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Short Communication

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Sustainable Packaging for Mars (Planet)

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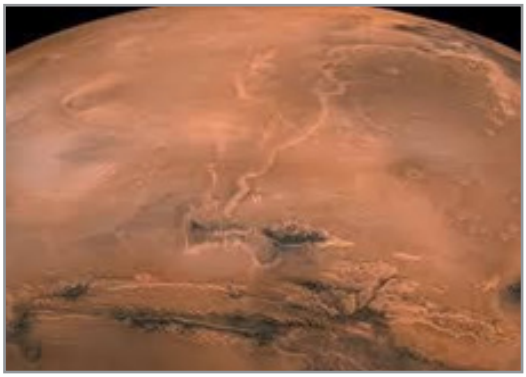
Abstract

This paper presents applications of wide ranges of Sustainable packaging materials and designs for FMCG, Pharmaceutical products, Electronics & Electrical products and many.

Introduction

We all know till today MARS have extreme climatic conditions and scientists are working day and night to make it possible to start human colony, for that Sustainable packaging materials need to use in order to save the planet right from the beginning. Wide ranges of testing for sustainable packaging materials done and we are ready with many. Hopefully by 2030 we can start using those sustainable packaging materials on MARS. Our aim is to use only Biodegradable & recycled polymers and paper-based packaging materials for packaging of any products if scientist can able to discover petrol on MARS which not yet confirmed.

Sustainable Packaging for Pharmaceutical Products



a) Identification of Packaging Materials

Manual operation	Test Methods
Identification of LDPE POLYMER	➢ Can use IR or DCS method and standard graph is available in USP
Thickness of individual layers	➢ Digital thickness tester or nondestructive testing machine.

b) Analysis of Laminates

The most effective instrument to carryout identification of multiple layers by IR.

DSC is also a very efficient testing machine for identification of Polymers and raw materials.

c) Non-destructive Leak Test for Expensive Products

- Can save time and cost.
- Very good machine.

Following Packaging is not Suitable on MARS

- Blister packaging contains PVC/PVDC
- ALU/ALU
- HDPE, PP, PVC bottles

For Packaging of Tablets, Capsules and Semiliquid's following Packaging Materials are 100% Sustainable

- Glass bottle with Aluminun or Tin cap (all Raw materials are available on MARS).
- Better to use "Glass vials, Glass PFS, cartridges for injectable products. Better to avoid polymeric primary packaging materials. (we all know as per USFDA not possible to reuse primary packaging materials for pharmaceutical products).
- For high radiation "Glass vial, PFS and cartridges need to coat with Gold printing) sometimes black coating would be fine. Make sure all inks should be biodegradable.

Sustainable Packaging of Foods

Vacuum pack is must for packaging of foods for space. In this process removes atmospheric oxygen from the Primary packaging products since Oxygen is the primary source of product degradation.

Vacuum Packaging and their Advantages

- Substantial Increase Shelf Life
- Barrier from External Elements
- Clear and Visible External Packaging
- Minimal Need for Chemical Preserves
- Quick and Efficient
- Reduced Product Loss
- Affordable Packaging Option
- Minimal Up-Front Cost
- Excellent for Freezer Storage
- Professional and Accepted Packaging Option Used Around the World

Following Primary Packaging Materials are Suitable for Food Packaging Purposes on MARS

1. As we know quality sand is available on MARS and from that we can produce "Glass bottle" and glass is the most suitable material for food packaging. (HDPE, PET, PVC we can't use to keep in mind sustainability of the planet).
2. TIN or Aluminum caps need to use not plastic cap.
3. Glass plate, bowl, Cup need to use during taking foods.
4. Aluminum "Tube" need to use for packaging of "Tomato sauce, butter etc" not plastic tubes.

Warehouse

- In order to save the MARS planet we can't use "wooden pallets in stores. We have to use "Metal pallets"
- Racks should be made of Metal not wood.

Most Suitable Sustainable Packaging Materials for MARS

- Biodegradable polymers for packaging of dry fruits and vacuum pack.
- Recyclable "bubble wrap"
- Glass jars, vials, PFS, Cartridges, tin and Aluminum cans.
- Organic ecological textiles.
- Edible films.

References

Since this is an "original research work" so no need of any references.