

# **Assessment of State Composting Regulations in the United States**

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**Abstract:** This investigation was conducted to identify the current status of state composting regulations in the U.S. using an extensive survey administered to regulators from all 50 states. Questions were included regarding: background information on composting; status of regulations; regulatory details including feedstock specific provisions and regulatory framework with respect to MSW regulations; details regarding type, properties, and amount of materials handled by composting activities; outgoing materials and storage of materials; type of composting facilities; initial development of the regulations; level of rigor of regulations; enforcement and reporting requirements; efficiency and level of satisfaction with regulations; permitting fees; and modifications to regulations. A total of 37 states completed the survey. The majority of the surveyed states had regulations for composting activities and required permits for operation of composting facilities. In general, type of permits was based on operational conditions at a facility including type and size of facility, type of materials processed, and throughput of material with various exemptions. Permitting requirements for composting generally were less strict than the requirements for MSW. Residual content generally was not quantified for regulatory purposes. The majority of the surveyed states had regulations related to the duration of materials storage at a facility. In the survey, 16 and 11 out of 35 states indicated that they had standards for the composition or quality of waste that may be composted and standards for the quality of compost intended for different applications, respectively. Regulations were developed to minimize impact to the environment or nuisance to nearby residents. Criteria

developed by U.S. Composting Council, USDA, and other agencies and regulations from other states were adopted. Experience, engineering judgment, standard composting practices, and input from industry were used in the development of regulations. Economic impact of the regulations was assessed by several states. More than a third of the states indicated changing current regulations. In most cases, new regulations were developed for management of food waste and biosolids composting activities and liquids at facilities including storm water and wastewater.

**Keywords:** composting; regulation; state; survey; feedstock; waste

## **Introduction**

Composting is a significant component of waste reduction and waste diversion activities. Regulatory oversight typically is used for entities and operations involved in composting activities as compostable materials commonly are part of the waste stream and composting activities are considered waste operations. This investigation was conducted to determine the level and details of regulatory oversight of composting activities in the U.S. to support a staff driven review and potential modification of composting regulatory schema in California.

## **Survey**

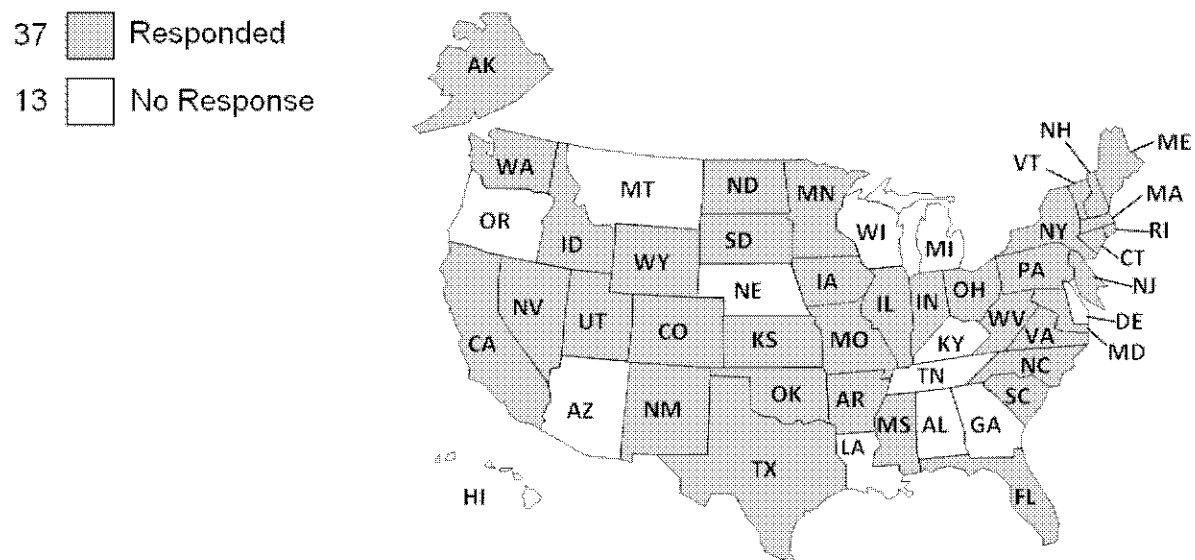
An extensive survey was administered to all 50 states to identify significant aspects of composting regulations. The web-based survey was developed using Survey Crafter Professional 4.0 software and included 39 questions. Photographs were added to enhance the appearance of the survey and to keep the interest of the respondents for high rates of complete returns. The survey is presented in its entirety in Hanson et al. (2010). The survey included questions related to:

- background information regarding composting and composting related definitions;
- status of composting regulations and regulatory trends;
- description of regulatory framework with respect to MSW regulations;
- quantitative thresholds in regulations;
- specific details of composting regulations including feedstock specific provisions;
- type of composting facilities;
- details regarding type, properties, and amount of materials handled by composting activities;
- details regarding outgoing materials;
- storage of materials;
- initial development of the regulations;
- integration of science, engineering, and economics principles in regulations;
- enforcement of regulations and reporting requirements;
- level of rigor of regulations;
- efficiency and level of satisfaction with regulations; and
- legislative status of regulations.

## **Survey Results and Analysis**

A total of 37 states completed the composting survey (Fig. 1). The complete set of survey results is presented in Hanson et al. (2010). Green waste was defined as yard trimmings, leaves, twigs, and grass clippings in the survey. Less than one third of the surveyed states reported the relative fraction of green waste (for the definition provided in the survey) composted in their respective

states, which varied between 1 and 100%. More than half of the surveyed states indicated the use of a specific definition for green waste (or yard waste – the term used by some states). In most cases, the reported definitions for green/yard waste were similar to the definition of green waste used by the research team. Additional descriptions included plant wastes from the food processing industry, untreated or clean wood wastes, paper products, and pre-consumer vegetative food waste. In some cases, more specific terms were used to identify compostable materials including the definition for “land clearing debris” as trees, stumps, branches, or other wood generated from clearing land for commercial or residential development, road construction, routine landscaping, agricultural land clearing, storms, or natural disasters. Exclusions from green/yard wastes were described as industrial or agricultural processing wastes, vegetative waste from industrial processing such as food processing, food waste, food processing waste, or soiled paper. A relatively low percentage of the surveyed states (22%) indicated the use of a specific definition for food wastes.



**Fig. 1. Surveyed states.**

Windrow, aerated static pile, and aerobic in vessel composting were used for green wastes in 92, 54, and 38% of the surveyed states, respectively. In addition, use of passively aerated static piles was reported. The majority of the surveyed states indicated that green waste composting was regulated at the state level (Fig. 2) and permits were required for operating composting facilities (Fig. 3). Fees were associated with permitting or operating under a permit in more than half of the surveyed states. Exemptions from permitting were used in most of the surveyed states. Exemptions were provided as a function of type of feedstock and operation. Backyard/on-site residential and agricultural composting and garden waste composting were exempted as well as clean wood processing operations. The exemptions typically included quantitative criteria for amount of materials processed or less commonly criteria for size or location of facilities/operations. The material limits used for exemptions were highly variable and ranged between approximately less than 1 ton/hr and 1 ton/yr. A single set of regulations typically was used for a given state. A low number of states indicated involvement of multiple regulatory agencies in composting operations such as the Department of Agriculture regulating product

quality and the Department of the Environment permitting composting facilities. Local health departments also were indicated to be involved in regulation of composting activities.

