

PREMIER MARINE COLLAGEN

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*INNOVATIVE BREAKTHROUGH:

- ↑ **10x** Production yield
- ↑ **2x** Protein content
- ↑ **2x** Hydroxyproline content (Purity)
- ↓ **3x** Production time
- ↓ **13x** Impurity (Ash content)
- ☑ **Halal** source
- ☑ **Tested non-toxic and heavy metal free**

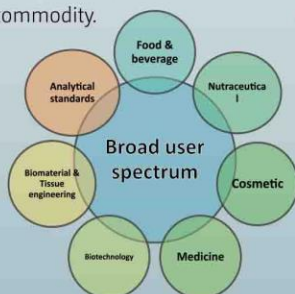
* Comparisons made between the patented 7 days improved method and the conventional 21 days method of extracting collagen from jellyfish.

INTRODUCTION

- The global collagen market was valued at \$648.2 million in 2012 and is expected to reach \$891.8 million in 2017 (Frost & Sullivan, 2013)
- Native, non-denatured collagen is critical for the bestowal of durable structural support, biocompatibility and biomimetic capability which is of utmost significance for the development of effective products for human applications.
- Currently, the market price of pure native collagens are MYR 75.00/mg (Type I, rat tail), MYR 88.45/mg (Type II, chicken cartilage), MYR 600.00/mg (Type III, human placenta), MYR 148.00/mg (Type IV, human placenta) and MYR 478.50/mg (Type V, human placenta).
- Two major bottlenecks present in the production of pure native collagen are depleting sources of collagen as well as the lengthy and inefficient extraction process leading to cost hike, supply shortage and variability of collagen quality.

INVENTION

- High quality *halal/kosher* collagen extracted using a rapid and economical procedure from highly abundant jellyfishes without the use of expensive enzymes and hazardous chemicals.
- Simple and 100% up-scale feasible process.
- Value creation from an underutilized local fisheries commodity.



USEFULNESS AND APPLICATION

- PREMIER MARINE COLLAGEN:** High collagen quality with low impurity content suitable for cell culture.
- Collagen produced is stable at body temperature: ideal for multipurpose fabrication and formulation of functional commercial products.
- Non-toxic and environmental-friendly process to product.
- Cheaper production cost.

Advantageous	Our product	Commercial pure native collagen
Source	Local under-utilised jellyfishes, a little known capture fisheries commodity in Malaysia. Currently, edible jellyfishes is only traded and utilised as cured jellyfish in Chinese (海蜇) and Japanese (Chuka Kurage) cuisines.	Largely bovine (cow) and porcine (swine) sources, with minor portions from human placenta for specific types of collagen. Ovine (sheep) and porcine (fish) source of pure native collagen is presently growing but is yet to be available widely in the market.
Price of raw materials	None (for raw unprocessed jellyfish used in this innovation); MYR 2.00 – MYR 6.00 per kg for cured jellyfish tissues.	Fluctuating due to limited and depleting source.
Production time	1 week or less	1 week or less
Production process	Direct, without the need of de-skinning, de-scaling and de-boning and de-fatting.	Involved the initial separation steps of bone, skin, scales, fat and internal organs.
Halal status	Halal and kosher	Sceptical. Non <i>halal</i> for porcine source. High doubts on slaughtering techniques for ruminants and poultry sources. Reported adulterations for bovine sources.
Safety	Tested non-toxic, heavy metal free and hypoallergenic	Current concerns involved the vulnerability of the raw materials to deadly viral and prion-caused infectious diseases especially bovine spongiform encephalopathy (mad cow disease) for the bovine source, rabies for the ovine (sheep) and caprine (goat) sources, and SARS for porcine sources.
Sustainability	High. Jellyfishes are aquatic nuisance which is reported to be steadily increasing worldwide.	Uncertain due to constant attack of diseases, pollutions, and consumer demands.
Stability	Stable at body temperature.	Type I collagen, which is extracted from cow, pig and most fishes is not stable at body temperature.



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