COMPOST

FOR AGRICULTURE

SJB recycling ltd

INTRODUCTION

Introduction

SJB Recycling is one of the UK's largest providers of green waste composting services. Jointly owned by North Yorkshire County Council and City of York Council, much of our day-to-day recycling is carried out in South and West Yorkshire but we also oversee and offer technical support to our sister company Yorwaste on its operations in North Yorkshire. We are the sole supplier of compost from all SJB and Yorwaste sites.

SJB Recycling and Yorwaste provide green waste composting services to many local authorities and operate across seven sites located in Northampton, Dewsbury, Esholt, Rotherham, Harewood Whin near York; Tancred, near Catterick; and Seamer, near Scarborough.

SJB Recycling and Yorwaste use facilities that meet the appropriate regulations for undertaking open-windrow composting. All our composting sites are fully permitted and are operated to high environmental standards achieving ISO 14001 and 9001 certification. Where possible green waste is processed to produce compost to the PAS100: Compost Quality Protocol Standard. Where this has not yet been achieved, compost is recycled in line with the Environmental Permitting Regulations and associated close Environment Agency scrutiny.

SJB Recycling seek to work with farmers and land managers to produce and supply composts that are suitable for use in arable and grassland farming systems, providing a real benefit to agricultural sustainability and productivity.

BENEFITS

Agricultural benefits of SJB compost

Our composts contain readily available potassium (K) and slower release nitrogen (N), phosphorous (P) and sulphur (S). Trace elements and micro-nutrients are also supplied in smaller but useful quantities.

Compost organic matter is rich in carbon, which is necessary for soil microbial populations to function. Soil micro-organisms are necessary to drive nutrient cycles and other essential soil processes.

Compost has a neutralizing value and is about 10% as effective as limestone, tonne for tonne of dry matter.

Organic matter in compost is significant and able to provide many benefits:

- Improved soil structure
- Greater water holding capacity and infiltration
- Increased cation exchange in lighter soils
- Reduced nutrient leaching.

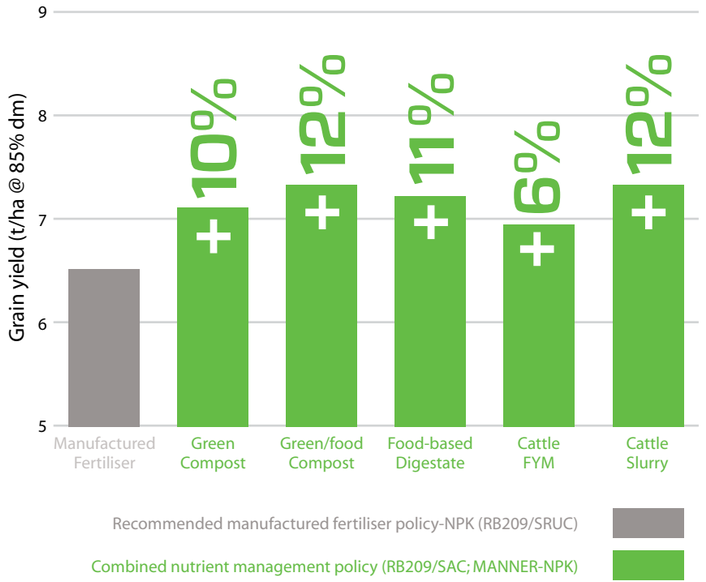
IMPROVEMENT

Yield Improvement

The effect of introducing compost into agricultural soils has been shown to significantly increase crop yields. A recent trial by DC-Agri* showed higher yields were attributed to compost use. The trial showed that where green waste compost was used in conjunction with purchased fertiliser as part of an integrated nutrient management plan, crop yields increased by 10% in comparison to a crop fertilised only with purchased mineral fertilizer.

Results from WRAP's DC-Agri project show statistically significant yield increases from using digestate and compost in combination with bagged fertilisers, in comparison with fertiliser only treatments calculated using the "Fertiliser Manual RB209" or "SRUC Technical Note 633". The increases resulted from the enhanced supply from organic materials of phosphate (Devizes) and sulphur (Aberdeen and Terrington).

The DC-Agri project is a four year research project looking at the use of quality anaerobic digestate (biofertiliser) and compost in agriculture, integrated with an extensive knowledge exchange network. The project is funded jointly by Defra, WRAP, WRAP Cymru and Zero Waste Scotland.



Overall winter cereal grain yields in 2012 at three experimental sites (Devizes, Aberdeen and Terrington) as part of WRAP's DC-Agri project.

NUTRITION

Crop Nutrition

SJB Compost provides crop available nutrients which build soil fertility and reduce the requirement for expensive mineral fertilisers.

The table to the right gives average nutrient and organic matter values for SJB composts produced in 2015. As part of our service, agricultural users are given specific analysis for composts supplied onto their farm, to enable better crop nutrient management.

