3. QUANTITATIVE WASTE DIVERSION ASSESSMENT

3.1 Automated measurement of residual household waste

Ongoing technical problems with the RCV and weighing system throughout the project constrained the amount of residual weight data recorded for households on the collection rounds. However, two significant sets of weight data for consecutive weeks in October 2005 (11-13 and 18-20 October) were measured for 257 properties, equivalent to approximately 80 % of the households that were initially identified for inclusion in the Study (Section 2.1.2). This represented a population size of 642 residents. Thus, whilst the Study was unable to realise the full potential of the automatic system for weighing residual waste, this sample size was adequate to provide a representative and quantitative indication of the effects of HC and KC on household waste generation and diversion from landfill disposal.

The mean quantity of residual waste collected per household (Table 3.1) was less than the national average of 23.1 kg/household (hh)/wk (DEFRA, 2005) for all of the treatment groups (Section 2.1.1). The overall mean weekly amount of residual waste collected from the properties surveyed in RBC was 16.3 kg/hh. The average occupancy was 2.5 persons/hh and the mean amount of waste generated per individual was approximately 6.5 kg/wk.

Households in the Control group, that did not compost or participate in KC, produced approximately 17 kg/wk of residual waste. Interestingly, however, properties in the Recycling-only group also produced a similar amount of residual waste compared to the Control. This could be explained if, for example, Recycling-only households in practice did not participate in the kerbside recycling scheme. Alternatively, recyclable materials may be separated by these households, but the spare capacity in the residual waste bin created by recycling could be filled with other waste materials, such as surplus bulky garden waste. By comparison, Composting-only households produced approximately 1 kg (5 %) less waste than the Control or Recycling-only groups. Homeowners presumably dispose of all of their dry (i.e. non-biodegradable) waste first, therefore the observed decrease in the mass of collected residual waste for this group may reflect a direct reduction in biodegradable waste disposal and diversion from landfill due to HC. Alternatively, if homeowners in the Composting-only group also behave in a similar way to the Recycling-only group, and use the spare capacity in the bin to dispose of bulky garden waste (e.g. for material that may be unsuitable for HC, for instance), the apparent reduction in residual waste may be explained because denser food waste removed from the residual waste stream by HC may be replaced with surplus bulky waste of lower density. In contrast to either recycling or composting separately, households that both recycled and composted their waste had a much greater influence on landfill diversion and reduced the average amount of residual waste collected by approximately 2 kg (12 %) compared to the Control.

On a per capita basis, individuals within the Recycling-only group generated approximately 1 kg more residual waste than the Control group. The amount of waste produced per capita in the Composting-only group was approximately equal to the Control. However, individuals in the Recycling+composting group generated approximately 1 kg (13 %) less waste compared to the Control. This highlighted the importance of both practices in increasing waste diversion from landfill disposal.

The effects of promotional activities performed with the Recycling+composting group (Section 2.1.3) are shown in Table 3.2. There was no difference in the amount of residual waste collected from unsupported households compared to the Control group (i.e. households that do not recycle or compost their waste). However, residual waste was significantly reduced by the advisory leaflet on HC (Appendix III), but there was no additional benefit for waste diversion from landfill disposal from also visiting homeowners engaged in HC.

Table 3.1 Effect of home composting and kerbside recycling on the collection of household residual waste measured by an automated weighing system fitted to the RCV

Collection period	Treatment group	Total no. of properties	Total no. of persons	Total waste (kg)	Average waste (kg/property)	Average waste (kg/person)
Week 1 11-13 Oct 2005	Control	35	89	625	17.9	7.0
	Recycling-only	71	161	1273	17.9	7.9
	Composting-only	15	36	241	16.1	6.7
	Recycling+composting	136	356	2120	15.6	6.0
Week 2 18-20 Oct 2005	Control	35	89	589	16.8	6.6
	Recycling-only	71	161	1200	16.9	7.5
	Composting-only	15	36	253	16.9	7.0
	Recycling+composting	136	356	2053	15.1	5.8
Week 1+2	Control	70	178	1214	17.3	6.8
	Recycling-only	142	322	2473	17.4	7.7
	Composting-only	30	72	494	16.5	6.9
	Recycling+composting	272	712	4173	15.3	5.9

Table 3.2 Effect of different promotion activities for home composting on the collection of household residual waste measured by an automated weighing system fitted to the RCV

Collection period	Recycling+composting treatment group	Total no. of properties	Total no. of persons	Total waste (kg)	Average waste (kg/property)	Average waste (kg/person)
Week 1 11-13 Oct 2005	Control	35	89	625	17.9	7.0
	No promotional support	50	129	910	18.2	7.1
	Leaflet	45	120	654	14.5	5.5
	Leaflet+home visit	41	107	556	13.6	5.2
Week 2 18-20 Oct 2005	Control	35	89	589	16.8	6.6
	No promotional support	50	129	864	17.3	6.7
	Leaflet	45	120	606	13.5	5.1
	Leaflet+home visit	41	107	583	14.2	5.5
Week 1+2	Control	70	178	1214	17.3	6.8
	No promotional support	100	258	1774	17.7	6.9
	Leaflet	90	240	1260	14.0	5.3
	Leaflet+home visit	82	214	1139	13.9	5.3

The results presented here demonstrate that HC and KC may significantly reduce residual waste collection for disposal in landfill overall, but they may also have potentially complex and subtle effects on waste disposal patterns. These cannot be discerned by weighing the mass of residual waste alone. Therefore, compositional analysis of the residual waste is also required, to complement the total weight data, to fully quantify and interpret the effects of recycling and HC practices on waste diversion from landfill disposal.

