SHORT COMMUNICATION

Application of Different Flexible Films in Shrink Wrap Packaging Machine for Packing of Tamarind (*Tamarindus indica* L.) Pulp Briquettes

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ABSTRACT

Shrink wrap packaging is one of the best and newest techniques for storage of tamarind pulp briquettes. In this paper various thicknesses of flexible films namely 19 micron LLDPE, 38 micron LDPE and 63 micron MDPE has been used for standardized individual shrink temperature and residence time inside the shrink wrap machine tunnel.

Key words Shrink wrap, tamarind briquettes, packaging, fish eyes and burn holes

Processing and packaging are the two important phases of operations in the food industry. The final phase is the packaging stage. The correct packaging enables processors to pack fresh and fresh-cut fruit and vegetables and extend their shelf life (Scetar et al., 2010). The concept of individual film wrapping (IFW) of fruits and vegetables to delay deterioration was first proposed and investigated by Whitacre et al. (1939) at Texas A&M and by Stahl and Vaughan (1942) at the University of Florida (Barmore, 1987).

Sharma and Pal (2009) revealed the technology of shrink-wrapping for apple (variety Royal Delicious) and kiwifruit (variety Allison) has been standardized. Different types of heat-shrinkable films, viz. Cryovac (9 μ), polyolefin (13μ) and LDPE (25 μ) were used. Cryovac film was the best in extending both shelf-life and storage life with better retention of fruit quality over unwrapped fruits. And best results were obtained when heat shrinking was done at 120 °C temperatures with 10 seconds’ exposure.

A team of scientists at CIPHET, Abohar has standardized this novel packaging technique for various fruits like kinnow, peach, guava, apple, pomegranate and vegetables such as tomato and capsicum. The individual shrink-wrap packaging extends the shelf-life by preventing the moisture loss, maintaining firmness and reducing the respiration rate. It also delays the physiological deterioration of fruits sometimes even better than the low temperature storage. In general 10-20% reduction in transpiration rate is possible by shrink-wrap packaging under ambient condition. One of the biggest advantages of individual shrink-wrap packaging is that it prevents secondary infection, which is important for long-term storage. Individual fruit wrapping also provide the optimum gas and humidity condition for maintaining the quality during transit and storage. As a result, it doubles or at times triples the shelf life of fruits and vegetable without any refrigeration. The extent of benefit from shrink-wrap packaging depends upon the type of produce, its physiological maturity and initial quality (Gupta and Kumar, 2007).

Tamarind is a very useful kitchen product and available in abundant form in rural area. It is again an important ingredient in Ayurvedic medicines as well as in daily needs throughout India. All these needs are fulfilled by tamarind pulp (Lende and Chandak, 2012). The pulp constitutes 30-50% of the ripe fruit (Purseglove, 1987; Shankaracharya, 1998 and El-Sidding, 2006), Tamarind processing encompasses the unit operations such as drying, dehulling, defibring, drying, deseeding and packing (Karapoora et al., 2014). Shrink wrap packaging usually applied for packaging horticulture produces, its uses for packaging of tamarind pulp briquettes is a new practices for improving shelf life and appearance.

Present studies were attempted to standardize individual shrink wrap temperature and residence time of different flexible films in packaging machine to see the feasibility of shrink wrapping of tamarind pulp briquettes.

MATERIAL AND METHOD

Ripe tamarind fruit were procured from the Minor Forest Produce Mandi Jagdalpur (Chhattisgarh). Damaged, decayed and defective were sorted out and uniform size tamarind pod was desheling and deseeding manually. 250±5 g of deseeded tamarind pulp (*Phool imli*) was briquetted in 13×9×2 cm hopper size manually operated tamarind briquetting machine. Tamarind briquettes were wrap in LLDPE, LDPE and MDPE film and replicated in ten times for shrink packing in shrink packaging machine (Model BS-450, Samrath Engineers, India) at different temperature and residence time. After shrink packaging seeming of packaging materials and physical properties of packaging material was recorded.
Table 1. Number of tamarind briquettes packed in different flexible films affected during different shrink temperature and residence time (N = 10)

<table>
<thead>
<tr>
<th>Shrink Temp. (°C)</th>
<th>Residence Time (Sec)</th>
<th>Appearance of packaging</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>MDPE (63 µ)</td>
<td>LDPE (38 µ)</td>
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<tr>
<td>Fish eyes</td>
<td>Burn hole</td>
<td>Fish eyes</td>
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<tr>
<td>10</td>
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RESULTS AND DISCUSSION

Effect of different shrink temperature and residence time on packaging of tamarind briquettes

The data presented in the Table 1 revealed that different shrink temperature and residence time affected separately on individual packaging materials these two measures problems occurred were follows

Fish eyes

The packaging defect fish eye was not found during shrink temperature 200°C at residence time 15-20 sec in MDPE, 150 °C at residence time 20 sec in LDPE and 100 °C at residence time 15-20 sec in LLDPE, this defect shows decreased trend continuously when increased temperature and residence time in individual shrink packaging. Fish eyes are round or oval patterns on a package caused by poor shrinking. Fish eye’s makes package look very unprofessional. Its causes due to insufficient heat, low air velocity and high tunnel conveyer speed.

Burn holes or burn out

Burn holes are when too much heat is applied to the shrink film being used, which leads to burning or tearing while shrinking. It causes unwanted holes on shrink film. Burn out symbolizes improper heat on the bubble of the package. the results (Table 1) shows these defect was continuously increased when increasing individual shrink temperature of respective packaging films at all three residence time and no these defect was appear when shrink temperature 200°C at residence time 15-20 sec in MDPE, 150 °C at residence time 20 sec in LDPE and 100 °C at residence time 15-20 sec in LLDPE.

CONCLUSION

Shrink-wrap packaging is a new technique for storage of tamarind pulp briquettes. Shrink-wrap packaging enhances the appearance and shelf-life and finally result in value addition of the tamarind pulp briquettes, hence tamarind will fetch higher price. That’s standardization is a necessary for implementing and developing standard for production, compatibility, interoperability and safety of process.

LITERATURE CITED


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