MEDI HERB
HERBAL MEDICINE EXCELLENCE

SUBMISSION

to the

HOUSE OF REPRESENTATIVES STANDING COMMITTEE

ON SCIENCE AND INNOVATION

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INQUIRY INTO BUSINESS COMMITMENT TO RESEARCH AND DEVELOPMENT IN AUSTRALIA

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INTRODUCTION:

In this submission, the experiences of a medium-sized, regionally based herbal manufacturing company are briefly described. This will include a short history of the company and a description of the company's Research and Development activities. This information will then be used as a basis from which to address the questions raised by the inquiry.

COMPANY BACKGROUND:

MediHerb was founded in 1986 by Kerry Bone, a first class honours graduate in Chemistry from Melbourne University, with a post graduate qualification in Phytotherapy from England. MediHerb was born out of Kerry's desire to produce efficacious herbal medicines and this has remained the driving force behind every aspect of the company from herb sourcing, manufacturing, quality assurance and research.

MediHerb is an Australian owned public unlisted company that has gone on to become Australia's largest purchaser and manufacturer of herbal medicine products for the professional market. MediHerb processes approximately 250 different species of medicinal herbs into either liquid extracts or tablet formulations, which are sold only to health care practitioners, such as herbalists, naturopaths, pharmacists, chiropractors GP's and medical specialists. It has approximately 90 employees, located in every state of Australia, as well as the USA. The manufacturing base of the company has remained in Warwick, a rural community approximately 170 km southwest of Brisbane. MediHerb has a strong export focus and presently sells products in New Zealand, Scandinavia, Europe, SE Asia, West Indies and the USA. In 2002 MediHerb won the Southern Queensland Premiers Award for Export for small to medium manufacturers – a significant achievement for a small organistion.

Herbal medicinal products are manufactured according to the Pharmaceutical Code of GMP and regular audits of the manufacturing facility are performed by the Therapeutic Goods Administration, this being the same body and standard applied to the pharmaceutical industry. In practice, however, the herbal manufacturing under GMP is more complex than conventional drugs, due to the extra complexity conferred by the varying constituents present in the herb biological matrix. This coupled with the lack of appropriate pharmacopoeial monographs and guidelines has meant that this information has had to be developed in-house and applied to the products manufactured by MediHerb.

RESEARCH AND DEVELOPMENT AT MEDIHERB

R&D has been a key element in the success of MediHerb over the past 17 years and has been driven by the research background of the founder, Kerry Bone. MediHerb has always contributed significantly to its own internal research with expenditure of greater than 5% of gross sales being re-invested in research. This has resulted in a team of over 12 scientists, including three PhD's, working in R&D and Quality Control. This team

has diverse industry experience in food and herbal products, university research, drug analysis in hospitals, pharmaceuticals, quality assurance, technical writing and clinical nutrition. Attendance and presentation of scientific data at overseas conferences has been a regular part of the roles of the R&D group.

The initial areas of interest centred upon obtaining the best quality raw materials and methods of making efficacious liquid products, this involved agronomic growing trials and evaluation of extraction methodologies. In more recent years the focus shifted to the analytical determination of phytochemical constituents of herbs and finished products; and the conversion of the liquid products into solid dose forms.

At present the three areas of focus are:

- Formulation of efficacious herbal solutions to meet patients' needs
- Validating the efficacy of herbal formulas by clinical trials and in-vitro research
- Researching the phytochemisty of medicinal plants

It is only by combining phytochemical, biochemical, clinical and traditional herbal knowledge that MediHerb can continue to produce high quality products that meet the changing needs of the global market.

MediHerb's history of R&D can essentially be split into the following categories:

- **Agronomic research**

  As the herb sourced from the farm is the raw material for the finished products manufactured by MediHerb considerable research effort has gone into this area. This was initially as in-formal assistance and guidance to the herb-growing producers utilising best practice information published in the literature or from anecdotal reports. There has also been three formal projects funded by RIRDC in collaboration with either the University of Newcastle or the University of Tasmania. These projects investigated the agronomic issues affecting the quality of the herb produced and investigated *Echinacea purpurea, Valeriana officinalis* and *Matricaria recutita.* Contribution to agronomic research in Slovakia investigating the growth of *Tribulus terrestris* has also been supported.