3.2 Waste compositional analysis

The RCV weight data were complemented by a detailed compositional analysis of residual waste sampled from selected households on the collection rounds (Section 2.1.2). The collection and sorting of the residual waste was completed with the assistance of a specialist contractor in waste compositional analysis (Waste Research Ltd, Sheffield). Waste was sampled for analysis on two occasions to provide detailed information on the effects of HC and KC on the properties of household waste collected for disposal in the summer (30 June 2004) and autumn (10-11 November 2004) periods. Households from all treatment groups were sampled in the summer waste analysis, whereas in the autumn, composition data were measured for the Control, Recycling-only and Recycling+composting groups. A summary of the numbers of households and treatment groups sampled for both campaigns is presented in Table 3.3. The recycling scheme operated by RBC included the KC of glass, paper and card, metal and textiles (Appendix II, Table A2.3).

Table 3.3 Number of households per treatment group in summer and autumn analyses

Treatment group	Summer analysis No. of households	Autumn analysis No. of households
Control	17	44
Recycling only	50	50
Composting only	12	Not sampled
Recycling+composting	37	48
Total	**116**	**142**

3.2.1 Summer results

3.2.1.1 General aspects and data presentation

Table 3.4 and Figure 3.1 summarise the waste arisings for each household treatment group in kilograms per household per week (kg/hh/wk) and Table 3.5 and Figure 3.2 present the compositional data as percentage by weight. Detailed data on the waste categories and sub-categories can be found in Appendix VI. During the summer campaign, the largest quantity of residual waste was disposed by households in the Recycling-only group, equivalent to 16.7 kg/hh/wk, whereas the Control households produced the smallest amount overall, equivalent to 12.4 kg/hh/wk. However, the number of households representing this group was relatively small (Table 3.3). The total amount of residual waste declined for households engaged in composting and KC in the order: Recycling-only, Composting-only and Recycling+composting. The residual waste from the Recycling+composting group contained the smallest amounts of recyclable materials suggesting that householders who also compost their waste may represent the most conscientious group at recycling wastes through KC and other schemes.

3.2.1.2 Putrescible materials

This primary category made up over 50 % of the total weight of residual waste collected for the Control and Recycling-only groups (Table 3.5). The proportions of putrescible waste collected from households engaged in HC were marginally smaller compared to non-composting groups and were equivalent to 48 % and 49.5 % for Recycling+composting and Composting-only treatment groups, respectively. In terms of the mass of waste collected,

however, the Control group generated the smallest weekly amount of putrescible waste, 6.3 kg/hh/wk, followed by the Recycling+composting group, which produced 6.7 kg/hh/wk. Recycling-only households disposed of more putrescible waste than any of the other Treatment groups, equivalent to 8.8 kg/hh/wk. Garden waste constituted the majority of the putrescible waste in all the samples examined and ranged from 2.4 kg/hh/wk for the Control to 4.6 kg/hh/wk in the Composting-only group (see Appendix VI: Tables A6.1 – A6.4). This result is notable and indicates that, whilst HC may reduce the disposal of biodegradable waste overall (eg by comparison of Recycling-only with Composting-only and Recycling+composting groups), the amount of garden debris in the residual waste stream may be potentially increased by HC. Compostable kitchen waste, mainly comprising raw fruits and vegetables, and non-compostable kitchen waste, including cooked food, processed food and meat and fish, were found in approximately equal quantities in the residual waste. They were highest for the Recycling-only group (equivalent to approximately 2 kg/hh/wk) and lowest for the Recycling+composting samples (1.1 kg/hh/wk) (see Appendix VI: Tables A6.1 – A6.4). Therefore, the results indicated that HC reduced the overall amount of food waste disposed compared to the Control by 0.6 – 1.0 kg/hh/wk, equivalent to a decrease of approximately 20-30 % in residual food waste. RBC did not accept putrescible waste in its kerbside scheme during the period of this investigation, but the recent introduction of a green kerbside collection is expected to significantly reduce the amount of biodegradable materials collected in the residual waste.

