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**Risk assessment of quality packaged processed food products using  
printed polypropylene films on rotogravure technology**

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**Abstract**

The most important functions of better packaging are to protect and preserve foodstuff from the various external factors during storage, transport and shipping periods with the same quality until the end of Shelf-life. On the other hand a lot of food products suffer from weakness based on using unsuitable packaging plastic materials. Based on this food products may suffer damage before its usage, in addition to the loss of the products. So recently, manufacturers of plastic films used in the packaging of food products, weather fresh or processed do concern to enhance the properties of these materials to cop with requirments of both the producers and the products itself.

Material barrier properties are the most important characteristics that packaging material producers are fousing on, in order to face both chemical and microbiological effects, in addition to other aspects that negatively affect the quality of the product. Moreover another critical factor that helped to maintain the quality of the product internally inside the package, the using of MAP Modified Atmosphere packaging technology e.g. injecting inactive gas such as nitrogen N<sub>2</sub> during the packing process.

The aim of research is to assess the risks which affects the quality of the plastic packaging film, starting from the first steps by tracing the early stages of appropriate selection of a qualified plastic film, food product characteristics, and the selection of printing inks and lamination materials down to packing factories qualifications; technology applied , storage, shipping and transport operations on the quality of the product Itself.

In terms of Bio-axial oriented transparent polypropylene films as one of the most important and characterized material having medium oxygen permeability and excellent water vapour permeability, the reseach was limited to that category of packaging material. Moreover these are locally manufactured, therefore it can be assessed, measured for its performance and quality based on practical experiences. Potatoes chips food products were selected as it is sensitive to oxygen gas, where many chemical variables, fungal growth and microbiological can happen as a result of changing the ratios of oxygen and there effects on the change of the taste and flavor. The oxygen level is set to be a key player in the preservation of food, thats to say the packaging that in hold the products plays a vital role in the preservation process. The research examined these packaging films and there properties with respect to properties needed for good preservation for the food. The results showed that the barrier properties of oxygen permeability of polypropylene films must be improved as well as keeping a very small proportion of this gas within the plastic packaging products manufacturer.



**Keywords:** barrier plastic film - processed food products - gas permeability to oxygen - permeability to water vapor.

### **Problem statement**

- Decline the appropriation degree of printed plastic films which is used packaging many processed food products, as well as there preservation levels that leads to undesirable interaction between food products itself and various external factors such as oxygen, water vapor, heat, ... etc.
- The negative effect of the undesirable interaction leads to change of some chemical characteristics of the food such as taste, flavor and color ... etc. In addition to the damage of the product itself before its shelf life date.
- Increase in wastage rate from processed foods as a result of the inability of the plastic films to maintain the quality of the food product during handling and storage periods.

### **Aim of study**

Evaluation of the factors affecting the performance of the barrier properties of plastic films used in the packaging of food products manufactured using the modified atmosphere gasses of technology against gasses and water vapor transimmisions and there impact on product quality and food reservation.

### **Materials and Methods**

Six printed packaging samples with transparent polypropylene films 20 micron with metalized polypropylene for one kind of Egyptian snacks food product were tested. Three samples before lamination with polyproplene film and the other three samples after the lamination process with different concentrations of oxygen.

Regarding to the gas and moisture permeability tests, all samples were analyzed by OTR permeation analyzer (Oxygen transmission rate), “ from Systech Illions company - Model 8501 according to ASTM D 3985 conditions ”. In terms of WVTR permeation analyzer (Water Vapour transmission rate), “from Systech Illions company - Model 7001 according to ASTM F-1249 Conditions”. Whereas oxygen concentration tests were conducted on inside the food package by O<sub>2</sub> tester from WITTGASETECHNIK company under lab conditions.

### **Results and conclusion**

Printing materials in each of OTR and WVTR tests showed to have a positive impact where the permeability of the films have decreased, therefore, increased the ability of the plastic film to prevent the gases and moisture to go throw the package, as there molecules blocked the inter spaces in the film.

Results of oxygen concentration experiments have showed that there was an effect of oxygen on the characteristic of free faty acid and the peroxide value present inside the product with a slight change, within the accepted range set by PIRA organization.

### **Acknowledgement**

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