- **Methods of Manufacturing Herbal Products**

  There are many different methods of extraction for herbal products and most of these have been evaluated by MediHerb. Some of the methods investigated include: Percolation, Maceration, Counter-Current Extraction, High-Speed Maceration, Sequential Percolation and Vacuum Filtration. This has been in-house research and out of this was born the unique 1:2 percolation method currently utilised by MediHerb.

The conversion of the liquid extract into dry form, whilst preserving the sensitive phytochemicals from heat and oxidative damage, has also been investigated utilising the following techniques: Centritherm Technology, Vacuum Concentration, Spray Drying, Conventional Ovens, Vacuum Ovens, Granulation, Fluid Bed Drying and Microencapsulation. The tableting technology to produce the final dose form has also been of considerable interest.

- **Phytochemical Research**

Many of the herbs commonly used in herbal medicine are poorly defined phytochemically and suitable analytical methods for the accurate measurement of these constituents do not exist. MediHerb has developed analytical methodology for the determination of the phytochemicals in approximately 90 different herbs and herbal matrices and has become recognised worldwide for its expertise in this area. With almost 250 herbs used by MediHerb there is still a long way to go on this project.

MediHerb was successful in 2001 in obtaining funding under the ARC-Linkage scheme to investigate the active constituents of a range of anthelmintic herbs in collaboration with the University of Queensland. Another ARC grant to investigate poorly defined medicinal plants in 2002 was unsuccessful despite receiving quite good reviews.

- **Clinical Research**

Many of the products used by practitioners of herbal medicine are prescribed upon the basis of traditional use and safety data has also been extrapolated from this use. MediHerb has sought to clinically prove the efficacy of its products by in-vitro or clinical trial data. To date we have been involved in more than 12 human clinical trials on such divers areas as Immune Function, Hepatitis C, Genital Warts, Venous Leg Ulcers, Pain Relief, Child Birth, Sleep Enhancement and Cognitive Enhancement, with positive results being found in over half of the completed studies.

Most of the clinical trial work undertaken by MediHerb has been with Universities and Hospitals where MediHerb's role is to supply investigational product and assist with protocol development, this has been achieved in a cost-effective manner. MediHerb is presently fully funding two novel formulations in pilot human clinical trials, which is consuming a large proportion of the allocated R&D funds.

Funding for herbal medicine research has been difficult to obtain under the NHMRC system and there does not appear to be any alternative systems to bridge the gap. MediHerb has previously had a START grant application rejected in this area and has only in the last round of BIF grant offers been successful in obtaining funding to investigate the biovailability of an Echinacea preparation for immune enhancement. The time required to submit the START grant was very onerous for a small company and took place over a period of approximately 6 months consuming a significant

proportion of the time of 4 staff, the BIF grant application while simpler due to the work already undertaken for the START grant still took approx 1 month of almost full-time work by 2 staff to complete.

- **CRC of Herbal Medicine Research**

  An attempt was made several years ago to put together a CRC of Herbal Medicine Research comprising several universities and the major herbal medicine manufacturers to be based at Lismore in Northern NSW. This project was very enthusiastically supported over a period of 12-18 months by all involved and was believed to have fulfilled all of the criteria and would have contributed very strongly to the development of the industry as a whole. This application was rejected.

SUMMARY:

MediHerb has on the surface been quite successful by obtaining funding under three different research grant systems (RIRDC, ARC-Linkage and BIF). This has, however, been a matter of trying to seek any funding option for any of our research interests, rather than the optimum of looking at our core research interests and choosing an appropriate funding option. The R&D Tax Concession is the only initiative which has been able to offer overall support to the broad range of manufacturing and product orientated R&D that MediHerb has been forced to undertake in it first 17 years.

MediHerb has been hampered by the fact that it is an established, but small, manufacturing company and not born out of a research institution. As such it has not had a research track record to draw upon and this appears to have gone against it. It is hoped that with the change in focus of MediHerb into more core areas of research looking at proof of efficacy and safety for its products that it will be able to more successful in gaining access to additional R&D funding.

