

Disposal of leather goods



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Introduction

The consumer has a responsibility not to use the simplest method of disposal - unfortunately still in common practice - that is, just throwing refuse away. Campaigns to collect worn and unwanted goods and sporadic recycling initiatives go some way towards improving the situation. However the best solution would be to make new material or products from recovered leather. The second best way to dispose of used leather is by incineration, because leather provides considerable amounts of energy. But this leaves the problem of dealing with the slag.

Nature of problem

The simplest method of disposal is to return the used natural product leather to nature, e.g. to compost it. We are therefore studying this carefully. Some initial progress has been achieved. We have ascertained that organic material like dyes or pigments, retanning agents, fat liquor may degrade under given biological conditions. However, chrome tanned leather is hard to compost and the reaction of the remaining metal, which may include some inorganic pigment and metal from complex dyes, is not known in detail. Therefore, at the present time composting trials are mostly performed with metal-free shavings or leather waste. The composition of a typical wet white shaving waste is shown in table 1.

Table 1: Composition of wet white pre-dried

Water content	10 %
Total dried matter (105°C)	89.7 %
Total organic dried matter (combustion)	89.0 %
Phosphorus (as P ₂ O ₅ , calculated)	0.01 %
Potassium (as K ₂ O, calculated)	0.04 %
Calcium (as CaO, calculated)	0.2 %
Magnesium (as MgO, calculated)	0.003 %
Nitrogen (as N, calculated)	15.1 %



Wet white waste before composting

Composting method

Compost, normally placed in a shady corner, is the heart of a biological garden. It requires heat, moisture and oxygen in order to react aerobically (oxidatively). The compost shown in table 2 was used in a field test:

Table 2: Composition of standard compost

Greenery	4'500	kg
Fruit waste	500	kg
Wet white shavings and trimmings	320	kg
Initial compost	50	litres
Stone powder	30	kg
Water	330	litres

The compost behaved like a natural garden compost. The reaction process is triggered by micro-organisms and takes place in three stages (heating, hot stage, cooling) at different temperatures over a total period of about approximately 6 months. The reaction mass heats up to a maximum of 70-80°C, thereby harmful biological substances are being destroyed. The earth organisms then require nitrogen in order to build up their own protein. In biological enterprises, especially in autumn, when foliage, wood and shrub waste occurs, there is often too little nitrogen present, and it frequently has to be added. We have seen that metal-free shavings or metal-free leather, added at the beginning of the composting process, can provide this additional nitrogen.

However, every compost composition shows behaves differently. Therefore the general guideline shown in table 3 should be followed for composting leather waste and in selecting chemicals used for producing metal-free leather.

Table 3: Composting guideline

1	Shavings or leather waste must be composted together with other organic natural material.
2	Shavings or leather waste must be reduced to very small pieces and care taken to make sure that the compost is very well mixed.
3	Aliphatic compounds like natural fat decompose faster than aromatic products like synthetic syntans.
4	Products of low molecular weight are easier to destroy than those of high molecular weight or even cross-linked products which are often used for the finishing process.
5	Avoid problematic chemicals like chlorinated paraffin, nonyl-phenols, some preservatives and others.

Results

The results of various studies carried out show that excellent compost with a high nutrient content is obtained by this method. The assumed average analysis of the compost including leather waste is shown in table 4:

Table 4: Compost analysis

1	pH	6-8
2	Water content	40-50%
3	Organic matter	45-55%
4	Nitrogen (measured on try contains)	1.5 -2.0 %
5	Heavy metal content: i.e. cadmium and mercury	less than 1ppm
	Heavy metal content: i.e. lead, chromium copper, and nickel	less than 100ppm

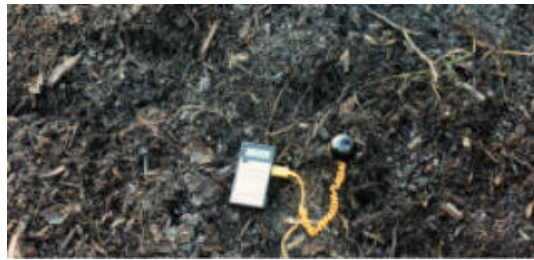
Field tests with this compost revealed that nitrogen was released to the soil at a slow rate, therefore this compost has to be classified as a long term nitrogen fertiliser. This is a very clear indication that leather is (and should be) a highly stable material. Too much leather in the compost can slow down the fertilising effect. The heavy metal content should be low to meet the strict limits set by experts and authorities.



Wet white must be reduced by a shredding machine

Conclusion

Experience to date indicates that on the strength of these results we can feel justified in hoping to have found an environmentally acceptable disposal procedure for chrome-free shavings and leather. In principle, metal free shavings and leather have been found not to inhibit the biological process of composting and can be used as fertiliser. However, it must be borne in mind that leather is often produced with unknown chemicals, which may slow down the composting and fertilising behavior. For every type of leather trials should be carried out and be verified by drawing up integral environmental balance sheets.



Controlling of the composting process with the appropriate tool

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