

AN INDIGENOUS PERSPECTIVE ON BIOTECHNOLOGY IN NEW ZEALAND: A MAORI SCIENTIST PERSPECTIVE

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Biotechnology has received much attention, both within New Zealand and globally. An important area where this debate has been neglected in New Zealand has been the interface of Tikanga Maori (Maori customs and traditions) and science. There is much debate on the importance of understanding indigenous perspectives towards science in general, and biotechnology specifically. However, little research beyond theoretical implications has been conducted. This paper explores this interface by interviewing 12 Maori scientists involved in biotechnology research. This paper seeks to answer the question of *how does biotechnology fit in the Maori world?* Using discourse analysis, we find that Maori scientists have strong cultural links between themselves, their research, and Maori. Further, this relationship is symbiotic in nature, with each side nurturing and guiding the other. However, Tikanga Maori does place some major obstacles to the full integration of Maori culture and biotechnology. Nevertheless, there is an open willingness by Maori to reduce their 'cultural concerns' if there are benefits for their people. These benefits are more focused on health than wealth though, with a consensus that cultural concerns can be overlooked if health benefits are possible.

Keywords: *biotechnology, Maori, Scientist, indigenous perspectives*

INTRODUCTION

The science of biotechnology has grown in recent years, and with this growth comes an expansion of the areas within which this science is applied. Nowhere is potentially more hazardous or of concern than when the latest technology interacts with indigenous cultures. The following paper explores the

role of biotechnology amongst practitioners who are also of the indigenous people of New Zealand: Maori. Maori, similarly with other indigenous peoples around the world, hold special relationships with growing organisms and the earth. Consequently, the impact of biotechnology on Maori culture and beliefs is of importance to researchers and societies globally, as lessons from New Zealand may be applicable for the wider global community. The present study establishes the role of biotechnology and the indigenous Maori of New Zealand, and explores the attitudes and research behaviours of scientists who are Maori. The paper seeks to understand *how biotechnology fit in the Maori world?*

BIOTECHNOLOGY

Biotechnology has many wide-ranging definitions. Hobbelink (1991) defined biotechnology as any technique that utilizes living organisms to create, modify, or improve products, plants, and animals, or to develop micro-organisms for specific purposes. By this definition, biotechnology encompasses practices that are as old as humankind: ancient farmers and indigenous people have been cross-pollinating plants and crossbreeding animals for centuries. Indigenous biotechnologies around the world include fermentation technology to make wine, and other preparations. Today, biotechnology is more associated with modern technologies, particularly genetic modifications (GM). This method for altering the genetic composition of cells and organisms can be used to alter or mix the characteristics or traits of a micro-organism, plant or animal. Developed in the 1970s, GM's ability to transfer genetic material between life forms still has the potential to expand through the refinement and development of the technology. While biotechnology is often readily associated with GM, the present study this research interprets biotechnology in broad form to mean a "range of techniques for modifying life forms for various practical uses which encompasses, but is not limited to, GM" (Cook & Fairweather, 2005, p.1).

INDIGENOUS/MAORI KNOWLEDGE

Ellen and Harris (2000) delineated the characteristics of indigenous knowledge into eight categories. These are: (1) local (embedded within a particular place); (2) orally transmitted (passed on through repetition, demonstration & imitation); (3) a result of interactions in every day life; (4) has no

organized theoretical framework; (5) redundant in order to serve retention; (6) constantly changing; (7) shared through the community; (8) integrated holistically. As such, indigenous knowledge is the local knowledge that is unique to a culture or society, and this knowledge is passed on from generation to generation, usually by word of mouth and cultural rituals, and has been the basis for agriculture, food preparation, health care, education, conservation and the wide range of other activities that sustain a society. Indigenous people have a vast knowledge of the eco-systems in which they live and of ways of using natural resources sustainably. Today, some suggest there is a risk of this knowledge being lost and with it valuable knowledge about ways of living sustainably (Gough, 2005). This categorisation of indigenous knowledge fits well with Maori, as does the fears for loss of knowledge.