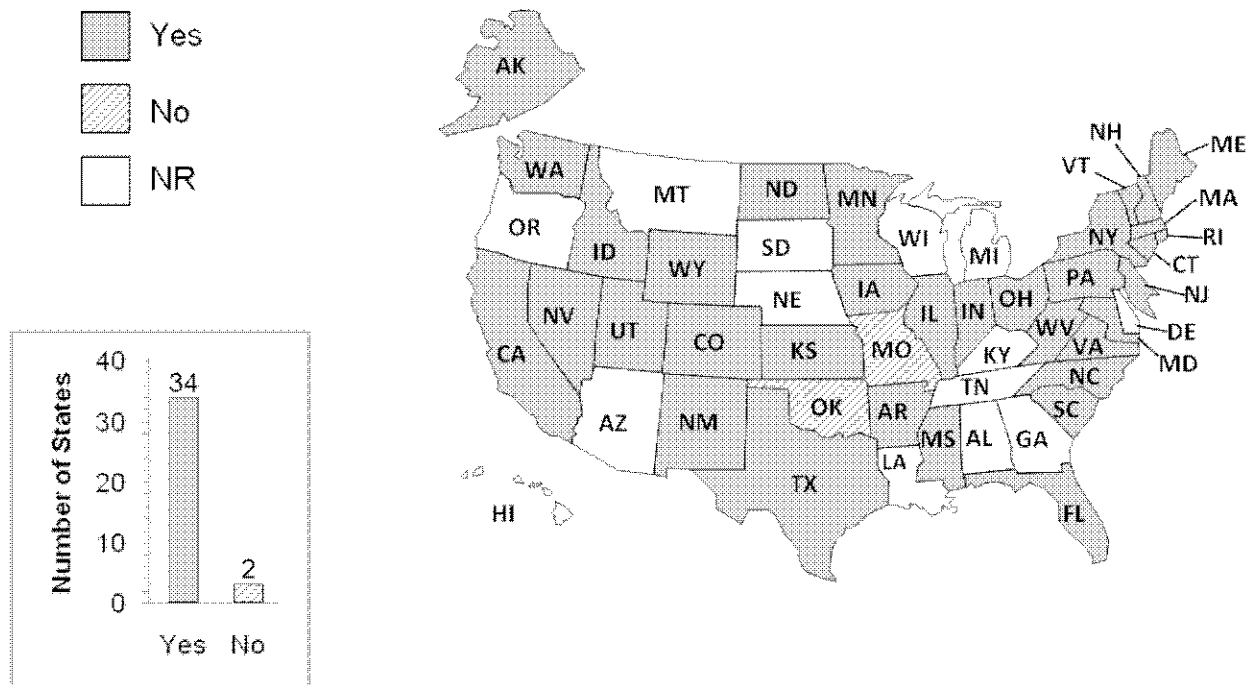


Fig. 2. Is Green waste composting regulated at the state