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LCA of a Roast Stored in Aluminium Household Foil

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Executive Summary

"LCA of a Roast stored in Aluminium Household Foil"

Büsser S. and Jungbluth N. (2008) LCA of a Roast stored in Aluminium Household Foil; ESU-services Ltd. commissioned by European Aluminium Foil Association e.V. (*EAFA), Düsseldorf, DE and Uster, CH.*

The protection of food and the prevention of food wastes directly contribute to resource savings and the protection of the environment. Prepared food receives special attention as not only the food itself, but also all efforts for its preparation will be lost, if wasted.

Some kinds of meals are commonly prepared in larger quantities on purpose and leftovers are consumed the following days. For the storage and conservation of these, different means are in use. Aluminium household foil is one of them.

In order to understand and relate the contribution of the aluminium foil to the overall impacts that are associated with the production, preparation and leftovers a typical case is investigated in detail within this study.

With regard to the case of **stored meat roast remains** the two main targets are:

- Investigation of the environmental relevance of stages and interdependencies within the life cycle of roasts while taking consumption patterns and consumer behaviour into consideration.
- Investigation of the environmental relevance of aluminium household foil with respect to its function within the life cycle of roast.

For a comprehensive view the entire life cycle of roast including the storage of roast remains was studied. The life cycle of prepared roast involves not only the direct purchase of a product from the supermarket, but also the further preparation including cooking, roasting and storage at the household.

There are hundreds of different ways to prepare roasts. They can be made from different kind of meat as veal, pork, beef or poultry and are cooked on the stove or in the oven between 30 minutes and 2 hours. Roast remains are easy to preserve and commonly used as cold side dishes or stewed and used in soups. A generic recipe was chosen to model the life cycle and all environmentally relevant in- and outputs.

The life cycle of roasts encompasses the whole food supply system from the barnyard until the consumption and storage of remains wrapped in aluminium household foil at home. The life cycle starts with the production of meat, i.e. farming and slaughtering of animals. Meat then is packed and transported under refrigerated conditions to supermarkets. Meat is either transported boned and already packed or not conditioned and hooked. During this route an intermediate storage at a cold store is included in this study. In big supermarkets meat mostly can be bought at the operated cabinet or from the chilled cases. From the supermarket meat has to be transported to the household. In the household meat first is stored in the fridge until it is cooked with water, butter, salt, herbs, onions, etc. The roast remains are wrapped in aluminium household foil and stored in the fridge for some other days until they are eaten as well.

A similar life cycle is modelled for the aluminium household foil. Aluminium foil is first produced, packed, and transported to the supermarket. From there transport to the household takes place. After use aluminium household foil is given to recycling or disposed, ending up in an incineration plant or land-fill site.

In this study veal and pork roasts are investigated. Remains are wrapped in aluminium household foil and stored in the fridge. They are not heated again. Meat sold in conventional supermarkets is investigated. Butchers or direct-sales at the meat processing plant resp. slaughterhouse are not considered.

The results of this study are calculated for ten environmental indicators. The main impact assessment and discussion, however, is based on a selection of the five most widely accepted indicators. These are Cumulative Energy Demand (CED), non-renewable [MJ-eq.], Global warming [kg CO_2 eq.], Ozone layer depletion (ODP) [kg CFC-11 eq.], Acidification [kg SO_2 eq.] and Eutrophication [kg PO_4^{3-} eq.].

Figure 1 reveals the results for the standard case for the five selected indicators scaled to 100%.

