

SINGLE-IMPACT FICHE

MANURE PROCESSING TECHNIQUES

IMPACT: SOIL NUTRIENTS

Data extracted in July 2021

Note to the reader: This fiche summarises the impact of manure processing techniques on SOIL NUTRIENTS. It is based on 1 peer-reviewed synthesis research paper¹, including 92 individual studies.

1. WEIGHT OF THE EVIDENCE

- **CONSISTENCY OF THE IMPACT:**

Manure processing techniques, namely either composting or anaerobic digestion, have no significant effects on soil nutrients according to the reviewed synthesis paper, at the stage of land application of treated manure, as compared to raw manure (see **Table 1**). The number of synthesis papers reporting positive, negative or no effect is based on the statistical comparison of the intervention and the control. The number of synthesis papers reporting relevant results, but without statistical test of the effects is labelled as "uncertain".

In particular, soil fertilisation with composted or digested manure, as compared to raw manure, showed no significant effects on soil total nitrogen.

The reviewed synthesis paper include data collected in Europe (see **Table 2**).

Table 1. Summary of effects. The numbers between parenthesis indicate the number of synthesis papers with a quality score of at least 50%. Details on quality criteria can be found in the next section.

Impact	Intervention (Technique)	Positive	Negative	No effect	Uncertain*
Increase soil nutrients	Composting/Anaerobic digestion	0	0	1 (1)	0

* Number of synthesis papers that report relevant results but without statistical test comparison of the intervention and the control.

- **QUALITY OF THE SYNTHESIS PAPERS:** *The quality score summarises 16 criteria assessing the quality of three main aspects of the synthesis papers: 1) the literature search strategy and studies selection; 2) the statistical analysis; 3) the potential bias. Details on quality criteria can be found in the methodology section of this WIKI.*

2. IMPACTS

The main characteristics and results of the synthesis papers are summarized in **Table 2**. Summaries of the meta-analyses provide fuller information about the results reported in each synthesis paper, in particular about the modulation of effects by factors related to soil, climate and management practices.

¹ Research synthesis papers include a formal meta-analysis or systematic reviews with some quantitative results. Details can be found in the methodology section of the WIKI.

Table 2. Main characteristics of the synthesis papers reporting impacts of manure processing techniques on soil nutrients.

Reference	Population	Scale	Num. papers	Intervention (technique)	Comparator	Metric	Conclusion	Quality score
Liu, SB; Wang, JY; Pu, SY; Blagodatskaya, E; Kuzyakov, Y; Razavi, BS 2020	Arable land	Global	92	Fertilisation using composted/digested manure (Mixed, Cattle, Pig, Poultry)	Fertilisation using untreated manure (Mixed, Cattle, Pig, Poultry)	Soil total nitrogen	Composted/digested manure application, compared to untreated, induced a non-significant effect size on soil total nitrogen.	69%

3. KNOWLEDGE GAPS

The authors did not report knowledge gaps in the reviewed synthesis papers.