level in your state?

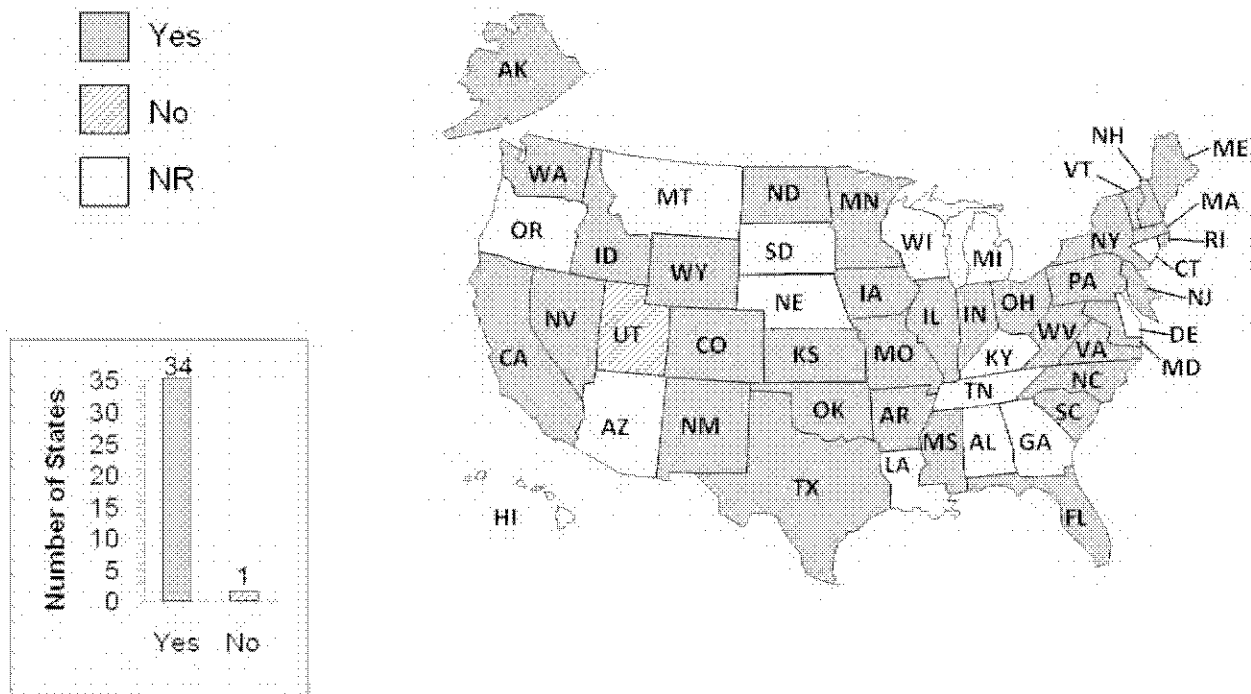
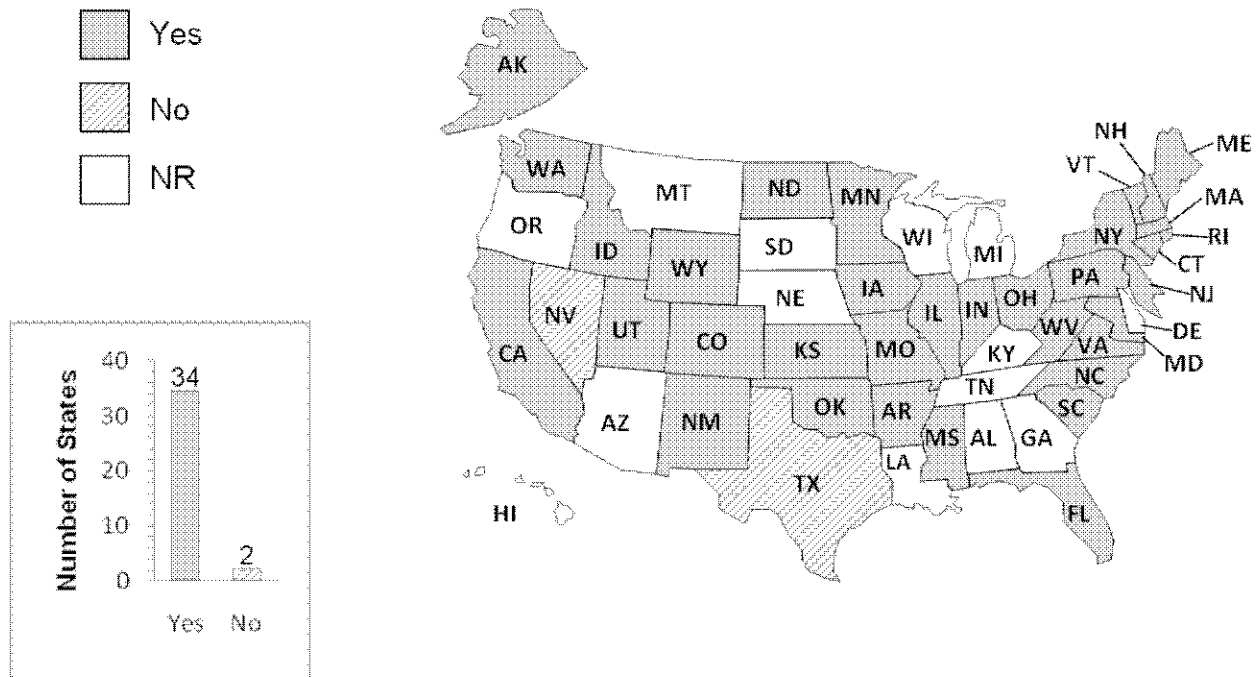


