Efficacy and proof of concept of herbicide coated plastic mulch for use in alternative strawberry and tomato production systems.

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Abstract: Three years of extensive field and laboratory research was conducted to evaluate the efficacy and commercial feasibility of herbicide coated plastic films as an alternative production technology in high value cropping systems. A generic sulfonylurea herbicide, halosulfuron-methyl, was used as a candidate herbicide that was incorporated into a gelatinous matrix on one side of various formulations of layered low-density polyethylene films. This product was then used as agricultural bed mulches in a variety of high value crops, including strawberry and tomato, in several states where these crops currently use methyl bromide or other fumigants for control of weeds and other soil borne pests. In addition to performance against pests, the Mass Transfer Coefficient was determined for herbicide treated and untreated film, as well as in-situ measurements of film permeability to various fumigants with VOC meters at the time of, and immediately following application. These studies were conducted in warm and cool weather conditions, different soil types, and a variety of plastic laying machines.

Data are reviewed across trials for efficacy, crop safety, fumigant containment, and agronomic suitability for strawberry and tomato production systems.

Overall, the method is: 1. Very effective in delivering the herbicide onto target soil surfaces and in controlling weeds within the spectrum of activity of the herbicide used, and, 2. Is retentive of 1,3-D, methyl bromide, DMDS, and chloropicrin initially, but ultimately allows diffusion over time following application. In this respect, it has the physical properties of both high and low barrier films in practice. These characteristics are discussed in light of suitability in commercial production systems.