Table 3.4 Summary of waste arisings according to household treatment group (kg/hh/wk) – June 2004

Waste fraction	Control	Recycling only	Composting only	Recycling+ composting
Paper and card	2.73	2.97	3.05	2.83
Plastic film	0.49	0.59	0.66	0.55
Dense plastic	0.84	1.14	0.81	0.94
Textiles	0.15	0.20	0.00	0.10
Miscellaneous combustible	0.60	1.14	1.15	0.75
Non-combustible	0.01	0.19	0.18	1.27
Glass	0.68	0.91	1.02	0.20
Ferrous metals	0.32	0.26	0.23	0.20
Non-ferrous metals	0.14	0.22	0.13	0.08
Putrescibles	6.31	8.81	7.26	6.70
HHW	0.05	0.02	0.01	0.09
WEEE	0.02	0.04	0.02	0.15
Fines	0.09	0.21	0.16	0.16
Total kg/hh/wk	**12.43**	**16.71**	**14.68**	**13.99**

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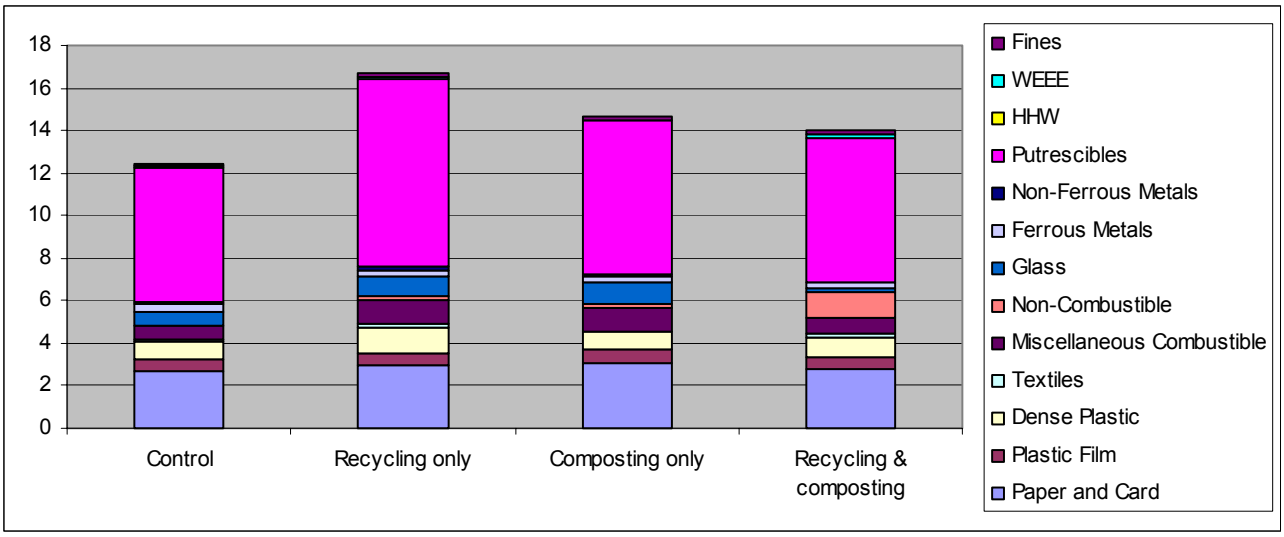

Figure 3.1 Summary of waste arisings according to household treatment group (kg/hh/wk) – June 2004

Table 3.5 Summary of waste composition (% by weight) according to household treatment group – June 2004

Waste fraction	Control	Recycling-only	Composting-only	Recycling+ composting
Paper and card	21.97	17.77	20.77	20.21
Plastic film	3.92	3.55	4.51	3.92
Dense plastic	6.78	6.83	5.51	6.68
Textiles	1.21	1.20	0.00	0.73
Miscellaneous combustible	4.86	6.84	7.84	5.33
Non-combustible	0.11	1.13	1.23	9.06
Glass	5.48	5.45	6.95	1.40
Ferrous metals	2.59	1.54	1.53	1.41
Non-ferrous metals	1.09	1.33	0.86	0.56
Putrescibles	50.72	52.72	49.51	47.88
HHW	0.38	0.10	0.08	0.62
WEEE	0.18	0.26	0.11	1.04
Fines	0.70	1.28	1.10	1.17
Total	**100.00**	**100.00**	**100.00**	**100.00**

