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TEMPORARY STRUCTURES FOR DURABLE COMMODITIES STORAGE AND PEST CONTROL

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The storage needs of many food manufacturers vary according to fluctuations in the markets such as changes in the availability of raw materials or alterations in customer demands. As a result, the storage needs for food manufacturers can change at very short notice, and the storage duration may be unpredictable ranging from short term such as a month, to long term such as a year. Storage solutions can easily be provided by use of permanent structures such as silos or by mobile structures such as PVC cocoons (Volcani cubes). However, these storage solutions although appropriate, are not always favored by the management of small to medium food manufacturers because of the economical burden they pose and the need to provide constant maintenance. Many manufacturers try to protect their goods by storing in warehouses and controlling insect infestations by pesticides. These storage conditions are problematic and often result in quality deterioration of the commodities. Therefore, there is a need to provide these food manufacturers with an economic solution to their storage requirements. In our search to provide an answer we have adopted several concepts and merge those into one technique that makes it possible for "service companies" to provide these manufacturers with single-use storage structures. In this presentation we propose for the first time the use of plastic laminate structures for the storage of durable commodities under modified atmospheres. These plastic laminates are assembled on location and constructed according to customer demand and storage needs. The plastic sheets are welded by heat on-site to construct an envelope-like structure that is hermetically sealed. After the sealing is completed the gaseous composition is modified by enrichment with nitrogen and reduction of oxygen levels to below 1%, or by inserting very low doses of phosphine gas to prevent insect development. An aluminum-foil component within the plastic laminate provides a very effective gas barrier thereby preserving the initial condition of the modified atmospheres for the storage duration. At the end of the storage time the plastic structure is discarded. Preliminary results on storage of chickpeas for four months under enriched nitrogen conditions showed that the relative humidity in the storage structure remained stable. The oxygen concentration in the structure was lower than 1%, throughout the storage time and no insect infestation had developed. Today the use of these temporary structures is available in Israel through a service company with prices ranging from 10 to 15 US dollars per cubic meter depending on the size of the structure.

Key words: Postharvest storage systems, temporary structure, insect control, grain storage, non-chemical alternatives, phosphine, modified atmospheres, nitrogen