INDIGENOUS/MAORI AND NATURE

Durie (2004) asserted that Maori and other indigenous people believe that amongst other things their relationship and sense of unity with the environment is a fundamental aspect of their identity, and defining who they are. This is evidenced by their relationship with land, forests, waterways, ocean and air. Consequently, nature in a wide all-encompassing definition is seen as being 'sacred' to Maori, and attempts to genetically modify these resources has serious cultural implications. For example, Deloria (1994) stated "most tribes were very reluctant to surrender their homelands to the whites because they knew that their ancestors were spiritually linked to the land" (p. 172-173). This highlights the importance of natural resources, and their perspective of being collective and intergenerational. Jones and Hunter (2004, p. 4) noted that the land is instilled with strong meaning for Maori, stating

A spiritual association that reflected Maori knowledge and devotion to land stewardship. The spiritual meaning of Indigenous knowledge is associated with the intertwining of the boundaries of land, tribe and self. It is understandable what effect the competition for land had on Maori identity as dispersal of land became equal to the disassociation of tribes from their ancestral origins. Loss of land, eventually up to 95%, was equivalent to the psychological alienation from identity, much like amnesia due to trauma.

Walker (1989) noted that for Maori, their tribal location and significant tribal markers such as mountains and rivers became an intrinsic part of their identity. Maori people maintained respectful and

spiritual connections with the land and the earth's natural resources, and their identity was intimately associated with the location of tribal boundaries, and therefore with the land. This highlights the fundamental importance that the land and nature has on Maori identity and ideology.

INDIGENOUS/MAORI AND SCIENCE

Durie (2004) asserted that indigenous knowledge couldn't be validated by science and neither can science be assessed according to the precepts of indigenous knowledge. This is because each are built on distinctive methodologies. Durie (2004) noted that science has at times been accused of intolerance towards other persuasions, especially those such as indigenous knowledge that cannot be validated according to a set criterion to assure validity. He warns that indigenous knowledge, though not ascribing to scientific principles, still runs the risk of being rationalized according to these principles with the knowledge then becoming meaningless as it is then out of context. For example, Maori have often dismissed science as a legitimate knowledge base due to its inability to explain spiritual phenomena (Durie, 2004), highlighting the odds with the way science and Maori view nature. Similarly, Kawagley (1998) questioned if science was an invention of European thought, and wondered whether scientific bodies of knowledge have emerged in other cultures. Clearly, when seeking to explore one paradigm (science) with another (Maori), there are risks associated with clarification and trust. This highlights the unique challenge of conducting scientific research on biotechnology with a Maori focus.

Kawagley (1998) noted that scientific hypotheses generally have their roots in observations and insights about the natural world, and hence laboratory science is raised as the true science, which diminishes the validity of science that is derived from naturalistic observation and insight, and in so doing devalues those cultures that traditionally operate this way. Snivley and Corsogilia (2000) suggested the conflicts between indigenous and Western science is due to Western science being taught at the expense of traditional indigenous knowledge. Kawagley (1998) maintained that science was unlikely to have a single point of origin, and thus it is more likely it has a plurality of origins and practices. Consequently, the author suggested it is naïve to restrict the definition of science to

'laboratory science' only. However, Durie (2004) criticised the debate between science and indigenous knowledge noting that while both sides assume that one is more relevant than the other, such a polarized debate does little more than further entrench positions in defence rather than provide new insights. However, these relationships are not mutually exclusive, with Snivley and Corsogilia (2000) noting that indigenous cultures have made significant contributions to western science, and Fler (1999) noted that the foundations of western science have recently come into question, and that which was once perceived as context free and objective, is now being questioned.

Indigenous People and Biotechnology

Tauli-Corpuz (2000) identified that rather than one conclusive view on biotechnology; indigenous people have expressed a number of different views in regards to their position on biotechnology, both as an individual and as a collective. These authors note three opposing views towards biotechnology and indigenous cultures. (1) Developments in technology and science are inevitable, and if so then indigenous people should forge the best possible contracts in order to share benefits derived from the resources and make rules on access which are mutually beneficial. (2) There is nothing wrong with biotechnology and therefore, indigenous people should not be opposed to it. The problem doesn't lie with the actual science or technology but who has control over it. (3) Opposition towards the further development of biotechnology, with a strong protest against the manipulation of life forms. Tauli-Corpuz (2000) noted that most indigenous people support this third position, and while they are not alone in taking this position, they are often accused of being anti-progress.

Tauli-Corpuz (2000) noted that indigenous people have experiences beyond most Western people, for example experiencing colonization, having their community militarized to allow for government appropriation of lands and resources in the name of development and progress. Hence, Tauli-Corpuz (2000) asserted that indigenous people are now seeking to assert their rights to have control over their bodies, territories, resources, knowledge, and cultures. Clearly, the relationship between biotechnology and indigenous people is a complex one, and in need of exploration into how indigenous culture and biotechnology might be able to influence each other.