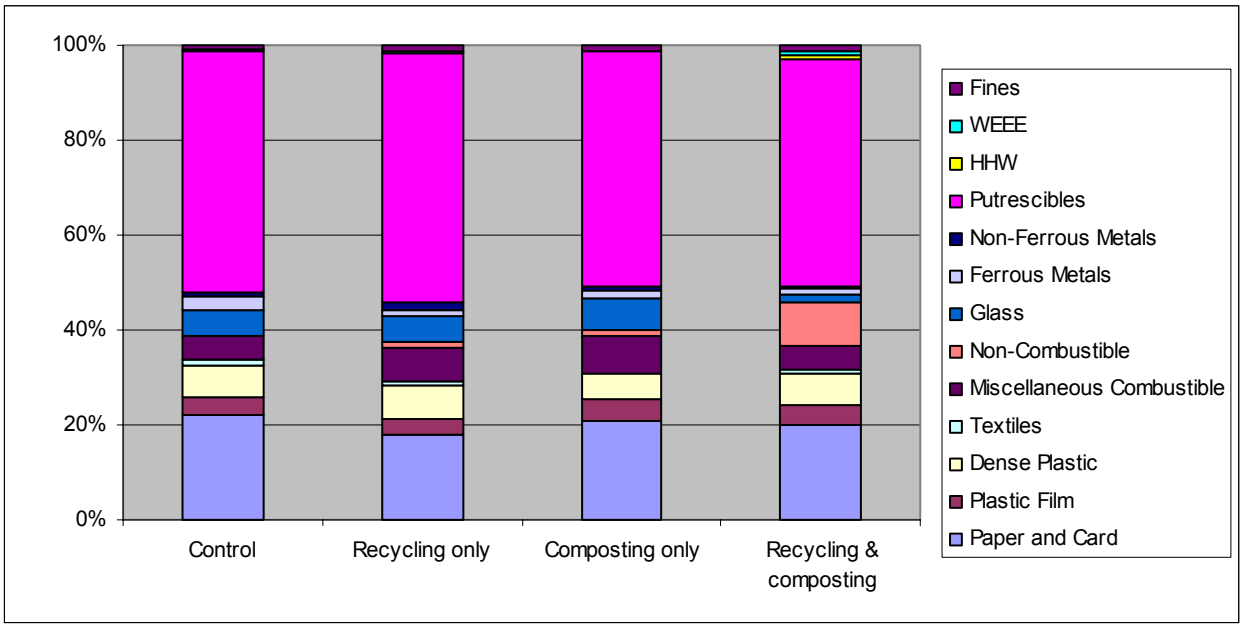

Figure 3.2 Waste composition (% by weight) according to Household Treatment Group – June 2004

3.2.1.3 Recyclable materials

Paper and card are collected for recycling by the kerbside scheme in RBC. Nevertheless, the results presented here suggested there was little variation overall in the total amounts of paper and card disposed in the residual waste stream between the different treatment groups, which was in the range 2.7-3.1 kg/hh/wk. Newspapers and magazines are accepted in the KC scheme, however, the quantities disposed in the residual waste (Appendix VI: Tables A6.1 – A6.4) suggested that opportunities remain to encourage homeowners to further increase recycling of these types of waste paper. The smallest amounts of newspapers and magazines were measured in the residual waste from households in the Recycling+composting group (0.26 kg/hh/wk) compared to the other household groups, including the Recyclng-only group (range: 0.83-1.14 kg/hh/wk). The comparatively small effects of KC observed on the overall amounts of paper and card in the residual waste may be explained because the dominant types of waste in this category, including cardboard and other types of waste paper, were not accepted for recycling by the KC scheme, and these represent approximately 65 % of the mass of the waste paper and card fraction.

The Recycling+composting group also disposed of smaller amounts of the other major types of waste category accepted by the KC scheme, including glass and metal, compared with households in the other treatment groups. Thus, the Recycling+composting group generated the smallest amount of waste glass, equivalent to 0.20 kg/hh/wk, and this value was less than 25 % of the amount disposed by the Recycling-only group. Households in the Recycling-only group discarded the largest amount of metals, equivalent to 0.48 kg/hh/wk (0.26 kg/hh/wk ferrous; 0.22 kg/hh/wk non-ferrous). Consistent with the patterns observed for other recyclable materials, the smallest amount of metal waste was disposed by the Recycling+composting group, equivalent to 0.28 kg/hh/wk. Textiles are included in the recyclable materials that are collected in the KC scheme. Small quantities of textiles (approximately 1 %) were present in the residual waste of all groups and were one of the lightest waste categories. The Recycling-only group generated the largest quantity of textile waste (0.20 kg/hh/wk) and Recycling+composting the least (0.1 kk/hh/wk).

Overall, the data from the summer waste compositional analysis indicated that there was relatively little difference between the level of recycling achieved by the Control and Recycling-only group. The largest reductions in residual waste collection were measured for

the Recycling+composting group. Therefore, housholds engaged in both types of activity were the most conscientious and effective at recycling biodegradable, and other waste categories, thus reducing disposal to landfill.

3.2.1.4 Materials not accepted for recycling by the RBC KC scheme

As would be expected, the patterns of disposal of waste categories not accepted by the KC scheme showed broadly similar patterns, and were also influenced by underlying demographic and socioeconomic characteristics of the households within the treatment groups. Waste samples of the four treatment groups contained similar amounts of plastic film in the range: 0.49-0.66 kg/hh/wk (Appendix VI: Tables A6.1 – A6.4), represented mainly by refuse sacks and carrier bags (0.21-0.26 kg/hh/wk) and packaging film, such as crisp packets and sweet wrappers (0.22-0.40 kg/hh/wk). Householders in the Recycling-only group disposed of the largest amount of dense plastic overall, equivalent to 1.1 kg/hh/wk, consistent with the general trend of increased waste disposal by this group of households, compared to the other groups. Large amounts of food packaging materials, including vegetable and meat trays and yoghurt pots, were present in waste samples from all groups, ranging from 0.27 to 0.40 kg/hh/wk. Similar amounts of plastic bottles were present in the waste samples from all household groups. PET bottles included cola, mineral water and fizzy pop bottles, and were in the range: 0.11 and 0.19 kg/hh/wk, and HDPE bottles, such as milk, detergent and household cleaner bottles, were in the range: 0.15 to 0.21 kg/hh/wk.

