



## 10 ways in which plants may help future Christmases be green

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Plants, rather than fossil fuels can provide our future energy, fuel and everyday products. Here's how plants can help us have a green Christmas:

### Travelling home for Christmas

#### 1) Transport

Biofuels will provide cleaner and greener fuels for the future. There are two different types of biofuel - bioethanol, which is made from corn starch and is an alternative to petrol, and biodiesel which is made from the seed oils of oilcrops such as oil seed rape. So called 'second generation' biofuels will be made from a much wider range of materials, allowing waste agricultural products to be used to make biofuels.

#### 2) Our cars

Plants will not only power our cars, they will also provide rubber for the tyres as well as engine oils and additives and the natural materials used in fittings.

- The supply of natural rubber from the rubber tree is under threat but the guayule shrub makes a similar type of rubber which can be used for tyres.
- Plant oils offer a sustainable source of oils, greases and lubricants now made from petroleum.
- Plastic door handles, wing mirrors and other fittings could be replaced by plant-made 'bioplastics' which are similar in function to common plastics but come from a renewable resource.

#### 3) Travelling further afield

Natural rubber is essential for aircraft tyres to withstand the heat and pressure generated on landing. Demand for rubber is forecast to exceed supply by 25% in 2020. Synthetic rubber does not dissipate heat as efficiently as natural rubber but guayule rubber, due to its similar properties to natural rubber, is a potential replacement material for aeroplane and other heavy-duty tyres.

Plastics are also widely used in aircraft fittings, in-flight entertainment and catering. In future, these could be made from bioplastics.

Biofuels for planes are under development in a bid to reduce the environmental impact of the aviation industry.

### Decorations

#### 4) Lighting up the Christmas tree

Electricity will be generated from plant material, 'biomass', in a biorefinery - an integrated processing system where biological feedstocks are converted into a range of products, providing fuel, heat and power. Biorefineries can generate

electricity by burning waste material to generate steam, converting biomass into fuel gas, or by using biogas produced by the digestion of biomass in the absence of oxygen.

## **Presents**

### **5) Gifts under the tree**

Leisure goods ranging from sport equipment to CD players, CDs and DVDs are dependent on plastics made from oil. Plants make a broad range of materials and so may provide a source of replacement products to create alternatives to plastics in a sustainable way.

## **Looking good for Christmas**

### **6) Good health**

Up to six per cent of the general population is allergic to latex, caused by an immune response to proteins found in rubber from the rubber tree, *Hevea brasiliensis*. Natural rubber is used to make examination and surgical gloves, condoms and other medical products as it forms a more effective barrier to disease than synthetic rubber. The guayule shrub, found in south western USA and Mexico, produces rubber with similar properties to *Hevea* rubber but which does not contain the proteins responsible for causing the latex allergy and is suitable for use in the production of protective medical products.

### **7) Beauty**

Plant oils and extracts commonly have a high value in cosmetic applications and can provide a renewable source of cosmetic ingredients, for example, to replace the use of petroleum-derived greases used in lipsticks and skin creams.

### **8) Fashion**

Synthetic textiles are now common and some, including nylon, acrylic and polyester, are made from petrochemicals. Plants can be used as a renewable resource to guarantee our supply of these useful materials or similar replacements.

## **Christmas dinner**

### **9) Turkey, sprouts and Christmas pudding**

Starch from potatoes, corn and other cereal crops can be used to make biodegradable packaging and plastics. The clingfilm, carrier bags and containers made in this way will protect your groceries just as well but once disposed of (by composting or biodegradation), will degrade in 3-6 months. In contrast, conventional plastic shopping bags and other packaging will still be around thousands of years later.

### **10) Cleaning up afterwards**

Some detergents, such as dishwasher detergents, are also commonly made using petrochemicals. Plants are a renewable resource of biochemicals which can be used to replace petrochemicals in detergents, as well as being less toxic to the environment.