Fig. 3. Are permits required for operating composting operations in your state?

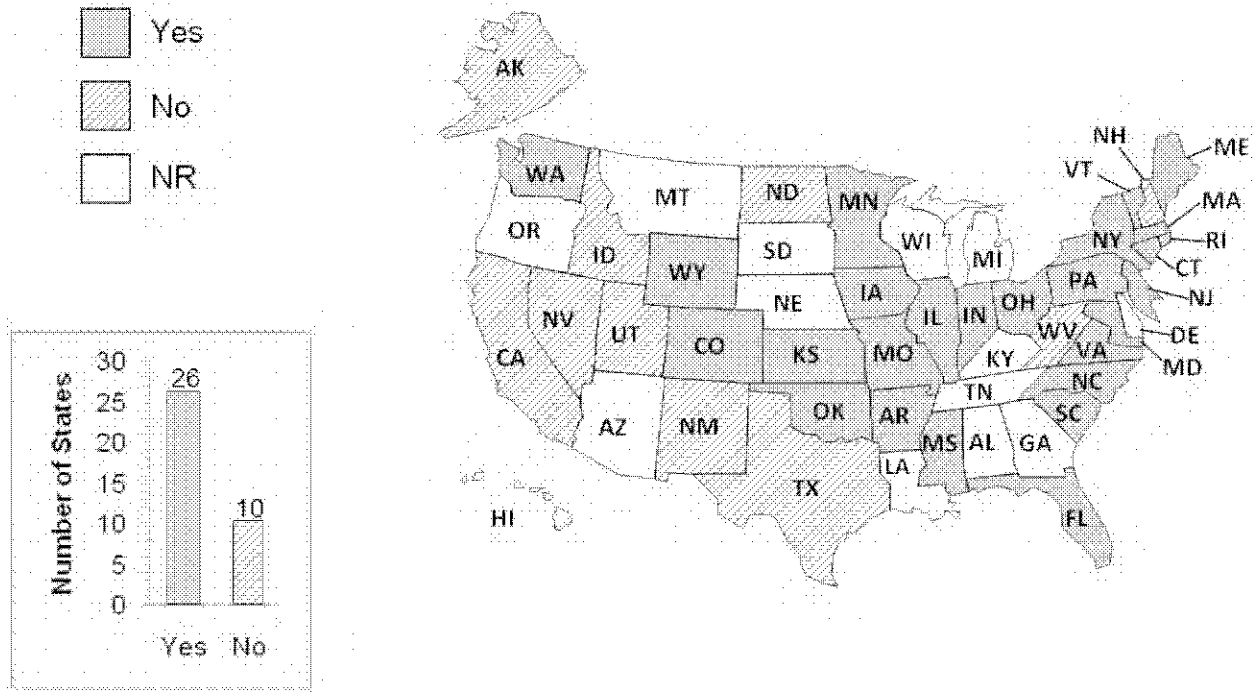
Green waste composting regulations differed from municipal solid waste regulations, food waste composting regulations, and biosolids composting regulations in the majority of the surveyed states (Figs. 4-6). While 72% the states indicated that composting facilities were regulated as solid waste facilities, 80% of the surveyed states indicated that the level of permitting applied to composting facilities was less stringent than regulations applied to landfills. Numerical thresholds typically were not used to distinguish various types of compostable wastes such as green waste, food waste, or biosolids. More than half of the surveyed states indicated that standards were present for the composition or quality of waste that may be composted (e.g., contaminants such as plastic, glass, and food waste that may affect the feasibility of composting green waste). Residual (i.e., contaminant) content and putrescible content were quantified for regulatory purposes in 47% and 19% of the surveyed states, respectively. Residual content was determined for incoming or outgoing materials and thresholds varied between 1 and 6% for regulatory oversight. Putrescible content was included qualitatively (e.g., with respect to odor generation) and was not quantified.



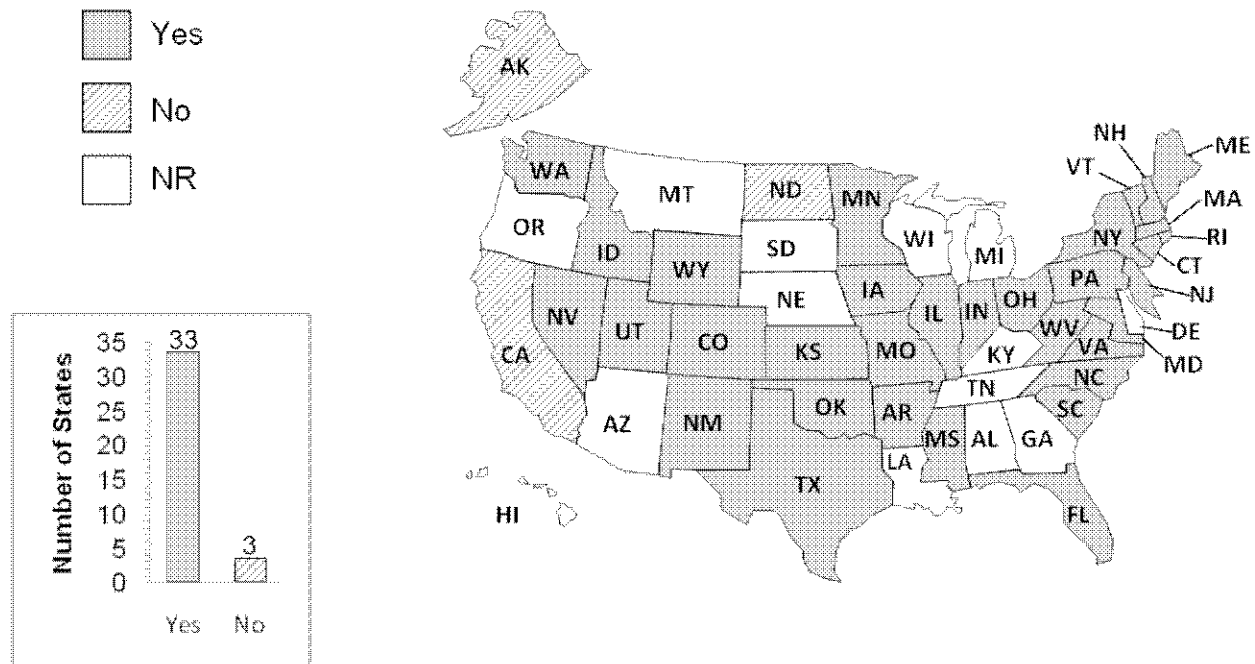
**Fig.4. Does the regulation of green waste composting differ from regulation of municipal solid waste in your state?**

