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NATURE'S HEALING HANDS

Maori have a rich knowledge of native plants and have found many uses for them, particularly for medicinal purposes. An opportunity exists for the development of medicinal products combining western and traditional Maori medicines. The purpose of this investigation was to develop a product for a specific medical condition using a specific Maori plant medicine (rongoa) as the functioning ingredient. The investigation was divided into two stages. The first stage was to determine which illness to treat and through a series of bioassays, which plant(s) to use. The second stage involved formulating initial concepts and developing the concepts with stakeholder input until a product the client was fully satisfied with was achieved.

Simple skin complaints such as cuts, rash and abrasions were identified as the medicinal condition to develop a product for. Kate Chen, a teacher in Auckland, was identified as the client as she suffers from skin complaints from working in the garden. Kawakawa (*Macropiper excelsum*, tarata (*Pittosporum eugenioides*) and patetē (*Schefflera digitata*) were suggested by Whea Taini Drummond (Te Whare Wananga o Owairoa) as plants to consider testing in the bioassay.

The objective of the bioassay was to determine which plant out of kawakawa, patetē and tarata should be used in the final developed product by determining the strength of the antibacterial activity of the plant essential oils against *Lactobacillus reuteri*, *Candida albicans* and a mixed culture of compost micro-organisms.

The essential oils of the three plants were first extracted by water distillation. Filter paper discs soaked in each of the essential oils were placed on nutrient agar plates inoculated with the three sets of micro-organisms. *L. reuteri* culture was made by combining *L. reuteri* capsules with lactose. *C. albicans* was supplied by an external laboratory. Mixed culture of compost micro-organisms was obtained by swabbing the compost heap the client worked with. The plates were incubated and the zones of inhibition formed were measured after 48 hours. Essential oils were also refluxed at 95°C and the method repeated with *L. reuteri* to determine whether heating had any effect on antimicrobial strength. The primary outcome variables for the bioassay were the volume of oil extracted and the diameter of the zones of inhibition.

The results showed that 150 g patetē yielded the most oil (56 ml) followed by kawakawa (52 ml) and lastly tarata (49 ml). Tarata was the most effective against *L. reuteri* (2.4 cm) and *C. albicans* (2.5 cm) followed by kawakawa (2.0 cm, 1.3 cm) and then patetē (1.6 cm, 1.1 cm). Against the mixed culture of compost micro-organisms, patetē was found to be the most effective (2.1 cm) followed equally by kawakawa (1.5 cm) and tarata (1.5 cm). After refluxing tarata was still the most effective (2.5 ml), followed by kawakawa (1.7 ml) and lastly patetē (1.6 ml).

The bioassay indicated that patetē yielded the highest volume of essential oil and exhibited the strongest antimicrobial strength against the mixed culture of compost micro-organism. Tarata was the most successful against *L. reuteri* and *C. albicans*. Kawakawa was moderately successful



against all three sets of micro-organisms compared to the other two plants. Patetē was selected as the plant to use in the technological product as it displayed the strongest antimicrobial effect against the micro-organisms that were the cause of the client's skin complaints. Furthermore the amount of oil yielded from the plant would be viable for long term production of the technological product, if the product was commercialised.

The second stage of the investigation begun by developing two gels and a cream as initial concepts using feedback from the client. Initial concept testing was done to decide the format of the product. The client selected the cream for further development as she felt most comfortable using a cream-based product and also because she was most satisfied with its appearance, viscosity, smell, texture and level of stickiness.

After selecting an initial concept I determined what skin products the client used, what the functions of these products were, what functions she would like in a skin product, and what sort of product characteristics she would she like. This was done by interviewing the client and asking her to fill out a questionnaire. The interview and questionnaire indicated that the client used few skincare products, and the ones she did use were moisturisers. When asked what product/s she wanted, the client said she preferred using a cream as opposed to other mediums and needed a day cream and a night cream. The client wasn't too fussed about fragrance just as long as it wasn't too strong. In terms of functions the client wanted a product that would moisturise the skin, improve skin quality, and heal cuts, grazes and infections.

From the results it was decided that the initial cream concept would be developed as two separate products: a day cream and a night cream. The functions of both types of creams were researched and the subsequent ingredient selection had to ensure that the day cream contained ingredients associated with protecting the skin; and the night cream contained ingredients associated with healing/nourishing the skin.

An important aspect of the investigation was developing a proposal for ongoing production of the products. To determine what the issues were surrounding ongoing development in particular regards to using Maori 'intellectual property' Whea Taini Drummond and Maui Hudson, a Maori ethics consultant at ESR Forensics were interviewed. There were conflicting views over whether it was appropriate to commercialise Maori knowledge or not. Whea Drummond felt that it was inappropriate to commercialise such knowledge because it was health related. Her philosophy was that Maori health knowledge was supposed to be shared and used for everyone's benefit. Mr Hudson on the other hand said that commercialisation of Maori knowledge was alright as long as a partnership was established with Maori who had ownership or ties to the knowledge being commercialised.

The proposal for ongoing production was dropped as a result of the consultation. This was decided because it was too difficult to trace the origin of the knowledge. Furthermore there were other aspects of ongoing production that could prove to be a barrier, such as the growth and harvest of native plant species. Despite this, the possibility of establishing a proposal for ongoing production remains open for the future.