NEW ZEALAND AND BIOTECHNOLOGY

Durie (2004) points out that it is crucial for Maori researchers to apply the methods and values of both systems in order to gain a better understanding of Maori, noting an increasing number of indigenous researchers who utilize the interface between science and indigenous knowledge as a source of inventiveness. He stated these researchers have access to, as well as an understanding of, both systems, and often use one to complement the other. This allows for research that shifts from proving the relevance of one over the other, to identifying opportunities arising out of combining both (Durie, 2004). Cram, Phillips, Tipene-Matua, Parsons, and Taupo (2004) stated that Maori are not anti-science, and rather view embracing science in order to help them fulfil their goals for their people and the environment. As such, we might expect to see Maori researchers involved not only in biotechnology, but also on the cutting edge of where science and culture's interact.

Fletcher (2005) suggested that the emergence of GM as a salient issue coincided with significant changes in New Zealand society, politically and particularly with the relationship between Maori and Pakeha (western colonisers). During this period, Maori were engaged in the ongoing process of land claims and customary rights to environmental resources, and monetary reparations. This was particularly relevant when it came to the GM Food issue, in that Maori could possibly bring claims against the Government if genetic modification conflicts with customary rights over flora and fauna (Fletcher, 2005). Cram et al. (2004) cited a major New Zealand agriculture submission to the New Zealand government in an application to field test a GM organism. The applicant stated "We take it for granted that everything in our environment is unique and in balance. Everything possesses mauri or a life force and is to be respected. Because everything is interrelated and inter-connected, a mutilation, modification or unnatural desecration of any part affects the whole" (p. 15).

Cook and Fairweather (2005) identified specific concerns in New Zealand regarding GM, particularly interesting was peoples familiarity with biotechnology was unrelated to their acceptance of, or general attitude towards, biotechnology. Importantly, the research established sound evidence of links between

perceptions of biotechnology and attitudes towards nature, post materialist values, and spiritual beliefs. These beliefs are very similar to those associated with Maori, further clarifying that 'indigenous' perspectives on biotechnology are not necessarily about anti-progress, but rather central to a cultures belief system. In their studies on the philosophy of attitudes, Eagley and Chaiken (1998) described this form of attitude strength as 'inter-attitudinal' strength in that it is highly linked to other attitudes and values, and this makes the attitude resistant to change as it is embedded in broader values and attitudes. Clearly, to change Maori perspectives towards biotechnology may be challenging *unless* the research is done in alignment with values towards nature, spiritual beliefs and mauri (life force).

RESEARCH QUESTION

Recently, Maori have challenged western thinking about science, and examples of this are the issues regarding whakapapa (genealogy) and genetic engineering, and indigenous approaches to sustainable management when managing for biodiversity (Waiti & Hipkins, 2002). Waiti and Hipkins (2002) asserted that due to these challenges to western thinking, it is now important for all scientists to have an understanding of Maori cultural values. However, there is little information available regarding Maori cultural values and biotechnology from a scientific perspective. The present study seeks to address this gap, by determining the role that Maori tikanga (culture and traditions) has on biotechnology research. In support, Barnhardt and Kawagley (1998) noted that native knowledge systems remain intact and in practice by indigenous people, and further, there is a growing appreciation of the contributions that indigenous knowledge can make in areas such as medicine, resource management, biology and human behaviour. From the issues highlighted above, I draw the major research question of *how does biotechnology fit in the Maori world?*

THE STUDY

The present study is based on in-depth qualitative interviews with 12 Maori scientists. While the majority of scientists were involved in pure research, three held some administrative or managerial aspects towards biotechnology, but these were all past-scientists with scientific experiences with which to draw upon. This research follows Durie's (2004) call for Maori researchers to apply the

methods and values of western and Maori systems in order to understand Maori. Therefore, a kaupapa Maori research methodology (Smith, 1999) was followed, where the research followed established Maori customs and procedures to ensure the validity of the cultural exchange. Interviews took approximately one hour, and were recorded and later transcribed. It was felt the most viable approach to the discursive study of Maori scientists in biotechnology was through narratives (Reissman, 1993). Brown (1990) suggested that gathering and interpreting narratives can serve as an opportunity for uncovering values, and this should readily apply towards indigenous scientists. Many authors note that narratives are the fundamental organizing instrument through which humans perceive the world (Fisher, 1984; Ward, 1985), and thus would be appropriate for understanding how Maori scientists perceive their cultural involvement in biotechnology. Narratives have been credited with giving order and meaning to social structures (Bennett, 1978); suggesting how people may act (Brown, 1990; Kirkwood, 1992; Kreps, 1990); and advocating specific actions (Meyer, 1997). Narrative studies have also been useful in illuminating employees' behaviour (Tompkins & Cheney, 1983), and emphasising differences to a social structure (Mumby, 1987).