For the Recycling-only and Composting-only groups, the greatest weight of miscellaneous combustible material was disposable nappies and sanitary towels. The Control group did not dispose of any waste within this secondary category. This was presumably explained because the majority of households sampled within the Control group were either retired people or had no young children. The main material in this category disposed by the Composting+recycling group was ‘other miscellaneous combustible’ waste, such as vacuum bag contents, which were also present in the waste samples of the other household groups.

Only very small amounts of non-combustible material were found in the residual waste samples. This was mainly construction and demolition (CD) waste in the Composting-only and Recycling+composting groups (upto 1.2 kg/hh/wk – although the majority of this was from a single property suggesting the disposal of significant amounts of CD waste is occasional and sporadic). Households in the Control group did not generate CD waste reflecting the demographic/socioeconomic characteristics of the sample. Household hazardous waste (HHW) and waste electronic and electrical equipment (WEEE) represented <1 % of the total waste in all treatment groups. The Recycling+composting group generated the most HHW and WEEE compared to the other treatment groups, equivalent to 0.09 kg/hh/wk and 0.15 kg/hh/wk, respectively. Only small amounts of waste fines, with diameter <10 mm were recovered from the waste samples. The largest quantity of fines was measured for the Recycling-only group (0.21 kg/hh/wk) and the Control group had the smallest fraction of fines (0.09 kg/hh/wk).

3.2.2 Autumn results

The number of properties sampled in the Control group was increased in the Autumn analysis from 17 to 44 (Section 2.1.2, Table 3.3) to provide a more representative cohort of households that did not recycle or compost their waste. During the autumn campaign the Recycling+composing households generated the least residual waste, equivalent to 10.8 kg/hh/wk (Table 3.6, Figure 3.3). This represented an overall reduction in the amount of collected residual waste of 30 % compared the Control group, which disposed of 15.4 kg/hh/wk. A small decrease in residual waste was recorded for the Recycling-only group, equivalent to <2 %, compared to the Control. The Recycling-only and Recycling+composting households discarded smaller amounts of the main recyclable materials (paper and card, glass and metals) accepted by the KC scheme relative to the Control group. The reduction in the disposal of recyclables by the Recycling and Recycling+composting household groups

was equivalent to 23 % and 53 %, respectively, compared to the Control. Interestingly, more putrescible waste was discarded by the Recycling-only group compared to the Control, representing an increase of approximately 25 %. Home composting reduced the amount of putrescible waste disposed by the Recycling+composting group by 14 % in comparison to Control households.

Table 3.6 Summary of waste arisings according to household treatment group (kg/hh/wk) – November 2004

Waste fraction	Control	Recycling only	Recycling+ composting
Paper and card	4.07	3.21	2.13
Plastic film	0.50	0.55	0.43
Dense plastic	0.96	0.91	0.75
Textiles	0.37	0.18	0.23
Miscellaneous combustible	1.40	1.30	1.06
Non-combustible	0.08	0.38	0.24
Glass	0.95	0.61	0.29
Ferrous metals	0.41	0.33	0.18
Non-ferrous metals	0.17	0.16	0.06
Putrescibles	5.82	7.26	5.00
HHW	0.24	0.05	0.06
WEEE	0.24	0.01	0.17
Fines	0.17	0.14	0.17
Total, kg/hh/wk	**15.38**	**15.09**	**10.78**