The quantities of incoming materials were determined slightly more commonly than the quantities of outgoing materials at composting facilities. Incoming and outgoing material quantities were determined using volume measurements more commonly than using weight measurements. Volume measurements were converted to weights using assumed unit weight values or existing conversion factors/guidelines. Material flows averages were used significantly more commonly than discrete spot measurements for determination of material quantities for regulatory compliance. The frequency of material flows measurements generally were between weekly and annual and discrete spot measurements between continual and less than monthly.

Reported material sampling frequencies varied significantly from daily measurements to multi-monthly to annual measurements.

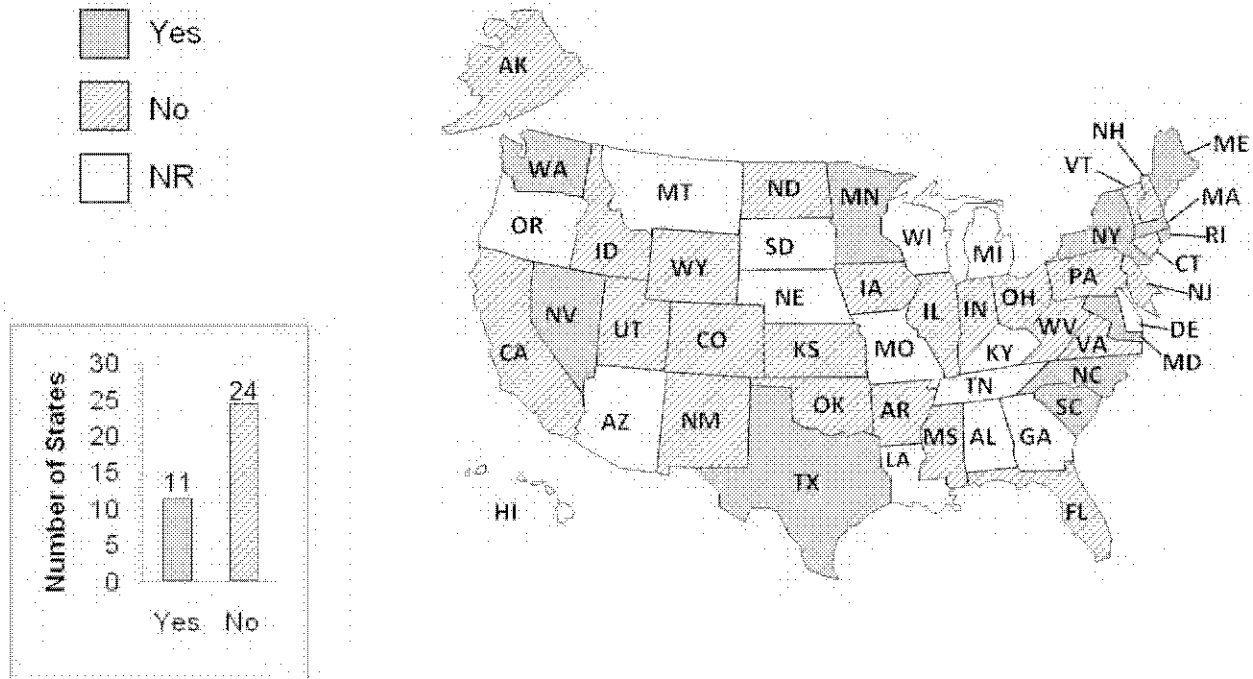


**Fig. 5. Does the regulation of green waste composting differ from regulation of food waste composting in your state?**



**Fig. 6. Does the regulation of green waste composting differ from the regulation of biosolids composting in your state?**

Less than half of the surveyed states indicated the use of parameters besides quantity for outgoing compost materials. Most commonly measured parameters were related to the quality of the compost and approximately one third of the states reported use of standards for the quality of compost intended for different applications (Fig. 7). The majority of the surveyed states (64%) indicated that they had regulations related to on-site storage of finished compost products at composting facilities. The reported durations varied between 6 months to 3 years rolling average. Storage of incoming materials was more restricted with requirements for processing within days or weeks. In addition, qualitative descriptions were included such as prevention of speculative accumulation and prevention of nuisance or public health impacts.