With regard of the specific questions posed by the Inquiry:

- ***What would be the economic benefit for Australia from a greater private sector investment in R&D?***

  Research and Development is crucial for the development of Australian industry regardless of the business they conduct, as this represents the future of the company in terms of new products, new customers and new market opportunities. Without R&D the Australian industrial segment will be reduced to copying overseas products and ideas and competing against low cost offshore manufacturers.

  The governments of Australia invest heavily in educating our children to become the best they can be. We are, however, losing the best of our highly educated talent overseas to better-organised research facilities that can recompense these individuals more satisfactorily. The individuals we are losing are those with initiative

and drive that see the opportunities that exist overseas, and in the absence of the same opportunities in Australia this will continue.

The commitment of private sector investment in R&D is critical to supporting the endeavours put in place by the various governments of Australia. The private sector is the only group whom can direct the research funding which is available to research projects that will benefit the parent company and as such benefit the economy as a whole. The danger from pure government directed funding is the lack of direction that may not result in a positive financial result. Whilst pure research is critical to the long-term picture, targeted assistance to directed research will yield more immediate benefits.

- ***What are the impediments to business investment in R&D?***

There are general factors that are major impediments to business investment in R&D and a central issue is the resources and infrastructure required meet the requirements for applying for concessions/grants and the maintaining of the records required. This has resulted in the inevitable need for consultants as the system becomes too complex for smaller businesses to understand and keep up to date with, also places strain upon a business's willingness to become involved in this system. The time required to submit CRC, START and BIF applications places significant stress upon the internal resources of any small business and involves staff from all departments of the business, not just R&D.

An issue for any company involved in clinical trials that has become crucial in the past year is indemnity insurance. The cost of insurance and the inability to obtain insurance for some some trials has meant that research work has to have been placed on hold. What was previously taken for granted has now become a major issue of negotiation between the industry partner and the research organisation undertaking the study. In our experience this issue had caused the suspension of three clinical trials MediHerb is involved in, this situation is still unresolved for two of these trials but appears headed for resolution after more than 6 months of negotiation.

Business investment in R&D falls into three major areas, each of which present major issues:

1. **Continual improvement research, this does not attract any funding opportunity**

   The requirement to undertake continual improvement of the existing products, technologies and techniques within an organisation is essential to the long-term success of the company. The only incentive for this continual improvement process is the R&D tax concession and changes in the reimbursement rate have adversely affected many companies' willingness to commit to long term programs. As R&D costs are often seen as overheads that do not contribute to

the bottom line of the company, they are often the first to suffer if the company is placed under financial stress.

2. **Industry partner funding opportunities in collaboration with Universities, where the University receives the funding**

   Funding directed at Universities that require industry partner contributions are seen to be fostering collaboration between these two groups, however, the outcomes achieved are often not what were expected by the industry partner. While the intent is that strong collaboration is the outcome of the funding, in reality it is often the University that has the idea and then approaches a range of businesses to determine someone who is willing to contribute to the research grant. It is difficult for an industry partner to find a University researcher to undertake research it sees as critical, due to difficulties in attracting a suitable research candidate and the desire of the industry partner for some commercial outcome. Issues of IP ownership quite often become major sticking points in discussions.

3. **Company funding opportunities where the business receives the funding**

   Funding directed at the actual companies offer the best incentive to invest more heavily in research as it avoids the issues of IP ownership, attraction of research candidates, keeping the project focussed on a commercial outcome. The major issue with this type of funding is the lack of options which are available, particularly in the area of herbal medicine research and many companies are reduced to scouting around the edges looking for any suitable scheme.

- ***What steps need to be taken to better demonstrate to business the benefits of higher private sector investment in R & D?***

The simplest method of demonstrating the benefits of private sector investment in R&D is by giving better support to those businesses that have a strong commitment to R&D. This will generate strong case studies to hold up as examples of what can be achieved by real companies following investment in R&D. Too many of the current examples are of spin-off or start-up companies and do not represent the established industrial group of businesses.

A simplification of the overall process of support for R&D, in terms of fund application, financial record keeping and support for business is required to attract more businesses to invest in R&D.