



### Commercial development of frass

- Requires
  - Quality
  - Consistency
  - Volume
  - Value

BSFL frass on greens w/ nematode pressure

BSFL frass on "healthy" greens

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### Frass composition can be variable

- Feedstock composition (and it's inherent variability)
- Larval rearing conditions
- Processing variation

	DDGS / Bakery By-product	Fish Offal	Tequila Bagasse
Crude protein, %	26.6	36.6	20.9
<b>N, %</b>	<b>4.3</b>	<b>5.9</b>	<b>3.3</b>
Crude fat, %	3.7	29.7	2.8
Ash, %	12.0	18.3	12.2
Ca, %	1.5	2.2	2.5
<b>P, %</b>	<b>1.4</b>	<b>1.8</b>	<b>1.2</b>
<b>K, %</b>	<b>1.8</b>	<b>2.9</b>	<b>1.5</b>
Na, %	0.49	0.74	0.41

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### Frass composition can be variable

- Feedstock composition
- Larval rearing conditions**
- Processing variation

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**Frass composition can be variable**

- Feedstock composition
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**Application type impacts additional processing needs**

- Particle size matters



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**Application type impacts additional processing needs**

- Particle size matters
- Additional processing adds cost



SGN (mmx100)    Dried, ground ~50    Granulated ~120    Crumbled ~240

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**Product registration**

- Product must be registered in each state of use
  - N, P, K for fertilizer registration
- For organic crops, OMRI, CDFA, WSDA review/approval
  - e.g., review of feedstock inputs, pathogen standard compliance, heavy metal testing
- May have additional testing/certification for specific applications
  - CA Leafy Greens (LGMA) certification

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**Summary**

- Frass is an amazing co-product of BSFL farming with tremendous potential for agronomic benefits
  - N, P, K and other essential nutrients
  - Structural improvement of soil matrix
  - Microbiome improvement via direct and indirect impacts
- Frass can be variable due to feedstock, production and processing methods
  - Agronomic value will vary with composition
- Frass particle size is an important consideration for applications (and cost!)
- Frass must be registered prior to use
  - Some additional testing/certification may be required

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