**Fig. 7. Are there standards for the quality of compost intended for different applications?**

The survey included questions related to initial development of the state composting regulations. A total of 65 and 42% of the states indicated that specific/quantitative science and engineering principles and specific/quantitative economic and feasibility principles had been used in the development of regulatory criteria, respectively. State regulators noted that criteria developed by U.S. Composting Council, studies conducted by USDA, and recent research in composting were referenced and adopted in the development of regulations. Several states indicated adopting regulations from other states. Experience, engineering judgment, and standard composting practices as well as input from industry stakeholders were used commonly in the development of regulations. Legislative directives were indicated to influence regulatory criteria. Leeway in enforcement was built in the structure of regulations in several cases such as establishing testing requirements but not limits/standards on tested parameters. In these cases, consumers were assumed to be knowledgeable on compost properties. In general, effects of composting activities on public health and the environment have not been investigated in systematic scientific studies that were readily accessed or directly adopted by regulatory community. Several states indicated use of economic impact reviews, fiscal impact assessments for large and small businesses as well

as local governments, cost benefit analysis, or least burdensome alternative analysis during the development of composting regulations. State regulators generally conceived their regulations to be approximately in line with regulations used in other states.

Composting operations were inspected by majority of the state regulatory agencies. The frequency of inspections ranged from monthly, quarterly, and annually (common) to in response to complaints (common). Composting activities (typically permitted facilities) were required to submit reports by the majority of the surveyed states. The reports typically included quantity of incoming feedstock materials and outgoing compost materials, with requirements related to type of feedstock, quantity of residuals and recyclables separated from the waste or compost, disposal or management of these materials, quantity of the compost removed from a facility, distribution or use of the compost, and testing results included by some states. The reports typically were required to be submitted on an annual basis.

Regulatory staff from half of the surveyed states indicated that operational efficiency at composting facilities was affected by regulations. The number of states satisfied with the current model of regulation (approximately half of the surveyed states) was higher than the number of states that were very satisfied, neutral, or dissatisfied. A total of 39% of the states indicated that they were considering or in the process of changing regulations for composting activities. Comments were provided by the state regulators in the survey related to i) problems with current regulations, ii) the status and direction and/or priorities for new regulations, and iii) general comments related to regulatory methods. Examples of the comments are provided below (presented verbatim in most cases).

i) Problems with current regulations:

- The state has no standards for compost. Anyone can sell a bag of dirt and call it compost.
- If the registered facilities are not routinely inspected, large disposal problems have developed in a few situations.
- We are getting requests to compost materials other than yard waste and this is problematic since those types of operations require a solid waste processing facility. The application fee for these is \$12,150, a very high cost.
- Some yard waste sites have caused trouble in the past. Litter and odor have been problems.
- Multiple waste streams can be difficult.
- We don't specify how long can the material be held on site and our rules indicate that green waste only can use any composting method even if not listed in rule. As a result we have several green waste only facilities that are pretty much just an open dump of green waste.
- The model does not adequately address composting of food waste. Financial assurance mechanisms are not well defined. Closure requirements need detail for stabilizing the site. Better fire emergency prevention and planning should be incorporated into the regulations. Composter certification and training requirements can facilitate better composting facilities.
- We need to have better requirements for liquid management, especially for larger facilities. In addition, we will also change regulatory triggers to allow smaller facilities via a registration process rather than obtaining a certification (permit).
- The main problem is reporting.
- We are currently revising our solid waste regulations including composting to lessen permitting and operational costs. We also intend to increase exemption allowances.



ii) New regulations:

- Recent legislation allows landfills to utilize yard waste in the harvesting of methane gas.
- Registration provisions encouraged recycling. We are proposing to expand the registration program to include composting more putrescible materials (e.g., source-separated food waste collected from institutional and commercial operations, but not from residential programs)
- Due to increased interest in food and paper waste composting, the state has a bill that would exempt certain composting facilities from local siting requirements, making it easier for food/paper composters to get a permit if they meet location standards (for windrow activities) or plan on using in-vessel composting.
- Mainly for solid waste composting sites (new regulations).
- We need to evaluate our regulations and make changes, as necessary, to promote more green waste composting facilities.
- Storm water and wastewater runoff regulations are being drafted.
- We are proposing that green waste facilities follow only the composting methods listed in rule. We are also describing better methods and adding minimum turning frequencies as applicable to encourage faster processing. We are also adding a requirement for minimum yearly distribution amount of 25% of the volume accepted in the previous year.
- We appear to have much interest within the state and from operators in neighboring states to address food waste composting. Limited staff is available for drafting solid waste regulations.
- Yes, we need to have better requirements for liquid management, especially for larger facilities. In addition, we will also change regulatory triggers to allow smaller facilities via a registration process rather than obtaining a certification (permit).