FINDINGS

Personal Views on Biotechnology

Some of the scientists interviewed presented their own view on biotechnology, and in some instances this is in contrast to the view of their organisation. This suggests that in some instances the work that they are required to undertake is at odds with their own beliefs as well as that of the wider hapu and iwi. For example, *"I accept the use of biotechnology for helping our people, for example with insulin. I don't have an issue with the product of insulin, but with new organisms there needs to be tight controls over it, they need to be contained in a laboratory environment", and "I am against genetic engineering because of who is funding it and what their purposes are, and things like the suicide gene is pretty stuffed up"*.

Cultural Links. The scientists interviewed identified links that they had to their iwi and whanau groups that helped make them more aware of what the Maori stance is on the work that they are

undertaking. These links helped them be more in touch and sensitive to the impacts on Maori. One Scientist talked about how his personal experiences with his iwi and their feelings of being left out of science-cultural discussions, led them to form a working party at their workplace, which involved local hapu and iwi. This facilitated a greater level of cultural awareness by the scientist's firm and scientific awareness by the hapu/iwi. They noted "*without me driving this idea from the inside, this just wouldn't have happened. It was frustrating at the start, but has become really worthwhile now*". A few of the scientists interviewed work with their iwi in an official capacity, such as a board member or a consultant to the iwi on different issues. Others maintain more informal connections to their marae and iwi. One scientist maintained multiple connections, with not only their own iwi but also other iwi groups around the country. Overall, most of the Maori scientists played an important role in disseminating knowledge to their hapu and iwi, as well as being a conduit for hapu/iwi concerns to be relayed back into the science domain.

Tikanga and Science

All of the participants commented on the interface between tikanga and science. Though all acknowledge that there is some clash, they felt that there are some risks to tikanga that are acceptable given some of the benefits to Maori that are available through the use of biotechnology science. The major benefit relates to medicines and medical benefits. One of the main themes that arose is that tikanga is not fixed. As such, Maori are not fundamentalists who are unmovable, and that tikanga is flexible and adaptable to changing times. Overall, participants felt that if tikanga were fixed and unchanging, then many of the technologies that are currently enjoyed like computers, cameras or even tar-sealed roads, would be against tikanga Maori. The participant's comments on tikanga Maori and science acknowledged the common arguments such as mauri (life force) and matauranga (education) but often arrived at the same conclusion that if it means much needed health benefits to Maori then these risks to mauri are borne and thus acceptable.

For example, "*Understanding the science will go along way to alleviate the perceived clash between tikanga and science*", "*My tribe has set up a matrix outlining biotechnology and the extent to which different work will challenge and conflict with tikanga Maori in order to increase understanding*

around the issue. The discomfort is greater if you cross species, and even greater if you cross genes. From a science point of view, that is nonsense because the fundamental building blocks of living things are essentially the same so there is no great significance if you do cross species. From a science point of view it is perfectly acceptable to put human genes into bacteria for the production of insulin”, “Because biodiversity is not a Maori concept, it has been adopted by Maori. It’s not traditionally a Maori concept, but we had other ways, same thinking but from a different point of view, modern concepts that Maori can adopt but they aren’t Maori traditionally”, “At the end of the day Maori can say it is inappropriate in accordance to our culture and spiritual traditions, but still support it. Because that is what we do anyway! We transfer organs, we immunize our children, I mean tar sealed roads are probably not in accordance with our tikanga. It’s only a matter of time before someone says actually its fine from my cultural perspective from my tikanga, and that’s what happened, people say that tikanga is adaptable, our tikanga is suppose to be adaptable to new things, we are a progressive hapu so we support it”, and “It’s hard to give a blanket statement about what is or is not acceptable to Maori, different Maori have different priorities. Different Maori have different perspectives about what is against their tikanga”.

Benefits and Costs

Overall, respondents made strong reference to the medical and health benefits of biotechnology research. Overall, despite conflicts regarding tikanga, most respondents felt iwi groups stated that these conflicts would be borne if there is going to be health and medical benefits. This is in response to the poor health statistics that Maori have in New Zealand. However, economic benefits were not considered to be enough of a reason to overlook tikanga conflicts. The following quotes highlight these aspects. *“I don’t think that benefits is really a conversation that has been delved into deeply, because we have gone into the spiritual concerns and impacts, the environmental impacts as opposed to the benefits”, “When there are clear non-economic benefits then the stance is not so much of a blanket ‘no’”, “A very common discourse is that Maori will often object to biotechnology based on concerns around tikanga. However, many will acknowledge that although uncomfortable with the idea, they would be happy to use it when health benefits are apparent”, and “If you want to look at*

potential benefits, financial, health benefits for GE you have to provide a space for Maori to say honestly this is okay. Without others taking that and saying oh well its sweet, its open slather, and abusing that consent. And that's your key stumbling block: it's having protocols to protect iwi or hapu who want to engage in this technology without their consent being abused by scientists or researchers and corporate who say oh well they are doing it you know, so that's the key challenge".

