results and Discussion



**Figure 1.** Effect of diet, gender and age of consumers on the taste of chicken meat  
LVA: Low vitamin A (control), HVA: High vitamin A maize, f: female, m: male

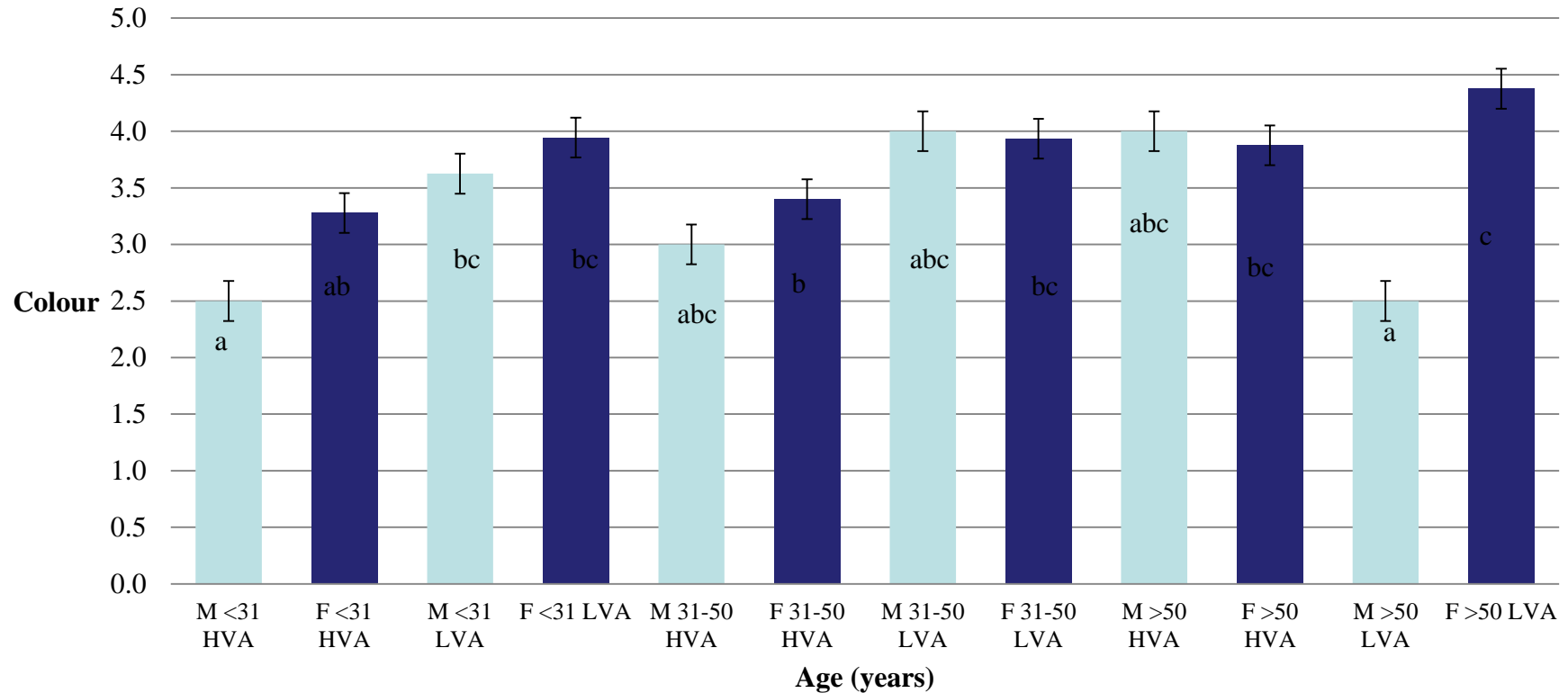
# Results and Discussion



**Figure 2.** Effect of diet, gender and age of consumers on the texture of chicken meat  
LVA: Low vitamin A (control), HVA: High vitamin A maize, f: female, m: male

