





The MHE is produced in tiny biodegradable particles, in the form of a liquid, a gel or a powder. The minute size of these salts increases the surface area, this multiplies and thereby speeding up the chemical reactions, leading to a reduction of the amount of fire retardant needed.

### **The First Cash flow**

The main challenge is to optimize the blending of fire retardants into a wide variety of products. A PVC for example, is rich in chlorine, and requires a different concentration of MHE depending on the additives to soften the plastic or to protect it against ultraviolet, which either enhance flammability, or stimulate it. After years of trial and error, a portfolio of competitive product applications emerged: wall-to-wall carpets made from polyamide, pipes and carpet back coating made from PVC, flexible foam made from polyurethane, cellulose for paper, polystyrene for construction and insulation.

Mats Nilsson went on to create Trulstech AB, a Swedish company. He opted for a series of licensing agreements with companies in the USA and Australia. Its Swedish partner Deflamo AB went on to get listed on the secondary market in Stockholm and launched the flame retardant under the brand name Apyrum®. Deflamo has a full scale manufacturing of the ingredients operational to respond to industrial demand, and leapfrog from a wholesaler of the core ingredient, to the producer of multi-density fiber board protected with this natural fire and flame retardant. Deflamo has produced a water based fire retardant for textiles and paper, a powder for polymers and a special adaptation for impregnating textiles made with natural fibers.

### **The Opportunity**

The innovation described goes beyond the mere substitution of one chemical with another. It offers opportunities to recycle grape pomace and citrus waste offering new perspectives to wine producing regions, to substitute toxic chemicals with food grade molecules, and to convert a highly centralized industry with few global players into a hub for regional initiatives, supported by a patent portfolio. In addition, the range of applications can quickly evolve from carpets on planes, and casings for computers, to fire extinguishers, and environmental friendly chemistry used in forest fires.

Someday, the same technology could even be applied in the mining industry, where sparks cause explosions and force the use of expensive nickel-based equipment. The most fascinating option in the future is the possible misting of the MHE to incapacitate guns and cannons. While there is no proof of this concept yet, the fact that the product is already competitive in price and performance at the outset of its market introduction, offers an indication of how far this product could go. It is up to the entrepreneurs around the world to complement what is there and get the business rolling.

## VIDEOS

For a video demonstration of how this technology works, please click on:  
[http://www.youtube.com/watch?v=0875g4GW\\_Rw&feature=related](http://www.youtube.com/watch?v=0875g4GW_Rw&feature=related)

For an introduction to the Citric Acid Cycle, please click on:  
<http://www.wiley.com/legacy/college/boyer/0470003790/animations/tca/tca.htm>



Mats Nilsson, the inventor. Photo courtesy of the inventor.

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