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## Surlyn® and Nucrel® Tested for Seasoning Sachet

*Masanobu Sato of Mitsui DuPont Japan describes how we helped a Japanese packaged goods manufacturer reduce their incidence of pinholes in a new seasoning product.*

Seasoning powders, by their very nature, present challenges to packaged goods manufacturers. The small sachets must preserve the product's freshness and flavor, resist puncturing and tearing during the manufacturing and shipping process, and seal through powdery particles.

Recently, Mitsui DuPont helped a Japanese food manufacturer conduct a comparison test between metallocene polyethylene (mPE) resin and Surlyn® /Nucrel® packaging resin for the packaging of a new seasoning spice that includes stiff fish parts. The end-user was interested in reducing pinholes while maintaining the cost-effectiveness of the overall structure.

The test structure created was paper (52.3 g/m<sup>2</sup>)/resin (15μ)/foil (7μ)/sealant resin (25μ). In the mPE structure, there also was a chemical primer and ozone treatment on the foil.

In the comparison test, we evaluated pinhole resistance in three ways, since it was not clear what evaluation methods corresponded to the pinhole resistance on the manufacturing line. The test methods employed were Gelbo flex after 30 cycles, puncture strength (by sticking a pin head into the laminated structure), and press through contamination (by putting a laminated sample between #180 sandpaper and a rubber sheet and pressing at 6.7 kg/cm<sup>2</sup> x 1 sec. on a compression machine).

In puncture strength testing, we observed that the pinholes were not at the seal area but rather in the body of the package. This was caused by the stiff fish parts stabbing through.

Test results revealed DuPont™ Surlyn® resin has a greater advantage in pinhole resistance. Further, in evaluating other properties, such as seal strength, hot tack and tear property, we found that mPE has no advantage over all Surlyn® and Nucrel® grades.

To maintain cost efficiencies while improving pinhole resistance, we recommended that the food manufacturer change the sealant thickness from the conventional 20 microns to 25-30 microns. According to our recommendation, more filling tests were held at the end-user's facilities to compare between mPE and Nucrel® under 30 micron thickness.

The test results showed that the seasoning package structure with Nucrel® sealant reduced its pinholes to almost nothing. On the contrary, the structure with mPE sealant not only couldn't reduce its pinhole number but also exhibited increased seal failure. The seal failure seemed to be caused by mPE's narrow hot tack window, and it became clear that mPE resins have an instability in seal, especially in the case of less heat conduction, such as a paper structure, thicker coating, etc.

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