iii) General comments:

- The registration program was developed with the assistance of a technical advisory group (TAG) with a balance of regulators and regulated, as well as private and governmental. The biggest disagreement in the group related to regulating tool (i.e., registration vs. general permit) because of the perceived stigma of an operation requiring a permit of any type.
- The majority of composting in the state is landscape waste, as the state has a ban on landscape waste going to landfills. Composting usually occurs in windrows because of land availability; usually the size of a composting site is not an issue. Recently I have noted more interest in composting food (restaurant, grocery store produce) waste. I expect to see more permit applications for food waste and in-vessel composting in the near future.
- We have very few facilities processing more than 1,000 yards of green waste annually. We find that our current rule is working well. We try to spend a great deal of time cooperating onsite with facility managers; helping to ensure compliance and successful composting.
- The issue that seems most meaningful is that of providing sufficient regulation to protect consumers and the environment while not unduly stifling a fragile emerging industry.
- Our process is very flexible and is primarily dependent on the permit to provide regulatory oversight. As such it is adaptable to almost any situation.
- We regulate all composters except for on-farm composting, which is regulated separately by our Division of Agriculture, which has its own composting regulations. In general, their regulations are not as rigorous as ours, since farmers are given some leeway, as farming has been on the decline in recent decades and we want to encourage farmers to stay in operation.
- Composters could potentially require several permits for a single operation if composting biosolids, agricultural wastes, and food wastes, compliance with storm water requirements,

and compliance with air quality standards for NO<sub>x</sub> emissions from diesel engines, fugitive dusts, and potential greenhouse gas emissions.

- Food waste and animal composting are more of an issue than green waste. Digestors for organics management are starting to be used and we need to develop rules to address these.

## **Summary and Conclusions**

An extensive survey was administered to all 50 states to identify significant aspects of composting regulations. Questions were included regarding: background information on composting; status of regulations; regulatory details including feedstock specific provisions and regulatory framework with respect to MSW regulations; details regarding type, properties, and amount of materials handled by composting activities; outgoing materials and storage of materials; type of composting facilities; initial development of the regulations; level of rigor of regulations; enforcement and reporting requirements; efficiency and level of satisfaction with regulations; permitting fees; and modifications to regulations. A total of 37 states completed the survey. The majority of the surveyed states had regulations for composting activities and required permits for operation of composting facilities. Exemptions from permitting were used in most of the surveyed states as a function of type of feedstock and operation. Backyard/on-site residential and agricultural composting and garden waste composting were exempted as well as clean wood processing operations. The exemptions typically included quantitative criteria for amount of materials processed (observed to be highly variable between states) or less commonly criteria for size or location of facilities/operations.

Green waste composting regulations differed from municipal solid waste regulations, food waste composting regulations, and biosolids composting regulations in the majority of the surveyed states. While 72% the states indicated that composting facilities were regulated as solid waste facilities, 80% of the surveyed states indicated that the level of permitting applied to composting facilities was less stringent than regulations applied to landfills. Residual content generally was not quantified for regulatory purposes. The majority of the surveyed states had regulations related to the duration of materials storage at a facility. In the surveys, 16 and 11 out of 35 states indicated that they had standards for the composition or quality of waste that may be composted and standards for the quality of compost intended for different applications, respectively. Regulations were developed to minimize impact to the environment or nuisance to nearby residents. Criteria developed by U.S. Composting Council, studies conducted by USDA, and recent research in composting were referenced and adopted in the development of regulations as well as adoption of regulations from other states. Experience, engineering judgment, and standard composting practices as well as input from industry stakeholders commonly were used in the development of regulations. Economic impact of the regulations was assessed by several states. More than a third of the states indicated “considering or in the process” of changing current regulations. Problems were identified related to reporting; enforcement by multiple agencies with variable regulatory requirements; and environmental protection issues such as litter, odor, and contaminated liquids. In most cases, new regulations and modifications to existing regulations were related to increases in interest in food waste and biosolids composting and management of liquids including storm water and wastewater runoff.

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