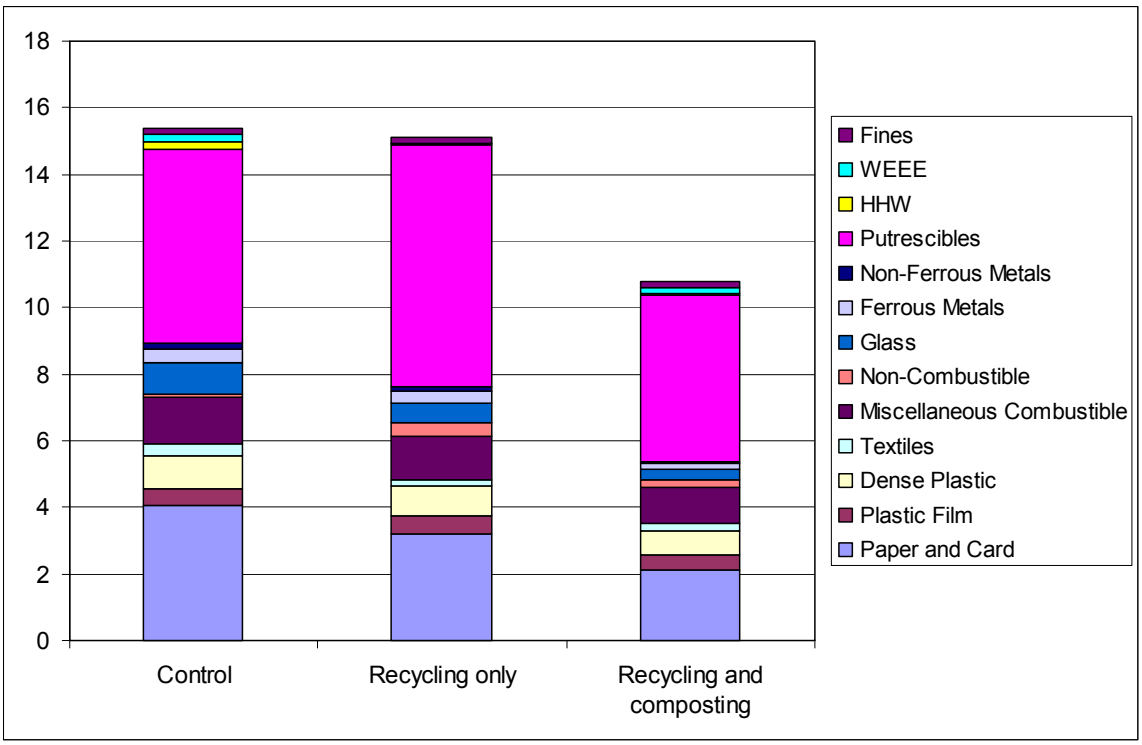

Figure 3.3 Summary of waste arisings according to household treatment group (kg/hh/wk) – November 2004

The composition of residual waste as percentage by weight is listed in Table 3.7 and shown in Figure 3.4. These show a general reduction in the proportion of recyclable materials recovered by the KC scheme (paper and card, glass and metals) in the residual waste compared to the Control. However, the proportion of putrescible waste collected from households in the Recycling-only and Recycling+composting groups increased relative to the Control.

Table 3.7 Summary of waste composition (% by weight) according to household treatment group – November 2004

Waste fraction	Control	Recycling only	Recycling+ composting
Paper and card	26.48	21.24	19.74
Plastic film	3.26	3.62	4.02
Dense plastic	6.24	6.06	6.96
Textiles	2.43	1.21	2.10
Miscellaneous combustible	9.08	8.62	9.85
Non-combustible	0.55	2.51	2.25
Glass	6.18	4.02	2.69
Ferrous metals	2.66	2.19	1.71
Non-ferrous metals	1.09	1.07	0.55
Putrescibles	37.81	48.09	46.45
HHW	1.57	0.32	0.54
WEEE	1.54	0.09	1.59
Fines	1.12	0.96	1.56
Total	**100.00**	**100.00**	**100.00**

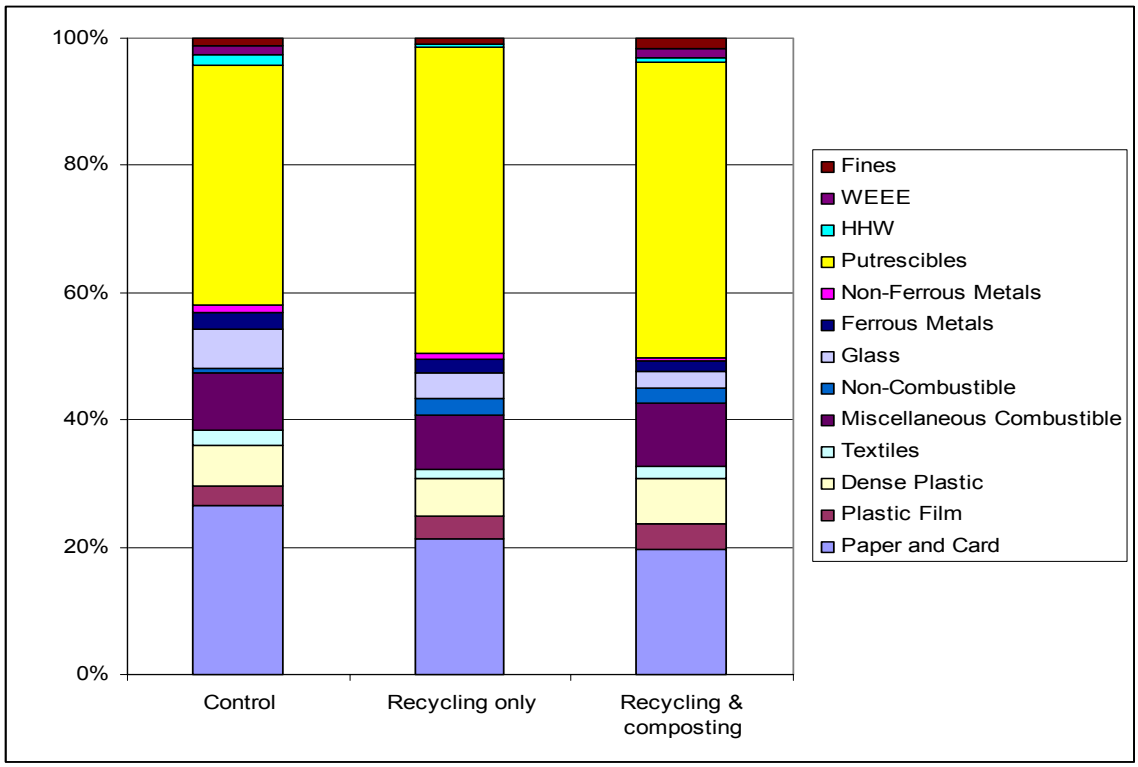

Figure 3.4 Waste composition (% by weight) according to household treatment group – November 2004

