

CURRENT STATE OF BIOTECHNOLOGY IN TANZANIA

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ABSTRACT

Modern biotechnology in Tanzania is still in its infancy. Progress has been limited because of lack of appropriate research policy, as well as economic and technological constraints. However, commercialisation of biofertilizers is already in place and current efforts are geared at developing recombinant DNA technology for vaccine production, embryo transfer and pharmaceuticals.

Key Words: Biofertilizers, commercialisation, rDNA, vaccine

RÉSUMÉ

En Tanzanie, la biotechnologie moderne est encore à un état embryonnaire. Les progrès ont été limités à cause du manque de politique appropriée de recherche, et de contraintes économiques et technologiques. Toutefois, la commercialisation d'engrais biologiques est déjà en place et des efforts actuels sont adaptés de façon à développer la technologie de recombinant DNA pour la production du vaccin, le transfert d'embryon et de produits pharmaceutiques.

Mots Clés: Engrais biologiques, commercialisation, rDNA, vaccin

STATE OF BIOTECHNOLOGY IN TANZANIA

As in many developing countries, modern biotechnology in Tanzania is still in its infancy. Although certain infrastructures exist which could support substantial biotechnology research (Table 1), there are economic and technological constraints. There is also a lack of appropriate research policy. Consequently, commercialisation of biotechnology is still premature. The discoveries in developed countries offer an opportunity to revolutionise traditional agriculture and animal production systems in Tanzania. Through biotechnology, the heavy investments required in

agricultural production, like fertilizers, pesticides, veterinary drugs, etc. could be minimised (Alvarez-Morales, 1995).

Tanzania has the largest ruminant population in Africa but all its domesticated animals are concentrated in only 40% of the grazing land, the rest being heavily infested with tsetse fly. The discovery of recombinant vaccines offers great opportunities; by using one vector and inserting the genes coding for the immunogenic antigens of several virulent agents which in return, reduces the cost of running several vaccination campaigns to control multiple diseases.

The Ministry of Science and Technology

TABLE 1. Institutional infrastructure to support biotechnology research in Tanzania

Ministry	Institution	Research Centre	Areas of Research
Agriculture	Animal Disease Research Institute (ADRI)	Temeke, Dar-es-Salaam	Diagnostic vaccine production, Animal disease control
	Livestock & Pasture Research Institutes	Mpwapwa	Animal breeding & production Pasture seeds
		West Kilimanjaro Majiya-Mwanza	Animal breeding & production
	Uyole Agriculture Research Institute	Mbeya	Crop production, Animal production and nutrition
	Tropical Pesticide Research Institute (TPRI)	Arusha	Pesticides, Plant genetic resource
Science and Technology	Horticulture Research & Training Institute (HORTI)	Arusha Tengeru	Fruits, Vegetables, Flowers
	Commission for Science and Technology	Dar-es-Salaam	Coordination, Policy, Funding
	University of Dar-es-Salaam	Microbiology	Bio fertilizers, Tissue cultures
	Muhimbili Medical Centre		Biochemicals, Traditional medicine Microbiology, Immunology etc.
	Sokoine University of Agriculture	Faculty of Agriculture, Forestry, Animal Science, Veterinary	Tissue culture, Recombinant DNA, Bio fertilizers etc

coordinates research in Tanzania but still lacks a national research policy with clear research priority areas. However, Sokoine University of Agriculture has been able to produce a commercial biofertilizer *NITROSUA*, containing rhizobium bacteria, for soybeans, cowpeas, green gram, groundnuts and *Crotalaria onchroleuca* (Marejea). There is also on-going research by other agencies to develop bio-fertilizers for paddy and to develop microbial insect control agents.

The Muhimbili Medical Centre envisages research on secondary metabolites, hybrids for

monoclonal antibodies production, vaccine production, pharmaceuticals, tissue culture and rDNA technology with the objective of offering diagnostic facilities for other branches of medicine. The major constraint is finance and expertise on rDNA technology. The Sokoine University of Agriculture also requires assistance for establishment of rDNA technology facilities for research in developing recombinant thermal stable vaccines, monoclonal antibody production for diagnosis, and embryo transfer technology for improvement of animal genetic resources.

Collaborative work between the Commission of Science and Technology and research institutes has identified the following biotechnology research programs for Tanzania: application of *in vitro* tissue cultures for the micro propagation of plants use of *in vitro* tissue cultures in conservation and exchange of plant genetic resources biological control of major pests through biopesticides and bio-insecticides development and application of improved strains of micro-organisms for food processing production of therapeutic agents, purification of water, mining, waste degradation, and nitrogen fixation; identification and development of useful genetic material for improvement of productivity of animal resources; and production of renewable energy through bio-foods and bio-alcohol.

BIOSAFETY REGULATIONS

Modern biotechnology being in its infancy in Tanzania, has no existing legislation that prescribes

its safe use. However, some legislation exists to control the introduction of new plant seeds or biological products, but none is specific on genetically modified organisms or on products containing copy genes of either plants or animals.

There are already biotechnologically manufactured products in the country and some private companies are already producing seeds and carrying out tissue cell culture. There is, therefore, a need for effective regulatory schemes to control the use of biotechnology so as to safeguard the public and the environment. As such, Tanzania is reviewing its existing laws to incorporate biosafety regulations.

REFERENCE

- Alvarez-Morales, A. 1995. Implementation of biosafety regulations in a developing country: The case of Mexico. *African Crop Science Journal* 3:309-314.