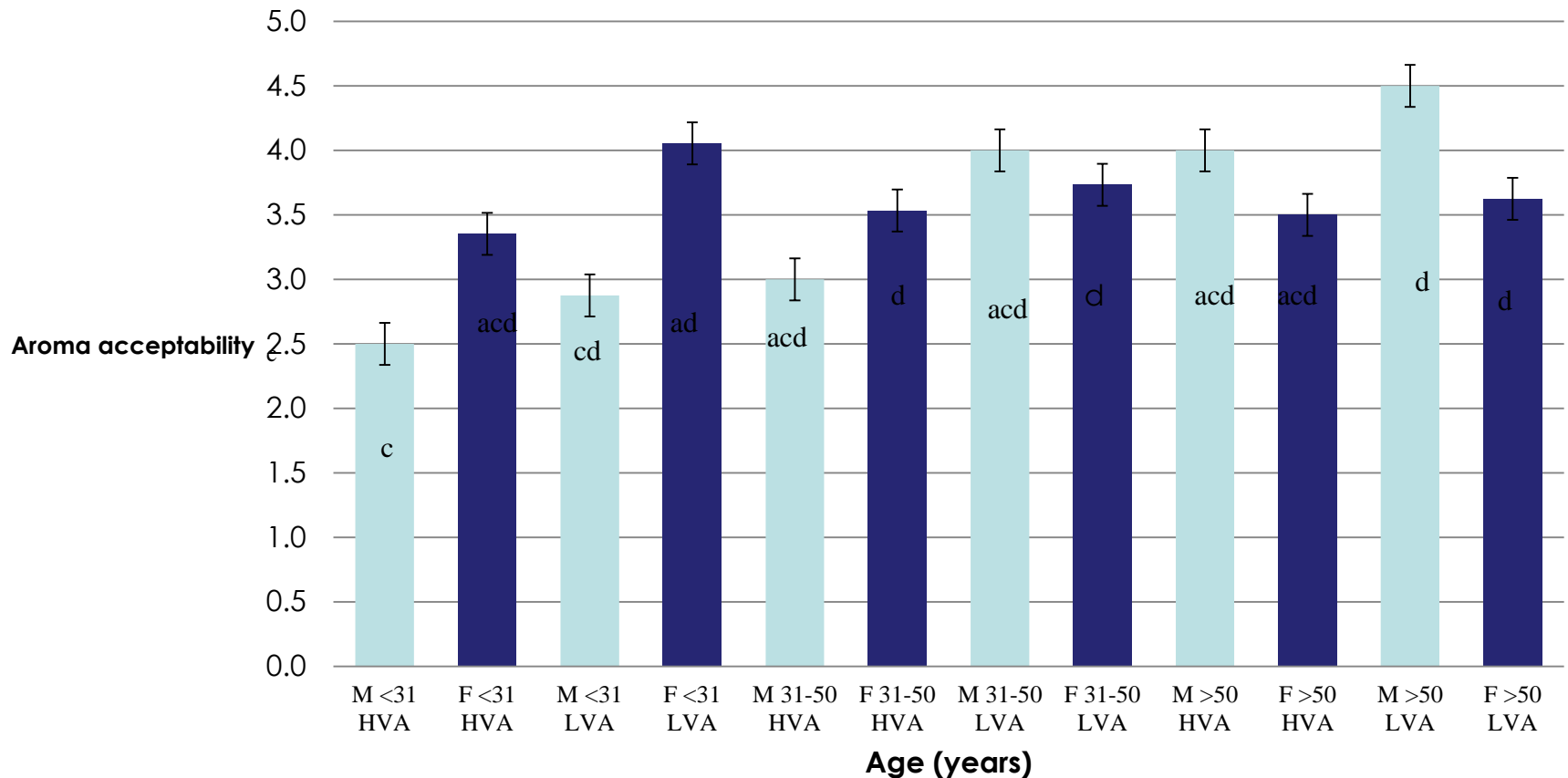


# Results and Discussion



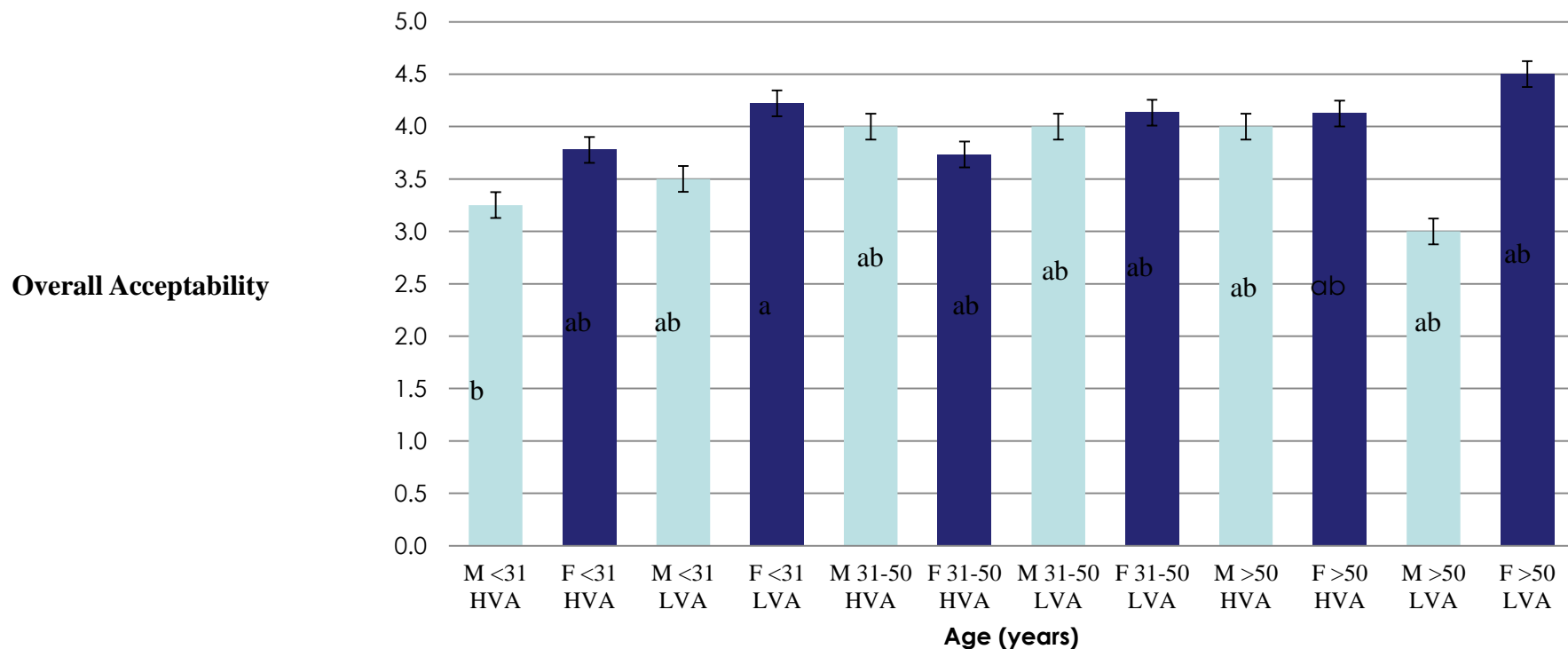
**Figure 3.** Effect of diet, gender and age of consumers on the colour of chicken meat  
LVA: Low vitamin A (control), HVA: High vitamin A maize, f: female, m: male

# Results and Discussion



**Figure 4.** Effect of diet, gender and age of consumers on the aroma of chicken meat  
LVA: Low vitamin A (control), HVA: High vitamin A maize, f: female, m: male

# Results and Discussion



**Figure 5.** Effect of diet, gender and age of consumers on the acceptability of chicken meat  
LVA: Low vitamin A (control), HVA: High vitamin A maize, f: female, m: male

# Conclusion

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- The result of the preference test and sensory characteristics indicate that the type of maize (LVA or HVA) used to feed the Ovambo chicken has no overall influence on the consumer's preference of the chicken meat .
- The influence of age and sex of the consumer on the rating of the chicken meat also has no overall effect on their preferences.
- The HVA diet fed to indigenous chickens does not influence the acceptability of the chicken meat by VAD consumers.
- Indigenous chickens fed provitamin A biofortified maize can be a possible strategy for curbing VAD in southern Africa regions where there is low acceptability provitamin A biofortified maize for human consumption.

**THANK  
YOU**



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