Non-Confidential Description - PSU No. 1730
“Process for Separation of Protein Membrane and Shell Material from Waste Egg Shells”

Keywords:
Eggshell; calcium; waste recycling

Links:
US Patent 6,176,376
US Patent 7,007,806
Inventor website

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Background
Egg shell waste from continuous egg breaking machines is an increasingly burdensome waste disposal problem. Close to 30% of all eggs consumed in the U.S. today are consumed as processed egg products (i.e. from egg breaking plants). A recent survey of U.S. breaking plants showed that the waste egg shells from breaking were used as the following: 27% to fertilizer, 21% to the feed industry, 26% to municipal dumps and 16% to a wide variety of limited use methods. Recycling of the waste egg shells could have an enormous impact on this waste stream. A major obstacle to the effective utilization of these waste eggs is that there are two products that have widely different characteristics and are joined together through a physical and chemical attachment. A simple process to separate the membrane from the calcium carbonate shell thus creating new recycling opportunities for the egg breaking industry is needed.

Invention Description
The disclosed invention is a simple, non-chemical process for the separation of the protein containing inner shell membrane from the calcium containing outer shell whereby the two materials can be recovered for further uses. The process is a simple water based mechanical method for separating the membrane and calcium carbonate. The result of the process is two streams, one containing mm size particles of dry membrane and one containing mm size particles of dried shell. The two products can then be more easily recycled. The shell (calcium carbonate) can be used, for example, as a source of calcium in animal feed or in human supplements. The membrane can be used as a source of protein and is potentially a significant source of highly valuable collagen.

Advantages/Applications
• Reduction in waste disposal costs by recycling waste eggshells
• Non-chemical process to recover valuable products such as calcium and collagen
• Process has been operated at a commercial scale
• Three issued US Patents

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