DEPARTMENT OF VETERINARY MICROBIOLOGY AND BIOTECHNOLOGY
COLLEGE OF VETERINARY AND ANIMAL SCIENCE
RAJASTHAN UNIVERSITY OF VETERINARY AND ANIMAL SCIENCES, BIKANER

SUCCESS STORY OF KAMDHENU-RKVY PROJECT

1. **Title of the Project: "State level breed confirmation (DNA fingerprinting) Centre"**
2. **Theme Identification/subject identification:** the theme of the project relates to DNA finger printing of the indigenous cattle of Rajasthan namely, Rathi, Tharparkar, Gir and Kankrej with an aim for their conservation.

3. **Situation/background:**

   i. Backdrop (genesis):

   Genetic characterization of breeds using molecular markers provide information relevant for conservation making decisions for livestock populations. Breed distinctiveness by microsatellite markers calls for variation in allele frequencies between test breeds.Owing to declining population of Rathi,Tharparkar, Gir and Kankrej Cattle in Rajasthan genetic characterization and diversity study using molecular markers is required.

   ii. Objectives:

   1- to establish "State level breed confirmation (DNA fingerprinting) Centre"
   2- to identify superior germ plasm of Rathi, tharparkar, Kankrej, and Gir breeds of indigenous cattle using DNA fingerprinting technique
   3- to establish morphological attribute of the chromosome of Rathi, Tharparkar, Kankrej and Gir breeds of indigenous cattle
   4- fingerprinting of available Rathi, Tharparkar, Kankrej, and Gir breeds of indigenous cattle through DNA marker
   5- to identify microsatellite markers specific to particular Rathi, Tharparkar, Kankrej and Gir breeds of indigenous cattle
   6- to carry out chromosomal analysis and karyotyping of bulls

4. **Programme Activities**
   1. DNA fingerprinting centre was established in the Department of Vet Microbiology & Biotechnology
   2. Microsatellite typing was undertaken.
   3. Animals of different breeds of indigenous cattle breeds were selected.
   4. DNA finger printing of selected animals was undertaken.

   Identification of goals

   5. To develop breed characterization protocol based on DNA fingerprinting using PCR technology

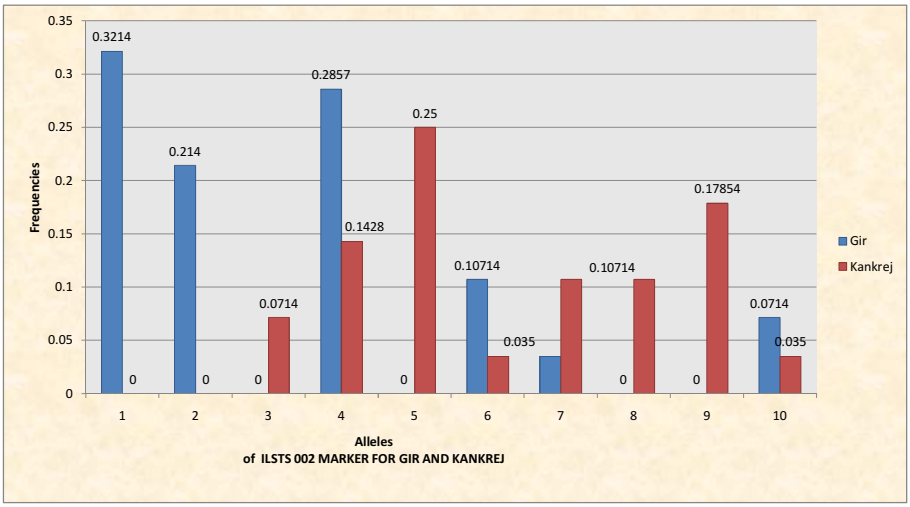
6. To develop standard breed specific profiles so that purity of any breed Rathi, Tharparkar, Gir and Kankrej can be identified.
7. To identify production and performance related markers through these techniques.

5. **Results/outcomes**

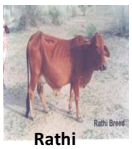
Important outcomes achieved

1. The DNA finger printing centre has been established in the Department of Veterinary Microbiology & Biotechnology
2. Microsatellite markers for DNA fingerprinting of indigenous cattle have been selected and used for studying genetic diversity in the cattle breeds of the State.
3. Microsatellite markers not present in some cattle breeds have been identified in select group of animals.
4. Rathi breed of cattle have been found to have maximum heterozygocity on the basis of presence of microsatellite markers.
5. verall Polymorphism information content and the HW values (0.9937 and 0.9937) of Rathi breed are highest tested with six microsatellite markers indicating greater genetic diversity.
6. Overall Polymorphism information content and HW values (0.989 and 0.9891) are minimum for the Tharparkarbreed tested with six microsatellite markers which suggest minimum heterozygocity amongst the four breeds.
7. Gir breed was the most distinct from the other three breeds. Genetic distance was least (1.320) between Rathi and Kankrej and highest between Gir and Kankrej (3.211).

Frequency distribution of various ILSTS 002 alleles in Gir and Kankrej cattle breeds



DNA FINGERPRINTING OF INDIGENIOUS BREEDS OF RAJASTHAN


Rathi


Tharparker


Gir

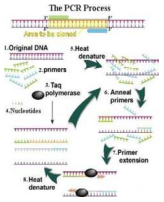

Kankrej


BLOOD

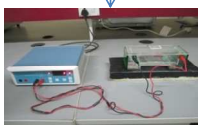

Rapid salt extraction method for DNA isolation

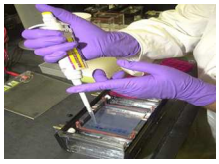

Isolated DNA in eppendroff tube

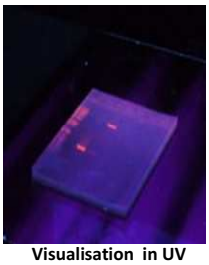

Microsatellite marker



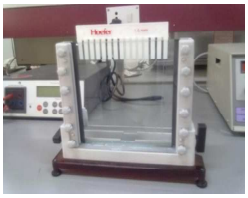

Thermocycler

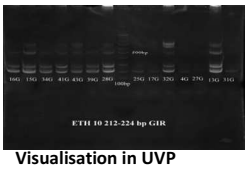

Agarose gel electrophoesis unit


Loading of pcr amplified samples


Visualisation in UV transilluminator


PCR amplified product for PAGE


Polyacrylamide gel electrophoresis



Visualisation in UVP