



台灣海洋大學研發出「全球第一瓶」全方位的正鈣產品

台灣海洋生物科技研發 前景可期!

文、圖/龔瑞林·國立台灣海洋大學

台灣推動生物技術產業已經歷廿多年，目前不可諱言的，包括技術、產品、產業與產值，仍然未有具體重大成效，雖然以生技公司登記的有300多家，而其中真正能納入歸屬的還是非常有限，總體年營業額尚未達500億元，「標竿主題」的建立或許才是改善之道。台灣標榜「海洋立國」自然應以海洋為優先主題，雖然國內海洋生物資源的生技應用，已逐漸受到重視，但仍必須持續加強投資研究，才能開花結果。



海洋大學的龔瑞林教授（左）所主持的細胞免疫實驗室，花費十年的時間成功研製全球第一瓶全方位正鈣，前教育部長吳京博士（右）。The Cellular Immunology Laboratory of National Taiwan Ocean University, led by Dr. Kong, Zwe-Ling (left), has dedicated 10 years in developing the first bottle of all-round positive calcium in the world. On the right is former Minister of Education, Dr. Wu Ching.

海鱸魚骨正鈣 全球第一瓶

國立台灣海洋大學的食品科學研究所細胞免疫實驗室，利用十年的時間研發骨骼保健品，使用海鱸研製複方魚骨鈣，為「全球第一瓶全方位正鈣產品」。本實驗室利用原本只能熬骨燉湯的大魚骨頭，進行高純度萃取研究，歷經十年與澎湖海鱸業者合作，選用澎湖「天和海鱸」做為主要魚骨鈣材料，這是台灣第一條拿下生產履歷身分證明的安全魚類。這條魚得來不易，是業者在海上撒下6億元，由海洋大學養殖系輔導，以中藥

配方餵養出來的魚。自海鱸身上萃取精煉特殊不飽和脂肪酸魚骨精油，再融合大豆異黃酮、葡萄糖胺、碳酸鈣、茄紅素、黑豆與洋蔥等高純度植物天然活性素材，調配成複方組合，做出海鱸魚骨鈣，研發出全球第一瓶全方位正鈣。這是海大產學合作最新的研發成果，由海大育成中心輔導廠商量產上市，並投保1500萬元產品責任險。所研發的海鱸骨鈣不是市售一般的吃鈣補鈣的鈣，而是具醫學上的正鈣平衡作用，協助骨質吸收後可有效抑制蝕骨細胞，讓增骨細胞增加、減少發炎疼痛，使平日藉由飲食吃下去的鈣得以吸收保存。

國內海洋生物科技漸受重視

國內每年新興生物科技相關科系畢業生持續增加中，如何合理運用消化這些人力於合適就業市場中，實在是重要而可預見的社會經濟議題，其勝敗關鍵在於落實整合「產學合作」創新的機制平台上。

以目前國內保健食品素材開發來看，幾乎都是國外進口，或是藉由國外的研究成果衍生產品在台製造，缺乏品牌指標性產品或是本土自發性的創意素材開發，生產技術方面也都屬於較傳統層次，現況可說是百家爭鳴而無首，但這就研發者而言或許是個絕佳的切入機會點，問題只是該如何切入及如何掌握成功關鍵罷了。目前傳統型保健食品市場已是接近飽和，應該加強產學互動以創造優勢及擴大利基，並同時提高與國外廠商之競爭能力，一方面產業界也應注重研發人力，以能順利承接學術界之研發成果，並引入較深層的技術及專利保護來確保獲利的空間。作法上，食品生技產業或許應選擇較具原創性之關鍵性原料、技術及產品，以整合型或產學合作之方式推動，而學術界應協助產業界建立關鍵性之技術平台，以厚植產業界之研發能力，同時政府相

關部會也應主動尋求媒合的國際合作機會，鼓勵國外公司來台設立研發及生產基地，整合產官學資源積極發展「具創新性高成長潛力且競爭優勢」的項目，紮實地做好保健食品生技產業的基礎建設工作。

食品生物科技研發仍不足

綜觀產業發展現況，普遍主要問題為，多年來學術界的研究主要偏集中在醫藥品關鍵技術之開發，對於食品生技方面的投入相對上不足，因此難有高創新性的生物技術或產品可移轉給食品

產業界。而產業界為生存只求急於轉型獲利，在研發能量不足情況下，大家一窩蜂競相投入淺層開發的保健食品，又在台灣先天內需市場極小的限制下，當然容易形成各家產品重複、訴求相近、惡性競爭、靠廣告抄短線的局面，非常不利於保健食品生技產業之永續發展。任何新興保健產品都該有它獨特的訴求才能建立目標市場，而訴求不是靠一味的創意花招廣告文宣，而是提出有科學依據的明確說詞，因為廣告只能激發一時的流行買氣，提升產品價值才能創造長期的穩定利益。

National Taiwan Ocean University produced an all-round positive calcium product, "the first in the world!"

The future is promising for Taiwan's marine biotechnology development !

