Dedication

To:

My father*Abusara,*

My mother*Nayla with her love and continuous*

Support remained for me as unlimited

Source of encouragement.

My husband*Awadalla*

For his understanding

during this investigation.

My doughter *Hatton and* ***My son****Ahamed*

For their love

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ABSTRACT OF THESIS

The objectives of the current study were the characterization of some Sudanese dairy cattle types mainly Kenana and Butana (on farm and molecular characterization) and their dairy production systems, adopted management practices, breeding objectives and constraints of dairy development in Sudan. A structured questionnaire was administered to 101 Kenana and Butana owners randomly selected from the homelands of both breeds. Personal interviews and repeated field visits were conducted. The average herd size of Kenana and Butana cattle was 10 and 6 animals, respectively.Kenana and Butana farmers adopteddifferent management systems. The traditional nomadic system was more prevalent in Kenana area (98%), while all Butana owners used a transhumant system (100%). Kenana and Butana cattle are kept in a mixed crop- livestock production system and livestock species kept by farmers comprise cattle, sheep and goats. Cattle are the dominant species, mainly used for draught power followed by milk production. The purpose of keeping cattle in the study area was to generate income from the sale of milk which was the main source of income for herders in the Kenana area (100%) and up to 50% of Butana owners. However, surplus milk is sold at farm gate to middlemen at low prices, and animals are sold live in the village or nearest markets. The general appearance and body conformation were the criteria for selection of

breeding bulls used by both Kenana and Butana owners (72% and 80.4%, respectively). Disease prevalence was important in both production systems and almost all farmers in both areas reported incidences of diseases. Trypanosomosis were the main problems reported by Kenana herders (61.8%) while Butanan owners complained mainly of ticks. Veterinary services in the country at large have declined in recent years and in some areas have witnessed a degree of collapse. The two breeds were also characterised by genotyping the *diacylglycerol acyltransferase1* (*DGAT1*) gene.In both breeds, the *DGAT1* Lysine variant (232K) that is associated with high fat and protein content as well as high fat yield in other breeds was the most frequent allele.The frequencies of the 232K allele were 96.3% and 84.6% in Kenana and Butana breeds, respectively. At the *DGAT1* promoter VNTR locus, four alleles containing four to seven repeats of the 18 bp motif were found in both breeds. The most frequent allele was the VNTR allele 3 containing five repeats with a frequency of 60.4 % and 57.5 % in Kenana and Butana breeds, respectively. In conclusion, the two examined Sudanese dairy cattle breeds do not differ in allele frequencies at the *DGAT1* locus.

ملخص البحث

الهدف من الدراسة الحالية ، التوصيف (داخل الحقل والمعمل _التوصيف الجزيئي) لـبعض أنواع الابقار الحلوب السودانية (كنانة وبطانة) ، بالاضافة لمعرفـة أنظمـة أنتـاج الالبـان والممارسات الادارية التي تم اتباعها ، و أهداف التربية والمعوقات لنظم انتاج الالبـان فـي السودان . تم عمل (101) استيان منظم لاصحاب ماشية (كنانة وبطانة) تم إختيارهم عشوائياً من مناطقهم الاصلية . اوضحت الدراسة ان متوسط حجم القطيع من ابقار (كنانـة وبطانـة) 6- 10 حيوان في المتوسط على التوالي . كما ان نظام التربية المتبع مختلف في كـل مـن المنطقتين (كنانة وبطانة) حيث يتم اتباع النظام الرعوي التقليدي (98%) فى كنانة فى حـين بتم ممارسة النظام شبه الحديث في أبقار بطانة بنسبة (100%) كما يتم اتباع نظـام الانتـاج الحيواني المختلط في كل من المنطقتين في تربية ورعاية الابقار والاغنام والمـاعز. الابقـار هي اكثر انواع الماشية السائدة وتستخدم أساساً لانتاج الالبان ، والغرض الاساسي مـن حفـظ الابقار في منطقة الدراسة هو العائد المادي من بيع اللبن الذي هو المصدر الاساسي للـدخل عند مربي الابقار فى (كنانة وبطانة) 100% الى 50% علـى التـوالى بالاضـافة الـى ان الفائض من اللبن يتم بيعه للوسطاء باسعار منخفضة كما تباع الحيوانات الحية فـي القريـة أو الاسواق القريبة . بتم إختيار ثيران التربية التى يتم إستخدامها من قبل المربين (كنانة وبطانـة) على أساس المظهر الخارجي العام والشكل بنسبة 72 %- 80.4% على التوالي . انتشـار الامراض هو احد المشاكل الهامة المؤثرة على نظام الانتاج للمزارعين في (كنانة وبطانة) . حيث تمثل التربانسوما المرض الرئيسي المؤثر على الانتاج عند مربي كنانة (61.8%) بينمـا يعتبر القراد هو المؤثر الرئيسي للانتاج عند مربي بطانـة . وعمومـاً تراجعـت الخـدمات البيطرية فى السنوات الاخيرة وفى بعض المناطق شهدت درجة مـن الانهيـار . كمـا تـم النوصيف الجزيئي للجين DGAT1 للسلالتين. أوضحت الدراسة أن الطفرة (232K لايسـين) ذات علاقة بزيادة الدهن ومحتوى البروتين وكذلك انتاجية الدهون ، وهـي تتكـرر بنسـبة 96.3% - 84.6% فى كل من ابقار (كنانة وبطانة) علـى التـوالي. أمـا الطفـرة الثانيـة (VNTR) الموجودة فى الجزء المحفز من الجين وعند التحليل المعملي تم العثور على أربعة أليلات تحتوي على 4-7 تكرارات ابتداءاً من 18 زوج قاعدي موجودة في كل من السـلالتين (كنانة وبطانة) والأليل الاكثر تكراراً هو أليل 3 الذي يحتوي على 5 تكرارات فهو موجـود بنسبة 60.4% - 57.5% فى (كنانة وبطانة) على التوالي. وختاماً نجد ان سلالات الابقـار

الحلوب السودانية (كنانة وبطانة) لا تختلف عن بعضها فى تكرارات الأليل بالنسبة للجين DGAT1 .