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SPECIES IDENTIFICATION OF INTERNAL ORGANS USING ANTISERA TO THERMOSTABLE MUSCLE ANTIGENS.

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SUMMARY

Thermostable organ antigens (TOA) were extracted from the liver, heart and kidney of 5 wild and 2 domestic animals. Identification of the species of origin of the TOA was successfully done using goat antisera to thermostable muscle antigens (TMA) in immunodiffusion tests. When tested against the homologous TOA, the species-specific TMA was shown to exist as:

i) cross-reacting antigen present in the serum of homologous species and in heterologous TMA.

ii) species-restricted antigen found in muscles and organs.

iii) striated muscle specific antigen restricted to heart and skeletal muscles.

iv) tissue specific antigen found in skeletal muscle only.

Antisera to thermostable muscle antigens are useful for species identification not only for fresh, cooked and autoclaved meat, but also for internal organs.

INTRODUCTION:

Identification of fresh meat has been achieved using immunodiffusion tests[1-2] and enzyme immunoassay[3-4]. Identification of cooked or heat treated meat has proved to be more difficult presumably because of the denaturation of heat labile species specific epitopes. Speciation of heat treated meat is therefore dependent upon heat stable antigens which have retained properties unique to the species. Such antigens have been found in muscles and have been used for species identification of both fresh, cooked and canned meats in immunodiffusion tests using antisera to thermostable muscle antigens[5-6]. This paper describes the use of goat antisera to thermostable muscle antigens to identify the species of origin of internal organs (liver, heart and kidney) from 5 wild and 2 domestic animal species.

MATERIALS AND METHODS:

Thermostable muscle antigens (TMA) and thermostable organ antigens (TOA) of cattle *(Bos indicus)*, kongoni *(Alcelaphus buselaphus cokii)*, wildebeest *(Connochaetes taurinus)*, eland *(Taurotragus oryx)*, pig *(Suus serofta domestica)*, Thomson's gazelle *(Gazella thomsoni)*, and Grant's gazelle *(Gazella granti)* were extracted from the muscle, liver, heart and kidney using the method described by Kang'ethe *et al*[5-6].

Antisera to TMA were raised in goats and were absorbed with serum proteins copolymerized according to the ethylchloroformate method of Avrameas and Ternynck[7].

The microtechnique of Ouchterlony's double diffusion method as described by Crowle[8] was used employing 1% purified Oxoid Agar (Oxoid Ltd., England). The slides were stained with Coomassie Brilliant Blue and destained until the background was clear (Axelsen *et al*[9]).

RESULTS AND DISCUSSION:

Goat antisera to TMA of cattle, pig, eland and wildebeest reacted only with their homologous TOA (Table 1). Goat antiserum to TMA of kongoni reacted with TOA of wildebeest, while goat antiserum to TMA of wildebeest did not react with TOA of kongoni. Goat antiserum to TMA of Grant's gazelle and Thomson's gazelle reacted with TOA of both these species.

Unabsorbed goat antiserum to TMA of kongoni reacted with kongoni TMA, kongoni serum and TMA of Thomson's gazelle (Fig. 1). Goat antiserum to TMA of kongoni reacted with its homologous TMA and serum giving a reaction of identity. The same antiserum reacted with TMA of Thomson's gazelle giving a reaction of identity with the same precipitin line given by kongoni serum. This shows that kongoni serum shares some antigenic determinants with TMA of kongoni and that these determinants are similar or identical to those present in heterologous TMA.

Figure 2 shows the results of immunodiffusion tests using absorbed goat antiserum to TMA of cattle and its homologous TMA and TOA. The results show that there exists:

i) a species restricted antigen, common to liver, kidney, heart and muscles.

ii) a striated muscle specific antigen, found in the heart and skeletal muscles and

iii) a tissue specific antigen, found only in the skeletal muscles.

This study has shown that TMA preparations contain at least 4 different antigenic components and that antisera to TMA can be used to reliably identify the species of origin of liver, kidney and heart in addition to fresh, cooked and autoclaved meats.

Table 1. Identification of internal organs using antisera to TMA in immunodiffusion tests.

ORGAN	TOA of	Antisera to TMA of: Cattle	Pig	Eland	Wildebeest	Kongoni	Thomson's gazelle	Grant's gazelle
HEART	Cattle	+	-	-	-	-	-	-
	Pig	-	+	-	-	-	-	-
	Eland	-	-	+	-	-	-	-
	Wildebeest	-	-	-	+	-	-	-
	Kongoni	-	-	-	+	+	-	-
	Thomson's gazelle	-	-	-	-	-	+	+
	Grant's gazelle	-	-	-	-	-	+	+
KIDNEY	Cattle	+	-	-	-	-	-	-
	Pig	-	+	-	-	-	-	-
	Eland	-	-	+	-	-	-	-
	Wildebeest	-	-	-	+	-	-	-
	Kongoni	-	-	-	+	+	-	-
	Thomson's gazelle	-	-	-	-	-	+	+
	Grant's gazelle	-	-	-	-	-	+	+
LIVER	Cattle	+	-	-	-	-	-	-
	Pig	-	+	-	-	-	-	-
	Eland	-	-	+	-	-	-	-
	Wildebeest	-	-	-	+	-	-	-
	Kongoni	-	-	-	+	+	-	-
	Thomson's gazelle	-	-	-	-	-	+	+
	Grant's gazelle	-	-	-	-	-	+	+

Key + = reaction of identity
- = no reaction

Figure 1.

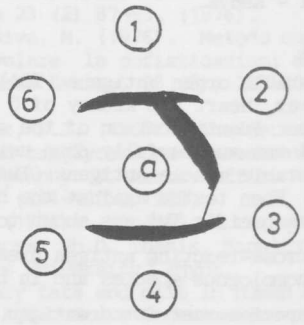

Figure 1.
Results of immunodiffusion test using unabsorbed goat antiserum to TMA of kongoni and TMA of other species and kongoni serum. a = unabsorbed goat antiserum to TMA of kongoni, 1 = Kongoni TMA, 2 = Kongoni serum, 3 = Thomson's gazelle TMA, 4 = Kongoni TMA, 5 = Grant's gazelle TMA, 6 = Goat TMA.

Figure 2.

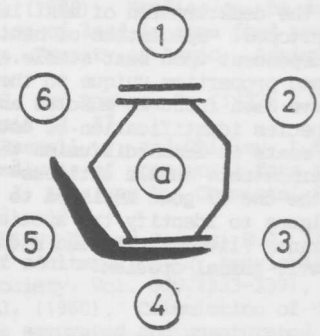

Figure 2.
Results of immunodiffusion test using goat antiserum to TMA of cattle absorbed with Copolymerized serum proteins and TMA and TOA of cattle liver, kidney, heart and lung. a = absorbed goat antiserum to TMA of cattle, 1 = Cattle TMA, 2 = Cattle liver TOA, 3 = Cattle kidney TOA, 4 = Cattle TMA 5 = Cattle heart TOA 6 = Cattle lung TOA.

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RELATIONSHIP BETWEEN SKATOLE CONCENTRATION IN BACKFAT OF GILTS AND ENTIRE MALE PIGS FROM THE SAME HERDES

CANCELLED

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