LIFE CYCLE ANALYSIS OF PALLETS AND PHYTOSANITARY TREATMENT METHODS

Research Summary

Packaging materials such as pallets form a critical component of the shipping and logistics industry. Pallets may be made of wood, plastic or corrugated paper. There are over 2 billion pallets currently in circulation within the United States, with a majority of it being wood (NWPCA, 2010). The market share of plastic pallets is on the rise. Thus the carbon footprint produced by the pallets is a critical factor. Plastic incurs larger carbon footprint owing to its production methods and raw materials used. Wooden pallets are however prone to pest infestation and require to be treated. Heat treatment and Methyl Bromide fumigation are the two currently approved treating methods used to kill pests in wooden packaging materials (WPM's). With rise in global trade, the use of these treatment methods has also increased. Methyl Bromide is a Class I ozone-depleting substance and affects the atmosphere adversely. Heat treatment requires additional energy and generates a significantly large amount of carbon footprint during the process.

The proposed research framework involves the investigation and evaluation of the environmental burdens incurred using a consequential LCA that compares each of the life cycle stages of a wooden and a plastic pallet. Significant emphasis is placed in comparing heat treatment, methyl bromide fumigation and radio frequency (RF) heating to determine the most effective, environmentally clean and economically viable treatment option. The objectives of this research are to demonstrate that dielectric heating using RF technology is equally, if not more, effective for killing pests in wood and environmentally superior to currently available treatments especially Methyl Bromide Fumigation. The LCA study quantifies the resource consumptions, total energy requirements, solid wastes, and selected atmospheric emissions resulting from the production, reuse, repair, recycling, and disposal of 48inch x 40inch pallets used in the

grocery industry. Data collected from various pallet manufacturing companies and treatment companies is analyzed using Sima Pro v 7.1 LCA software used specifically for life cycle assessment studies