



ESTIMATING RAPPROCHEMENT POSSIBILITIES OF FOUR SAUDI CAMEL BREEDS BASED ON MEAT CHARACTERISTICS

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INTRODUCTION

- Names of camel breeds were given based on coat color, ecotype, body feature and tribe names, ...etc.
- Since 1989, world camels were reported to be representing 48 breeds according to their morphology and phenotypes.
- The classification based on morphology and phenotypes was usually the common for naming Camel breeds.
- On the other hand, the most recognized method of classification built on the genetic markers (e.g SSR and SNP).
- Nevertheless, classification and /or re-classification considering production, and biometry is still common.



THE OBJECTIVE

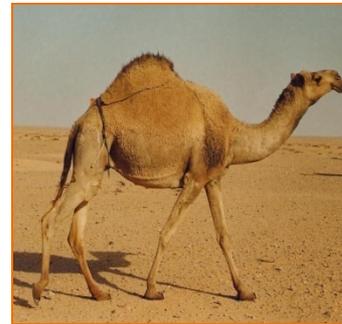
- The objective of this study was to differentiate between four major camel breeds in Saudi Arabia using multivariate discriminant analysis of meat composition and quality traits.



Majaheem



Maghateer



Sofor



Shoal



MATERIALS AND METHODS

- Six intact males from each breed were selected randomly and housed in four separate pens till six months old and averaged weight of 134 kg) .



MATERIALS AND METHODS

Before slaughtering

- The camels were weighted to obtain slaughter weight (Sltwt).



At slaughtering

- The camels were moved to slaughter house



MATERIALS AND METHODS

After slaughtering-following parameters were taken

Slaughter and Non-carcass Data

- Slaughter weight (Sltwt/kg)
- Empty body weight (EmptBy/kg)
- Hot carcass weight (Htcarcss/kg)
- Dressing percentage (Dress%)
- Rib-eye-area (RibEyeAr/cm²).
- Head weight (Headwt/kg)
- Neck weight (Neckwt/kg)
- Feet weight (Feetwt/kg)

Meat Histo-chemical and Quality Traits

- Fiber area (FibAr/ μ m)
- Sarcomere length (SL/ μ m)
- Protein%
- Moisture%
- Fat%
- Shear/(kg)
- Cooking loss (CookLs %)
- Myofibrillar protein index (MFI).
- The *pH*
- Color components (L, a, b)