3.2.2.1 Putrescible materials

Putrescible waste represented the largest fraction identified in the residual waste from all households, equivalent to: 37.8, 48.1 and 46.5% for the Control, Recycling-only and Recycling+composting groups, respectively. As would be expected, the amount of putrescible waste collected in the autumn was smaller compared to the summer period (Table 3.4, Figure 3.1). The lowest rate of putrescible waste disposal was recorded for the Recycling+composting group, equivalent to 5.00 kg/hh/wk. The Control group generated 5.8 kg/hh/wk of biodegradable waste and the highest overall rate was measured for households only engaged in kerbside recycling, equivalent to 7.3 kg/hh/wk. Households in the Control and Recycling-only groups disposed of similar amounts of kitchen waste, 3.9 - 4.2 kg/hh/wk (Appendix VI: Table A6.5 – A6.7). However, the disposal of food waste was reduced by 35 – 40 % to 2.6 kg/hh/wk for the Recycling+composting group. The decrease in food waste disposal relative to the control was 1.4 kg/hh/wk, equivalent to 72 kg/hh/y. This is broadly consistent with the value of 108 kg/hh/y recorded by Jasim and Smith (2003) for food waste inputs to compost bins measured by homeowners during a 2 year monitoring study of HC activities by 64 households. Contrary to what may be expected, HC increased the collection of garden waste by 0.7 and 0.26 kg/hh/wk, equivalent to an increase of 44 and 13 % relative to households in the Control and Recycling-only groups, respectively, and this behaviour was consistent with the Summer analysis (Appendix VI).

3.2.2.2 Recyclable materials

Control households disposed of approximately twice the amount of paper and card compared to the Recycling+composting group, equivalent to >4 kg/hh/wk. Households only recycling their waste produced an intermediate amount of this waste fraction equivalent to 3.2 kg/hh/wk. Newspapers and magazines constituted approximately 50 % of the paper and card in Control waste samples, but recyclable paper was reduced to 25 and 17 % of this waste fraction for the Recycling and Recycling+composting groups (Appendix VI: Table A6.5 – A6.7). Packaging glass made up most of the glass material present in the residual waste collected from all the households groups. Recycling+composting households generated the smallest amount of glass, equivalent to 0.29 kg/hh/wk, and this value was <30 and 50 % of the amounts disposed by the Control and Recycling-only households (Appendix VI: Table A6.5 – A6.7). The disposal of metals in the residual waste was reduced by approximately 60 and 16 % by the Recycling+composting and Recycling-only groups, respectively, compared to Control households, which generated 0.58 kg/hh/wk of this waste category. Similar amounts of textile waste were disposed by households in the recycling groups (0.18 – 0.23 kg/hh/wk) and, on average, disposal of textiles decreased by approximately 50 % compared to the Control value (0.37 kg/hh/wk).

3.2.2.3 Materials not accepted for recycling by the RBC KC scheme

The results showed that households engaged in recycling and composting activities also generally discarded smaller amounts of other waste materials not accepted by the KC scheme. For example, the amounts of plastic and HHW+WEEE waste generated by the Recycling+composting group were reduced by 19 and 52 %, respectively, compared to the Control.

3.3 Discussion

3.3.1 Comparison with national and regional compositional analysis data

The waste compositional analysis presented here for selected household groups in RBC were generally consistent with national waste statistics (DETR, 2000; Strategy Unit, 2002; Table 3.8).

In 2002, a survey of residual household waste was performed for Surrey County Council (MEL, 2004). The work consisted of a waste analysis campaign over two seasons, in October and February. The selection of households was based on the method of waste

containment and socio-demographic profiles of the Districts and Boroughs using standard ACORN categories. Two ACORN categories were among the sampled areas within RBC including: ACORN B (B4-Affluent executives and family areas, and B5-Well-off workers, and family areas) and ACORN E (E11-New home owners and mature communities, and E12-White collar workers and better-off multi ethnic areas).

Table 3.8 Household waste fractions (% by weight)

Household Waste Fraction	Waste Strategy	Strategy Unit
Paper and card	32	19
Textiles	2	3
Plastic	11	7
Miscellaneous combustible	8	8
Glass	9	7
Non-combustible	2	4
Metals	8	7
Putrescible waste	21	42
Fines	7	3
Total	**100**	**100**

The primary waste categories were similar to those measured here. At the time of sampling, RBC had not introduced KC. Households sampled in the Study reported here had similar socio-demographic characteristics to the B and E ACORN categories and, therefore, the data are comparable. Households in the Recycling-only, Composting-only and Control groups generally disposed of larger quantities of waste than indicated in the regional surveys (Table 3.9 and 3.10). The Recycling+composting group, on the other hand, produced similar or much smaller amounts of residual waste compared to the regional survey data, emphasizing that this group is potentially the most effective at reducing waste disposal.

