

## ...INTRODUCTION

The wool production worldwide in 2011 was 2,042,060 tonnes, with 13.4 % of this sheep wool being produced in Europe. Historically, sheep husbandry was a multipurpose rural activity. The increasing production of fabrics from artificial fibres and from others natural fibres such as cotton and flax, and a high increase of imported raw wool from Australia and Africa resulted in low demands for coarse wool in Europe. In the last years, sheep shearing was sometimes only an animal welfare activity with no profit for the farmer. The use of waste or by-products as nutrient sources for crop plants has a long history. However, there are some widely available waste products, that have not yet been utilized and that may have potential value as nutrient sources for crops. Sometimes due to price fluctuations, wool production may become uneconomical. Landfilling or surface disposing of the excess or low-grade wool is environmental concern. Hydrolysed wool has been tried as fertilizer source for plants. Composted wool has been used as an N source for crop plants such as chickpea and wheat. The objective of this work was to evaluate the influence of using sheep wool as organic fertilizer in processing tomato under organic farming growing conditions.



## ...METHODS

The fertilising trial in processing tomato consisted of four different treatments, based on different dosages of sheep wool (Table 1). These fertilising treatments were established taking into account that the tomato fertilizer needs are 150 N-80 P-160 K (Fertilizer Units, kg/ha). The trial were set up at the experimental field of Centro Tecnológico Nacional Agroalimentario Extremadura (CTAEX), in Badajoz (Spain). The experimental design was randomized, with 4 replications for treatment. The tomato plants were transplanted in April, at a planting density of 30000 plants/ha, using a mechanical transplanter (Fialho, Tex Driver). The tomato variety used was H (Heinz)-9661. The crop was grown according with the Organic Farming Regulation (Regulation (CE) 834/2007 of European Commission).

Table 1. Fertilising treatments

Treatment	Fertilizer	Doses (t/ha)	NFU*
TC	Humibio (6-7-7)	2.5	150
TD1	Sheep wool pellet	1	100
TD2	Sheep wool pellet	1.5	150
TD3	Sheep wool pellet	2	200
TD4	Sheep wool pellet	3	300
TD5	-	-	-



\*NFU: Nitrogen Fertilizer Units (kg/ha).

The total yield obtained ranged between 55 t/ha (TD5) and 102 t/ha (TD4) for the different treatments. It can be observed that the more N applied, the more Total yield obtained. Regarding the mean weight of one fruit, significant differences were not found among the treatments. No significant differences were found for green, over-ripened, sun damage and blossom-end rot fruits. The quality parameters of processing tomato were not affected by the application of sheep wool as organic fertilizer. Through the Sensory Analysis, we studied several parameters: colour, pulpy texture, syneresis, odour, taste, acidity, sweetness and viscosity in mouth. The tomatoes were presented as tomato paste. According to the obtained results, sample from control treatment was best evaluated for pulpy, viscosity, colour and sweetness.

Table 2. Quality parameters

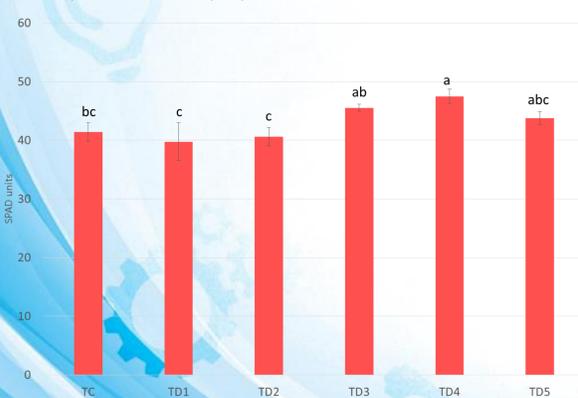
Treatment	pH	° Brix	Viscosity (cm/30s)	Colour (a/b)	Firmness (g)
TC	4.4 a ± 0.01	4.7 a ± 0.24	18.6 a ± 1.25	1.98 a ± 0.04	4599 a ± 355.06
TD1	4.4 a ± 0.06	4.9 a ± 0.24	18.1 a ± 0.46	1.91 a ± 0.03	4044 a ± 308.92
TD2	4.4 a ± 0.03	5.1 a ± 0.30	17.6 a ± 1.25	1.88 a ± 0.02	4486 a ± 348.16
TD3	4.3 a ± 0.05	4.9 a ± 0.17	18.1 a ± 0.74	1.92 a ± 0.05	4249 a ± 127.16
TD4	4.4 a ± 0.03	4.9 a ± 0.35	18.5 a ± 2.19	1.91 a ± 0.04	4430 a ± 281.34
TD5	4.4 a ± 0.06	4.8 a ± 0.42	19.3 a ± 1.45	1.93 a ± 0.08	4415 a ± 0.01

a = same letter in values indicate not significant differences (p<0.05), Tukey test

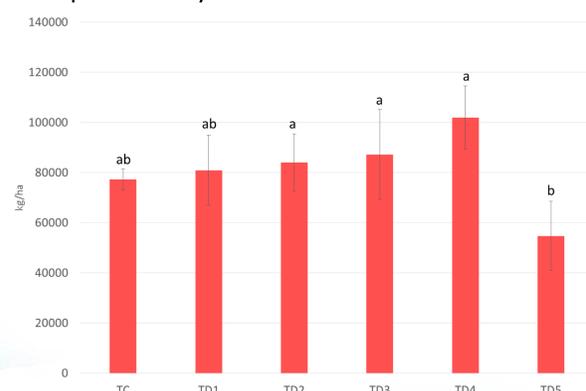
## ...RESULTS

Chlorophyll is the main photosynthetic pigment of plants and their content in leaf depends on foliar nitrogen concentration. SPAD measures of different treatments were found within a high reading range (39.75 to 47.46 units). Tomato plants from the highest dosage treatments showed the highest values of chlorophyll content. These results are consistent with the N fertilizer dosage applied and the observations in field during the crop cycle.

Graph 1. Chlorophyll content



Graph 2. Total yield



## ...CONCLUSION & IMPACT

All in all, it was demonstrated that sheep wool application as organic fertilizer at the highest doses allowed to obtain the highest yields, for processing tomato under organic farming growing conditions. The results suggest that sheep wool can be used successfully as alternative biofertilizer, at doses of 2000 kg/ha (200 N) for processing tomato in a sustainable and environmental friendly way.

## ...ACKNOWLEDGMENT

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