Article, photos / Jui-Lin Kung National Taiwan Ocean University

Taiwan's biotechnical industries have gone through more than 20 years of time, and it is quite obvious that there is still lack of major achievement no matter in techniques, products, industries or productions. There are more than 300 companies that claim to be a biotechnical company, but only a handful of them are really what they say they are, and the annual sales has seldom reached 50 billion NTD. Perhaps, the establishment of a "flagpole theme" is the way to improve this. Taiwan has been advertising itself as an "ocean country", so it is natural to have the ocean as the priority theme. The application of marine biological resources in biotechnical industries of Taiwan is getting more and more attention, and yet more investment and research works are still needed for further development.

Positive calcium extract from cobia, the first in the world

It has been 10 years since the Cellular Immunity Laboratory of Graduate Institute of Food Science, National Taiwan Ocean University started to research supplement products for bone health. The lab studied the calcium supplement formula using cobia bones

and came up with "the first all-round positive calcium product in the world". The lab began with the big fish bones, which were mostly used for making soup and broth, for high potency extraction research. He has been working with the cobia farmers in Penghu for a decade, and selected "Tien-Ho cobia" as the source of fishbone calcium. This cobia is the first in Taiwan that is given a life history certificate. It does not come cheap, as the farmers has thrown 600 million NTD into the water literally and developed a special feed formulated with Chinese herbs under the consultation of Department of Aquaculture of NTOU. A composite formula was produced from the unsaturated fatty acid containing fishbone essence extracted from cobia bones, along with the addition of soybean isoflavones, glucosamine, calcium carbonate, lycopene, black bean extracts and onion extracts. From this formula, the cobia fishbone calcium was produced and became the first all-round positive calcium of the world. This is the latest research achievement of NTOU cooperating with industries. The Innovative Incubation Center of NTOU helped the company to market the product, which is provided with a product liability police of 15 million NTD. The cobia bone calcium in the research is not just some regular calcium product that floods the



shelves of store. It provides the positive calcium balance and helps suppress osteoclasts, increase the number of healthy bone cells and reduce inflammation and pain. Therefore, the calcium contained in daily diet can be digested and stay in your system.

Marine biotechnology is getting more and more attention

Students are graduating from biotechnology-related fields year after year. It can be foreseen that this is an important social and economic issue to make the best use of this fresh supply of manpower in the job market. The key of success is to enforce the integration of the platforms existing in the innovation of “the cooperation of industrial and academic sectors.”

Looking at the materials used in the development of health supplement products in Taiwan, most of them are either imports or derivatives produced in Taiwan using imported technology. There is no brand name product or creative material developed locally, and most of the production techniques are at traditional levels. So far everybody is doing the production, but there is no leader. However, as the researchers have pointed out, this may be the perfect time to cut in, and the problem now is merely how to cut in and how to hold onto the key of success. At present, the traditional health supplement product market is approaching saturation. It is time to intensify the interactions between industries and the academic society for the creation of advantages and the expansion of niche while improving the capabilities to compete with international companies. The industries have to focus on the manpower development in R&D works in order to carry on the research achievement from the academic society, and the meantime shall introduce more advanced technologies and patent protections to secure profitability. In doing so, food and biotechnical industries may have to select key materials, techniques and products that are more original and proceed in an integrated way or work with the academic society. The academic society should help the industries to establish key technical platforms to improve the R&D capability of the industries. The government, meanwhile, should start looking for opportunities of international



選用澎湖「天和海鱸」做為主要魚骨鈣材料，這是台灣第一條拿下生產履歷身分證明的安全魚類，天和海洋開發董事長劉天和(左)

“Tan-Hou cobia” of Penghu is selected as the major material for fishbone calcium. This cobia is the first in Taiwan that is given a life history certificate. On the left is the chairman of Tien Ho Ocean Development Co., Mr. Liu, Tien-Ho.

cooperation, encouraging foreign companies to establish research and production facilities in Taiwan, integrating the governmental, industrial and academic resources for the development of “innovative, highly potential and competitive” products and establishing the foundation of health supplement and biotechnical industries.

More is needed in food and biotechnical industry development

Judging by the current industrial development, a common major problem is that academic research works have been dedicated in the development of key techniques for medical supplies for many years, and comparatively not much has been put in the food and biotechnical fields. As a result, there is hardly innovative biotechnical know-how or product to pass onto the food industries. Besides, for their survival, the industries focus only on making a profitable transformation and neglect the research capacity. A swarm of companies start to dive into the production of health supplement products requiring only low-level development. On top of that, as Taiwan being a small and limited market, no doubt there are too many similar products, creating a situation that the focuses are on the same group of customers and the only way out is more advertisements and commercials. This is hardly a way for health supplement and biotechnical industries to survive, let alone to develop sustainability. Every new health supplement product should have its unique focus in order to establish its target market. This should be based on scientific proof and verification, not just some flamboyant tricks of advertisement, which can only create a short burst of sales frenzy. To create a long-term and steady profit requires improvement of product values.