Nitrogen (N)
Following repeated use of compost, long-term nitrogen release will add to soil mineral nitrogen present within the soil, which can be detected by use of soil mineral nitrogen testing, potentially reducing the amount of nitrogen that would need to be purchased.

Phosphorous (P)
Around 50% of the phosphate in compost will be available to the next crop, with the remainder becoming available further into the crop rotation. Regular soil analysis every four years will determine the soil P index and allow phosphate accumulated from past compost applications to be detected and where applicable, bagged fertiliser use decreased, reducing the amount of purchased fertiliser required.

Potassium (K)
Around 80% of the potash is in a plant available form. Regular soil analysis every four years will allow soil potassium concentrations to be monitored and bagged fertiliser (Potash) use reduced as soil indices rise, thus reducing reliance on purchased mineral fertiliser.

Magnesium and Sulphur
Will contribute to maintenance of soil reserves.

35 t/ha Compost Application Rate

	Total (kg/ha)	Available (kg/ha)
Nitrogen (N)	250	0
Phosphorous (P)	97	48
Potassium (K)	217	173

	Total (kg/ha)
Magnesium (MgO)	124
Sulphur (SO^3)	92
Organic Matter	9,660

ORGANIC

Organic Matter

The loss of soil organic matter severely reduces soil quality and represents a loss of soil carbon. Soils with low levels of organic matter hold less water and are less resistant to drought and erosion. The Environment Agency estimates the costs of organic matter decline due to cultivation to be about £82 million per annum*.

Improved Soil Structure

Trials have shown that organic matter improves the aggregate strength of soils. Making the soil more resistant to compaction and allowing easier root penetration to enable crops to find moisture and nutrients. The workability of the soil is also improved, delivering potential savings on fuel costs.

Water Holding Capacity and Infiltration

Improved soil structure, from organic matter addition, aids rainfall infiltration rates reducing the risk of surface run off and associated soil erosion. Water holding capacity is also increased especially in light soil types, reducing the potential for moisture stress in a crop during dry periods.

Increased Cation Exchange (CEC)

Addition of organic matter to lighter soils will raise the CEC of the soil, improving its ability to hold onto Ammonium, Potassium, Calcium and Magnesium cations, reducing the risk of valuable nutrient losses through leaching.

Increased Soil Microbiology

It has been estimated there are 4 billion micro-organisms in a teaspoonful of healthy soil. Without a readily available supply of carbon from crop residues, compost and other manures, these microbes cannot function. Soil microbes are essential in the mineralisation process of plant nutrients and are associated with the production of humus. A healthy soil does not exist without the complex interactions between soil micro-organisms, organic matter and soil minerals.

*EA Report: The Total External Environmental Costs and Benefits of Agriculture in the UK. Published 24th April '07.

Compost Production

Composting is the breakdown by micro-organisms of organic wastes, in this case green waste, to produce a stable, pasteurized organic material – compost.

Green waste is collected by SJB Recycling and Yorwaste from local domestic and local authority sources. It is source segregated, which means that green wastes such as garden clippings and grass mowings are deposited in a dedicated green waste bin whose contents are collected from the source of production eg. a domestic dwelling.

The collected green waste is then transported back to the composting facility where materials such as plastic bags are manually picked out and disposed of separately, helping to prevent contamination.

The green waste is then mechanically shredded and formed into an open windrow on a concrete pad. The composting windrows allow air and moisture to be controlled during the stages of compost production, which are:

- **Thermophillic Stage,**
- **Mesophillic Stage and**
- **Maturation Stage.**

Thermophilic Stage

Temperatures within the shredded green waste increase to above 65°C for 7 days. Much of the initial breakdown of the waste occurs during this stage as microbiological activity is high within the windrow, which leads to the high temperatures. These high temperatures are important to ensure weed seeds and pathogens are destroyed.

Mesophilic Stage

Temperatures reduce to around 45-50°C. A different range of micro-organisms will dominate the windrow whilst further breakdown of organic matter continues. Mechanical screening of the compost acts like a sieve to remove 'oversize' woody lumps and any physical contaminants which may remain.

Maturation

Temperatures range from ambient to 45°C. Chemical reactions occur during this stage to produce mature and stable compost eg. conversion of ammonium to nitrate. The compost may be screened again and treated with a 'Windsifter' which helps to remove residual pieces of plastic.

Compost

Stable compost has low odour and a carbon/nitrogen ratio that will not lead to immobilization of nitrogen within the soil.

PRODUCTION

Soils underpin your agricultural lands' asset value and its ability to maintain profitable production both for you and future farming generations. Can we afford not to look after the very resource that we all depend upon?

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SJB Recycling working in partnership with its sister company Yorwaste

Yorwaste
Your green business partner