Additional comments included "We don't know exactly what the traditional Maori perspective is of biotech. But our conclusions were that the actual potential benefits, medical benefits were the dominant view in terms of people saying, if it were my moko, I would do what it takes to find out what is wrong. A lot have said in the consultation process, if I used this technology with my father that has this disorder, and then I would absolutely go for it. So there were actually a strong supportive component of medical benefits", and "We focus on medical benefits in the workshops. Because the financial, the economic benefits, its almost really difficult to go there. What we've found is that it is really difficult to go there straight away. And that's the big mistake that some have made, they underestimated the community response when in the 1990's they went for western foods, processed foods and big money tickets. If they went for food that would have got rid of drought in Africa, or a medicine, if they had promoted a medicine that was going to be a biotechnological revolution, but instead they went for these round up ready crops and I think that was a huge mistake. I think that we needed to learn from that in the medical area but we haven't because there is essentially a mad rush to make as much money as you can as quickly as you can".

Commercialisation

Some participants noted that they viewed biotechnology as a high-risk industry to be involved in, with it requiring large start-up capital, and potentially expensive running costs. Iwi will generally employ fairly conservative financial strategies, as they need to be conservative in managing their funds – principally settlement claims. As such, biotechnology becomes further removed from Maori as the financial approach required is typically beyond most iwi. Hence, the high risk and high return approach of biotechnology makes this an area where iwi will be unlikely to operate in. Further, it

appeared that commercialisation of biotechnology and the politics associated with it are seen as being highly related. For example, *“It is all very money centred these days: you have got to meet your outcomes, you have got to meet your milestones, objectives, all those sorts of things. The science that you do have usually has an application and potential to be commercialised, and that’s the system that we operate in. I don’t agree in it, but it’s the best we have got”*. Some of the participants acknowledged that though there is economic value to be had from biotechnology, that this isn’t a great motivator to encourage Maori participation. They suggested that Maori would see this as an added benefit for Maori, but only after other benefits were gained, such as health benefits.

For example, *“Sometimes people don’t have the capacity to commercialise. A lot of time the science that I do with the communities is not about money, it’s about katiakitanga or rangatiratanga. But we should still not forget about the economic, because the fact is we [Maori] need money because that is how we are going to develop. So that is probably the most challenging part of doing science with Maori, is trying to get that across, and move in that kind of direction. But in saying that, it’s very rewarding when that happens”*.

DISCUSSION

This paper set out to explore indigenous (Maori) perceptions of biotechnology, in response to critics who argued that Maori have fundamental opinions that need to be explored (Durie, 2004). We find the characteristics of indigenous knowledge (Ellen & Harris, 2000) were supported, with Maori scientists opinions on biotechnology being influenced by everyday interactions, being constantly changing and holistic in nature, and sharing with their community. It was clear from the respondents that their attitudes towards Tikanga Maori and biotechnology was influenced by the poor health statistics of Maori, which meant that attitudes towards biotechnology was more tolerant and ‘culturally changeable’ if there were clear health benefits for Maori. Hence, traditional values were not seen as being ‘immutable’ and thus were able to respond to changes in society. Further, these Maori scientists who might be seen as ‘guardians of (scientific) knowledge’ were also fully integrated in their Maori communities, and shared many aspects – including work and non-work with Maori communities.

These findings suggest that the perceived disparities between indigenous peoples (Maori) and science (specifically biotechnology), might be more due to communication issues rather than inherent insurmountable differences. This is because the respondents in the present study reported that cultural differences towards biotechnology are changeable if the benefits are strong enough for their people. Related to this, was the lack of influence *financial* benefits had on the willingness of Maori to reduce their cultural challenges towards biotechnology. While acknowledging that there **are** differences and obstacles towards Maori embracing biotechnology, the willingness to reduce or remove cultural challenges due to potential health benefits was not similarly held for financial benefit. This further reinforces Maori cultural focus on holism versus economic. Hence, understanding a cultural perspective towards biotechnology is important for society to ensure guardians of traditional indigenous knowledge (Maori) are respected and engaged in a positive manner.

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