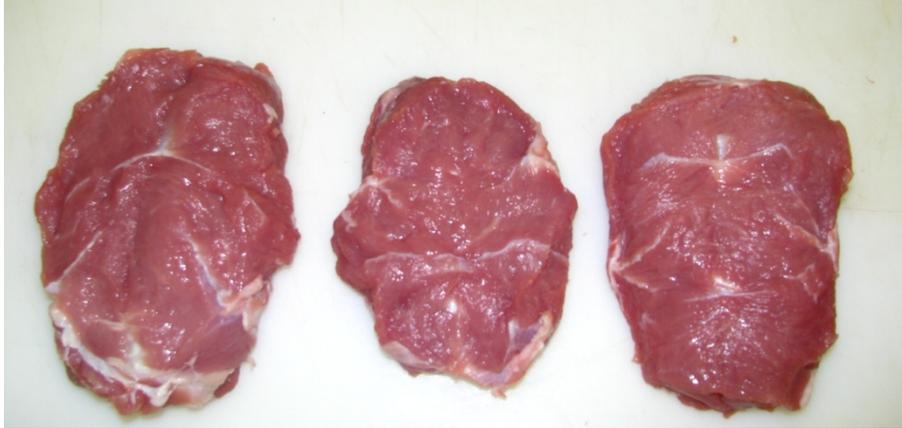
Head weight



HOT CAMEL CARCASSES

Different meat cuts





DIFFERENT STEAK CUTS OF DIFFERENT BREEDS

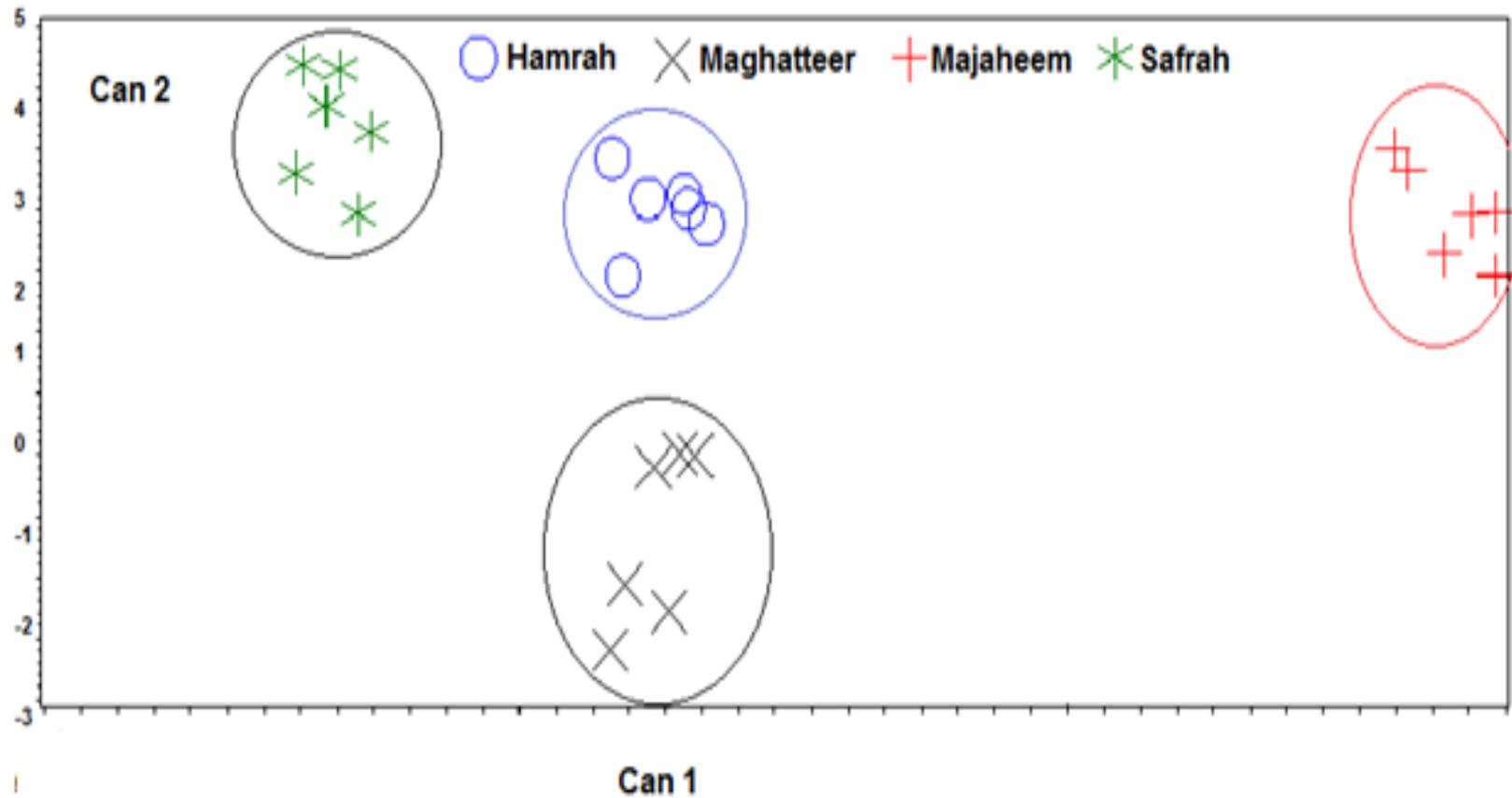


RESULTS

- The results showed a considerable genetic differentiation between Majaheem breed and the other three breeds in KSA based on the biometrical meat variables.
- The average values of biometrical meat traits of the Majaheem breed were higher than that obtained for the other breeds except few cases such dressing percentage (Dress) and Rib Eye area.
- The most discriminating meat variables were MFI, a^* , L^* , CookLs.
- The differentiation of those breeds, was based on MFI, a^* , L^* , CookLs, Neckwt, pH and b^* were significant in squered canonical correlation procedure.
- The Canonical discriminant analysis allowed further an understanding of the differentiation between breeds (Figure 2).
- Furthermore, two large clusters, one formed by Hamrah and Maghateer in one group along with Safrah.
- These classifications may assign each breed into one cluster considering they are better as meat producers.
- The Majaheem was clustered alone in another cluster which might be a result of being better as milk producer.



RESULTS



Canonical representation discriminating the four camel breeds using meat variables.



RESULTS

Table 2. The significant Stepwise selection discriminant analysis of studied variable.