Following consultation with the Maori stakeholders a set of criteria for selecting ingredients were established, and the core ingredients that made up the cream base selected. The criteria were established by talking to the client, considering the effect of ingredients and talking to Dr Graham Taylor, a cosmetics manufacturer at Shieling Laboratories. The client wanted ingredients that were safe to use and preferably not alcohol based. Furthermore after some discussion with the client as to what she deemed chemical and natural, it was established that the client preferred

ingredients with a natural origin, or at least synthesised from a naturally derived ingredient. Dr Graham Taylor provided me with a background of each of the ingredients in his laboratory, and from there the core ingredients for cream production were selected: emulsifier: PEG-40 stearate; preservative: phenonip; humectant: glycerine and panthenol.

The next step was to determine which concentration of patetē essential oil to incorporate into the day cream and night cream. The concentration of oil had to be chosen based on the effect it had on the client's identified skin condition. To determine the concentration to use, 2%, 1.5%, 1%, 0.5% and 0% patetē extract containing creams were produced (using the ingredients selected previously). The client then sampled each product in turn on an infected area of her skin with 24 hours between each product. The client was blinded as to which concentration she was using, and she noted down any changes in skin quality and appearance.

The client found that the 2% product gave the greatest healing effect in the evening. Cuts and scratches on her hand healed quickly, and any red areas of skin quickly became clearer. The client also noted that her dry skin became more moisturised after using the product. As a result, it was decided that 2% patetē extract would be incorporated into the night cream. The client also found that the 1% and 1.5% creams gave similar results as the 2% creams however the results weren't observed as quickly. It was decided that 1% patetē extract would be incorporated into the day cream. The decision was based on research that the skin's ability to absorb is weakest during the day and that skin products for wear during the day should have a protective function and not a healing function (*What is a day cream and a night cream?*, 2005). The client was also asked to evaluate the developed creams with the patetē extract and her response was highly positive, however she was not pleased with the thickness of the night cream and the scent of both creams. Despite these criticisms she was satisfied with other characteristics of the products as well as the aesthetics.

Following the concentration trial, ingredients that would give the day cream and night cream their functional effects were selected. General functional ingredients for both products were selected with the client by referring back to the functions she wanted in the product and talking to Dr Graham Taylor about the effectiveness of each ingredient in providing its function. The ingredient selection criteria were also referred to. The client chose to incorporate grapeseed oil for its ability to tighten and tone the skin; avocado oil for its ability to nourish and restore dry, dehydrated and mature skin; rosehip oil for its rapid healing property and anti-aging effect; and wheatgerm oil as it is an antioxidant and rich in Vitamin E which makes it good for the skin. Manuka honey was also added to aid patetē in the healing process after some research into the healing factor of manuka honey was found (*Waikato Honey Research*, 2005). Sunblocking ingredients were chosen for the day cream that would give SPF10 (the SPF level the client used).

A final evaluation was carried out as the client was satisfied with the stage of product development reached. The client's feedback for the cream developed using the functional ingredients was very positive. The added oils gave the creams a mild floral scent, a scent she was happy with it. Manuka honey thickened both creams, increasing the viscosity more so in the night cream. The client was fully satisfied with the viscosity, texture, scent, appearance and level of stickiness of both products. After trialling the products informally over a week, the client reported an improvement in skin quality as well as faster rates in skin healing (compared to without use of products). Furthermore the client also reported less infection from working in the garden. As the client was fully satisfied with the level of product development, it was decided that development would finish.

The final part of the investigation was to determine whether other members of the public were as receptive to the developed products as my client was by carrying out a formal product evaluation and testing. This was done by selecting 20 participants. Each participant was given 50g of each product and was asked to use the day cream in the morning and the night cream in the evening over the course of five days. During the five days they were asked to fill out an evaluation form, and after the five days they were asked to fill out a follow up form. Each participant acted as their own control so there was no randomisation (since all participants trialled both products), and there was no blinding.

The number of participants lost to follow up was moderate (15%). The majority of participants thought the products were effective in moisturising the skin (both products over 75%). Some highlights of the results for the day cream: 82% thought it applied well, 74% easy to apply, 100% good thickness and 71% pleased with the product. Some highlights of the results for the night cream: 82% thought it applied well, 62% found it easy to apply, 76% were pleased with the product. Both products scored highly in terms of the proportion of participants who would use it again (71% and 74%). Most criticisms for the products were directed at their colour and smell. As a result the first implication for future practice would be to consider using a different type of wheatgerm oil with less carotene that would give the products a whiter colour. Secondly consider adding a fragrance to the products.

To conclude, I was able to fulfil the aim of my investigation: to develop a product for a specific medical condition using a specific Maori plant medicine (rongoa) as the functioning ingredient. The products I developed combined traditional Maori plant medicine with western medicine, producing highly unique and successful products. The client was fully satisfied with both products, especially as both appeared to help reduce the infections she received from working with the compost in the garden. Furthermore the majority of participants in the product evaluation stated they were pleased with both the day cream and night cream. As the investigation progressed, the original intent to produce a pharmaceutical product for one client was broadened to producing a 'cosmeceutical' product that improved the skin quality and reduced the effects of aging for a broad range of people. Through the investigation I gained a deeper understanding of Maori health issues as well as issues relating to intellectual property. My investigation demonstrated that it is possible to incorporate traditional Maori knowledge into Western health products – a definite opportunity for New Zealand.