



FEBRUARY 22, 2018

# EGGSHELL MEMBRANE HEALTH BENEFITS

A SUMMARY OF HEALTH CLAIMS

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## Executive Summary

**Ecovatec's revolutionary technology has unlocked the amazing potential of Eggshell Membrane.** Eggshell membrane can be isolated from commercial eggshell waste products and has a wide variety of health benefits when processed. Eggshell membrane has been shown to improve the condition of people with **osteoarthritis** and its glycosaminoglycans and collagen provide its benefits to **gastrointestinal disorders**, anti-inflammatory properties, anti-bacterial properties, improvement in **wound healing**, and prevention of **wrinkles**. It also has uses in **tissue engineering**, **nanotechnology**, and environmental de-contamination.

## Background

Chicken eggshell is composed of a shell and 2 membranes, one attached to the shell and the other located on the egg white. The eggshell membrane contains **collagen** (type I, V, and X), **glycosaminoglycans**, egg white proteins, and eggshell matrix proteins<sup>1</sup>. Collagen is the main structural protein in the connective tissue in humans and is mostly found in tendons, ligaments, and skin. Glycosaminoglycans (GAGs) are used in the body as a lubricant as they tend to attract water; they have many different classes and functions. The main GAG found in eggshell membrane is **Hyaluronic Acid** (HA) which is found in the fluid that surrounds joints, cartilage, and the tissues of the eyes and skin.<sup>2</sup>

Chicken eggshell membrane has been approved by Health Canada for the claim "Helps to relieve joint pain and stiffness associated with osteoarthritis".<sup>3</sup> This is primarily due to its Hyaluronic acid content, recognized by Health Canada to support joint health<sup>3</sup>. Unhydrolyzed collagen (such as the collagen found in EcovaPure™ EM) has also been recognized as a skin-conditioning agent<sup>3</sup>. Many eggshell membrane products are known to "support the stability and flexibility of joint functions".

## A Review of the Health Effects of Eggshell Membrane (EM)<sup>1</sup>

A review paper by Cordeiro and Hincke (2011)<sup>1</sup> examines the uses of eggshell and eggshell membrane (EM).

### Nutraceutical Applications

- Eggshell membrane has been investigated as a treatment for osteoarthritis as it is suggested to be beneficial for healthy joints and regulation of connective tissue. This is due to the collagen and hyaluronic acid found in EM.<sup>1,4</sup>
- Glycosaminoglycans such as hyaluronic acid has also been evidenced to treat periodontal diseases<sup>1,4</sup>
- Eggshell membrane isolates have been shown to exhibit anti-inflammatory properties and may help reduce the swelling in joints.<sup>1</sup>
- An eggshell membrane powder which maintained the integrity of the original compounds was used to treat gastrointestinal disorders.<sup>1</sup>
- Fibers made from eggshell membrane were found to adhere to skin tissue, showing potential uses as a wound dressing to promote tissue healing.<sup>1,4</sup> This is specifically due to the hyaluronic acid which *Neumann et al* (2015) concluded is "safe and efficacious to be used in skin repair"<sup>2</sup>.

### Research and Science Applications

- Further research is being done on the applications of eggshell membrane to nanotechnology. Specific areas of research include medical imaging and optics.<sup>1,4</sup>
- EM has also been shown to be used as a sorbent for heavy metals, dyes, and pathogens in water and is being investigated as a potential sorbent in treating wastewater.<sup>1,4</sup>

### Cosmetic Applications

- The bioactive proteins, glycosaminoglycans, and collagen found in eggshell membrane have many uses in cosmetic products such as cold creams or powder makeups. They are thought to be less allergenic than traditional ingredients in cosmetics and can prevent the formation of wrinkles.

## Applications

Ecovatec's eggshell membrane product can be used in combination with other cosmetic and nutraceutical ingredients in the production of multi-vitamins and health supplements. It can also be used as a functional ingredient of many creams and lotions in the skincare market. Researchers can also purchase EM to support their development of nanotechnologies and tissue engineering/wound care technologies.

## Sources

<sup>1</sup>Cordeiro, C., and Hincke, M. "Recent Patents on Eggshell: Shell and Membrane Applications." *Recent Patents on Food, Nutrition & Agriculture*, vol. 3, no. 1, Jan. 2011, pp. 1–8., doi:10.2174/2212798411103010001.

<sup>2</sup>Neuman, Manuela G, et al. "Hyaluronic Acid and Wound Healing." *Journal of Pharmacy & Pharmaceutical Sciences*, vol. 18, no. 1, 2015, p. 53., doi:10.18433/j3k89d.

<sup>3</sup>Government of Canada, Health Canada, Health Products and Food Branch, Natural Health Products Directorate, Bureau of Product Review and Assessment. "Search licensed natural health products.", 13 Apr. 2016, <https://health-products.canada.ca/lnhpd-bdpsnh/index-eng.jsp>

<sup>4</sup>Santana, Ana, et al. "Biological activities of peptide concentrates obtained from hydrolysed eggshell membrane byproduct by optimisation with response surface methodology." *Food & Function*, vol. 7, no. 11, 2016, pp. 4597–4604., doi:10.1039/c6fo00954a.