Variable	Partial R-Square	F Value	Pr > F	ASCC*	Pr > ASCC
MFI	0.6351	11.61	0.0001	0.211	0.0001
a	0.4808	5.86	0.0052	0.341	<.0001
L	0.4606	5.12	0.0098	0.451	<.0001
CookLs	0.5078	5.85	0.0062	0.555	<.0001
Neckwt	0.3283	2.61	0.0875	0.599	<.0001
pH	0.3465	2.65	0.0865	0.628	<.0001
b	0.3129	2.13	0.1429	0.652	<.0001

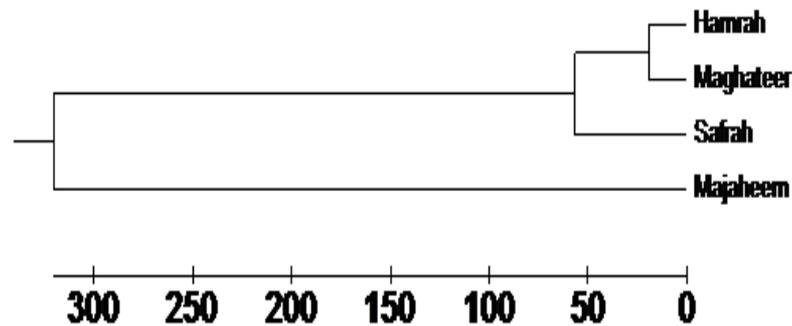
*Average Squared Canonical Correlation



RESULTS

The smallest evolutionary distance was observed between Hamrah and Maghateer and the largest distance between Safrah and Majaheem

This demonstrates that Safrah and Majaheem breeds presented the largest dissimilarity as evidenced by their multivariate means.



The neighbour-joining phenogram of the four camel breeds



Table 3. The significant correlation coefficients of different correlated variable between and within breeds.

Between Breeds	Within Breed			
	Hamrah	Maghateer	Majaheem	Safrah
Sltwt * EmptBy (0.96**)	Sltwt * EmptBy (0.96**)	Sltwt * EmptBy (0.99***)	Sltwt * EmptBy (0.97**) Sltwt *Htcarcass (0.93**)	Sltwt * EmptBy (0.94**)
Sltwt * Headwt 0.89*	Sltwt * HeadWt (0.89*)	Sltwt *Feed wt (0.88*)	Sltwt * NeckWt (0.90*)	EmptBy * RibEyAr (0.83*)
Sltwt * Moist 0.90*	Moist * Sltwt (0.90*)	Sltwt * HeadWt (0.83*)	EmptBy * Htcarcass (0.99**)	EmptBy * protein (0.91*)
EmptBy* Htcarcass 0.85*	EmptBy * Htcarcass (0.85*)	Sltwt * protein (-0.88*)	EmptBy * Neckwt (0.91*)	Htcarcass*Dress (0.930**)
EmptBy* Headwt 0.89*	EmptBy * Headwt (0.89*)	Sltwt * L (0.815*)	Htcarcass*Neckwt (0.90*)	Htcarcass*protein (0.84*)
EmptBy*Moist 0.86*	EmptBy * Moist (0.86*)	EmptBy * Feetwt (-0.88*)	Htcarcass*Shear (-084*)	Htcarcass*share (0.85*)
Htcarcass* Headwt 0.90*	EmptBy * Headwt (0.85*)	EmptBy * Headwt (0.85*)	NeckWt*Feetwt (0.82*)	
Neckwt*b -0.88*	EmptBy * Moist (0.86*)	EmptBy* protein (-0.86*)	PH*L (0.84*)	
RibEyeAr* MFI -0.95**	Htcarcass*Head wt (0.91*)	Htcarcass*Head wt (0.84*)	PH*b (0.85*)	
	NeckWt*b (-0.88*)	Htcarcass*Head wt (0.84*)		
	RibEyAr*MFI (-0.95**)	Htcarcass*protein (-0.86*)		
	Shear *PH (0.89*)	Htcarcass*FiberAr (0.96**)		
		FeetWt*protein -0.82*		
		HeadWt*protein -0.83*		
		Moist*b -0.95 **		
		Cookls*FibAr -0.95**		



CONCLUSION

- Inclusion of the meat variables for breed differentiation might encourage owners for breeding in favor of either meat, milk or both.
- The productivity type of the camel breeds of KSA needs further morphology and genetic studies.
- It would be better to leave the door open whether the KSA camel breeds are meat, milk producers or dual purpose.
- Lastly, this study demonstrates the viability of canonical discriminant analysis to evaluate meat variables, discriminating and classifying Camels.





At the end, the controversial question remains:

Do we raise Camels? Or Do Camels raise us up?