Table 3.9 Waste arisings and composition in Surrey County Council and Runnymede Borough Council (kg/hh/wk)

Waste fraction	Surrey	Runnymede
Paper and Card	2.90	3.26
Plastic Film	0.60	0.56
Dense Plastic	0.92	1.16
Textiles	0.42	0.45
Miscellaneous Combustible	0.83	0.90
Non-Combustible	0.23	0.18
Glass	0.92	0.77
Ferrous Metals	0.34	0.33
Non-Ferrous Metals	0.14	0.21
Putrescibles	5.58	5.39
HHW	0.02	0.00
WEEE	0.06	0.08
Fines	0.62	0.75
Total kg/hh/wk	**13.56**	**14.03**

Note: Runnymede data are derived from the mean of two ACORN categories and season; Surrey data are the average of all the ACORN categories.

Table 3.10 Waste composition percentages (by weight) for regional surveys of Surrey CC and RBC

Waste fraction	Surrey	Runnymede
Paper and Card	21.41	23.95
Plastic Film	4.45	4.05
Dense Plastic	6.79	8.26
Textiles	3.09	3.23
Miscellaneous Combustible	6.08	6.82
Non-Combustible	1.67	1.02
Glass	6.80	6.34
Ferrous Metals	2.49	2.50
Non-Ferrous Metals	0.99	1.42
Putrescibles	41.11	36.30
HHW	0.15	0.01
WEEE	0.43	0.65
Fines	4.52	5.47
Total	**100.00**	**100.00**

3.3.2 Impact of home composting and kerbside collection on the amount and composition of residual household waste

Data collected from the RCV indicated an overall reduction in residual waste equivalent to 12 % could be attributed to kerbside recycling and HC (Table 3.1). Comparing the residual weight data for the Recycling+composting and Composting-only groups with the Control indicated that the contributions of KC and HC to the overall reduction in residual waste were equivalent to 7 % and 5 % of the total amount collected for the Control group, respectively. Reductions in waste collection due to KC and HC were also observed in the compositional analysis data (Table 3.4 and 3.6). The decrease in total residual waste by HC compared to the Recycling-only group in June was approximately 14 % (in this case the Control group produced less residual waste than the Recycling-only group, which may be explained by the small sample size of the Control). A larger sample size was tested for the Control in the November analysis. The more representative sample size examined in November indicated a potentially much larger contribution of HC to waste diversion (a 14 % reduction in putrescible waste disposal was measured relative to the Control, see Section 3.2.2) than occurred in the June compositional analysis or was indicated by the RCV data. In November, KC on its own only reduced the overall amount of residual waste by 2 % whereas a decrease of 30 % was observed for the Recycling+composting group, compared to the Control. The results showed that the Recycling+composting group was the most effective at recycling other types of waste and disposed of the smallest quantities of recyclables overall, indicating a generally increased level of waste awareness and conscientious approach to recycling compared to the other groups of householders. The overall benefit of KC on the amount of residual waste produced, by reducing the collection of recyclable materials, was limited to a large extent due to the increased disposal of garden and other putrescible waste (Appendix VI) by the Recycling-only group. Home composting also had subtle, complex impacts on the composition of the residual waste stream. The total amount of putrescible waste produced by HC was less than the Control. However, the amount of garden waste disposed by homeowners engaged in this activity increased significantly compared to the Control (Section 3.2.2.1). Thus, the results presented here demonstrated that, in the absence of other measures to remove garden waste from the residual waste collection, the principal benefit of HC in reducing biodegradable waste is due to decreased disposal of kitchen waste. Without other measures to limit garden waste disposal, homeowners involved in both recycling and HC activities would appear to utilise the spare capacity generated in the residual waste bin to

dispose of their surplus, bulky garden waste. This may represent waste that is unsuitable for HC, for instance, and would otherwise have been transported by the homeowner to the CA site for disposal.

The RCV data (Table 3.1) indicated HC reduced the total amount of residual waste collected by 0.8 kg/hh/wk compared to the Control group. This value was also consistent with the decrease in putrescible waste disposal recorded for the Composting+recycling group compared to the Control (Table 3.6). Assuming the data collected for the autumn period may be regarded as a generally representative average (inputs of putrescible waste may be higher in the summer, but lower in the winter for instance), the total reduction in putrescible waste disposal due to HC, extrapolated to 52 weeks (1 year) was therefore approximately 42 kg/hh. However, if the increase in garden waste disposal observed for the HC group relative to the Control, equivalent to 0.71 kg/hh/wk, was not included in the residual waste (eg if homeowners who compost their biodegradable waste were encouraged not to dispose of additional garden waste in the residual waste bin), the potential diversion of putrescible waste by HC would be equivalent to 1.53 kg/hh/wk, or 80 kg/hh/y. The amount of putrescible waste disposed by the Control group in the autumn waste analysis was 5.82 kg/hh/wk (this value was similar to the regional data for RBC – see Table 3.9), equivalent to, 303 kg/hh/y. Therefore, HC achieved an overall reduction in putrescible waste collection of 14 % and this could rise to 26 % if homeowners do not increase the quantity of garden waste disposed in the residual waste bin compared to the Control.