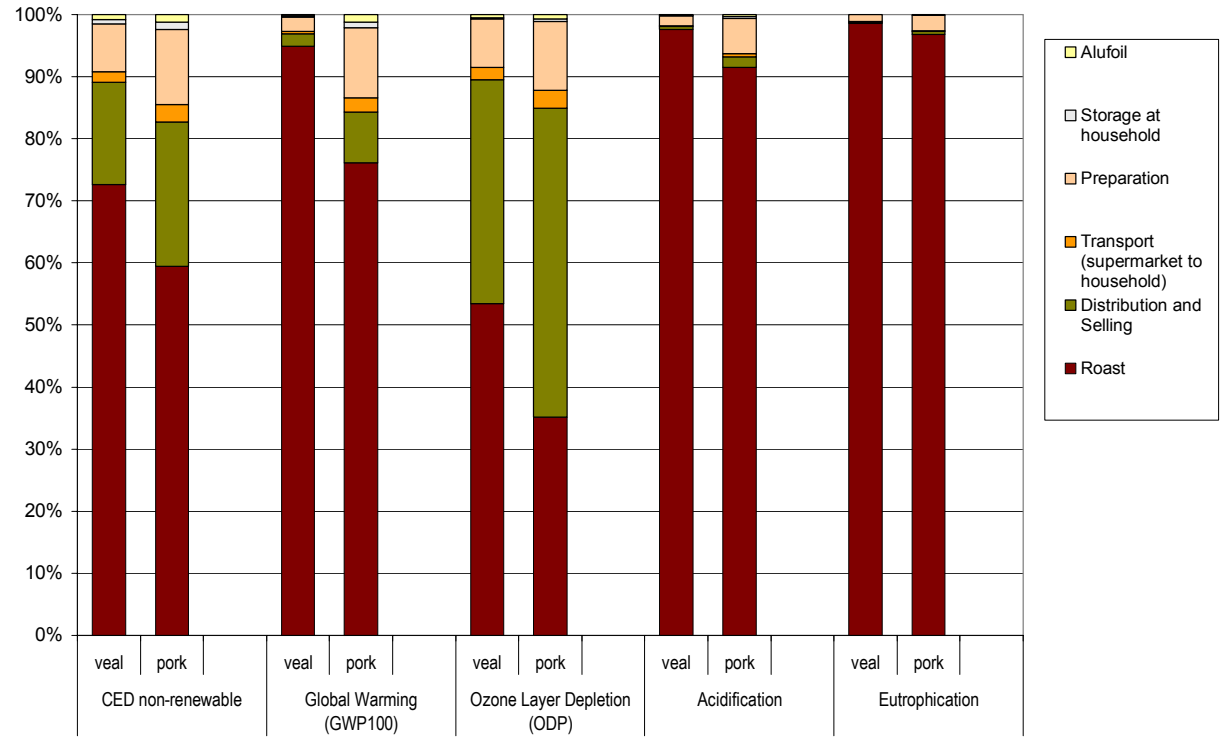

Figure 1: Results of the standard case for the preparation of 1 kg roast including half of the roast stored in aluminium household foil.

Based on the sensitivity analysis of the major assumptions the most relevant factors concerning the environmental impacts are for the majority of environmental indicators:

- **Type of meat and differences in agricultural production**: Compared to the other life cycle phases the agricultural production is responsible for a major share in nearly all indicators. Beef and veal have higher impacts than pork or poultry.
- **Transportation of meat**: Most kinds of meat are produced in Europe. Nevertheless also a significant amount (lamb, veal, and beef) is imported from New Zeeland or South America. If airplane transportation is taken into account transport based emissions increase in an order of magnitude.
- **Cooking time of roast and energy use**: A shorter cooking time or the switch to another recipe is one possible option to influence the environmental performance depending on the consumer's preferences. In any case preheating longer than necessary or overheating should be avoided and the oven should be switched off as early as possible.

The influence of the aluminium household foil is quite small for all indicators calculated. This will even be true if the amount of aluminium foil would be reasonably higher than assumed here. Remains of roasts should be kept instead of being thrown away for what aluminium household foil is an option. In this sense aluminium household foil helps to avoid spoilage and wastage of meat improving the environmental performance of the system under study[1].

[1] This does neither proof the environmental superiority nor the inferiority of aluminium household foil compared to other storage devices like rigid boxes or plastic wraps neither.