

**KETAHANAN KAYU TERMODIFIKASI
KIMIA TERHADAP BIODETERIORASI:
Studi pada Kayu Asap & Polistirena**

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Wood from Plantation

- Planted tree: juvenile wood
 - Inferior in physical-mechanical properties
 - **Lower durability class**
- Economic loss in 2000 (Yoshimura 2005):
 - **Indonesia USD 200-300 million;**
 - China USD 300 million, Japan USD 0.8-1 billion, Korea USD 200 mio; Malaysia USD 10-12 mio
- Wood from plantation is not preserved prior to use, increasing economic loss.

Preservation

- Preservative: environmental hazard
- **Wood smoke** contains a large number of polycyclic aromatic hydrocarbons (**PAH**), mainly composed of phenols, aldehydes, ketones, organic acids, alcohols, esters, hydrocarbons and various heterocyclic compounds (Stołyhwo & Sikorski, 2005)
- Supriana (1999) smoke method, traditional wood Preservation, the wood is placed above wood stove for long duration and the wood will be more dry and more resist to termite and fungi.

Purpose of Study

- Resistance of smoked wood to
 - Dry wood termite
 - Subterranean termite
- Treatment:
 - Control; Smoked; Polystyrene; Borax
- Wood species:
 - Mindi (*Melia azedarach*);
 - Sugi (*Cryptomeria japonica*).

2. Materials and Methods

Materials

- Wood samples :
 - Mindi (*Melia azedarach*), Indonesia
 - Sugi (*Cryptomeria japonica*), Japan
 - Size of sample: 0.8 cm by 2 cm Cross
 - 20 cm in-ground test,
 - 5 cm dry wood termite test,
 - 2.5 cm subterranean termite test
- Burnt wood: mangium (*A. mangium*)
 - Smoking period was 15 days.

Polystyrene

- Vacuum 600 mm Hg, 30 min
- Monomer styrene inserted
- Pressure 10 kg/cm², 30 min
- Oven: 100 °C; 24 hours
- Determined:
 - Polymer Loading.

Borax Treatment

- Wood specimens were soaked in 5 % borax (mixture of borax and boric acid in 1 : 1.5 w/w) during 24 hours using cold soaking process.
- All the treated woods were conditioned at room temperature for one month prior to the tests.

Dry wood termite test

- Wood 5 x 2 x 0.8 (cm; L, W, T)
- On the center of it sample a glass tube (3 cm height by 1.8 cm \emptyset) was placed
- Each sample:
 - 50 worker termites were put
 - Put in the dark room for **12 weeks**
- Determined (5 replication)
 - Wood weight loss
 - Termite mortality.

In-Ground test

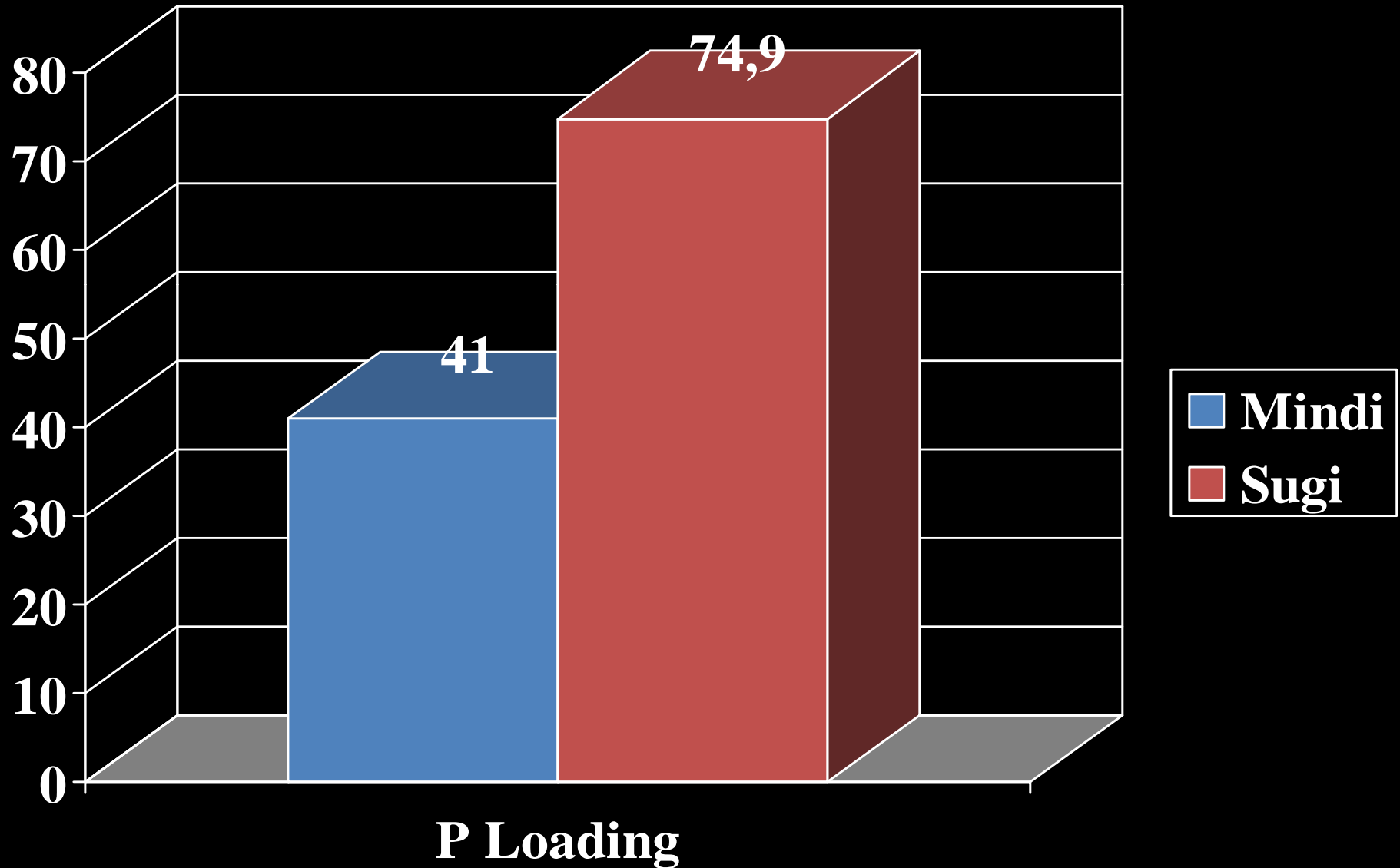
- Wood 20 x 2 x 0.8 (cm)
 - Vertically buried
 - 10 cm depth in the soil
 - Test in Bogor, Indonesia
 - Test period **three months**
- Determined wood failure
 - Five replication.

Subterranean termite, laboratory test

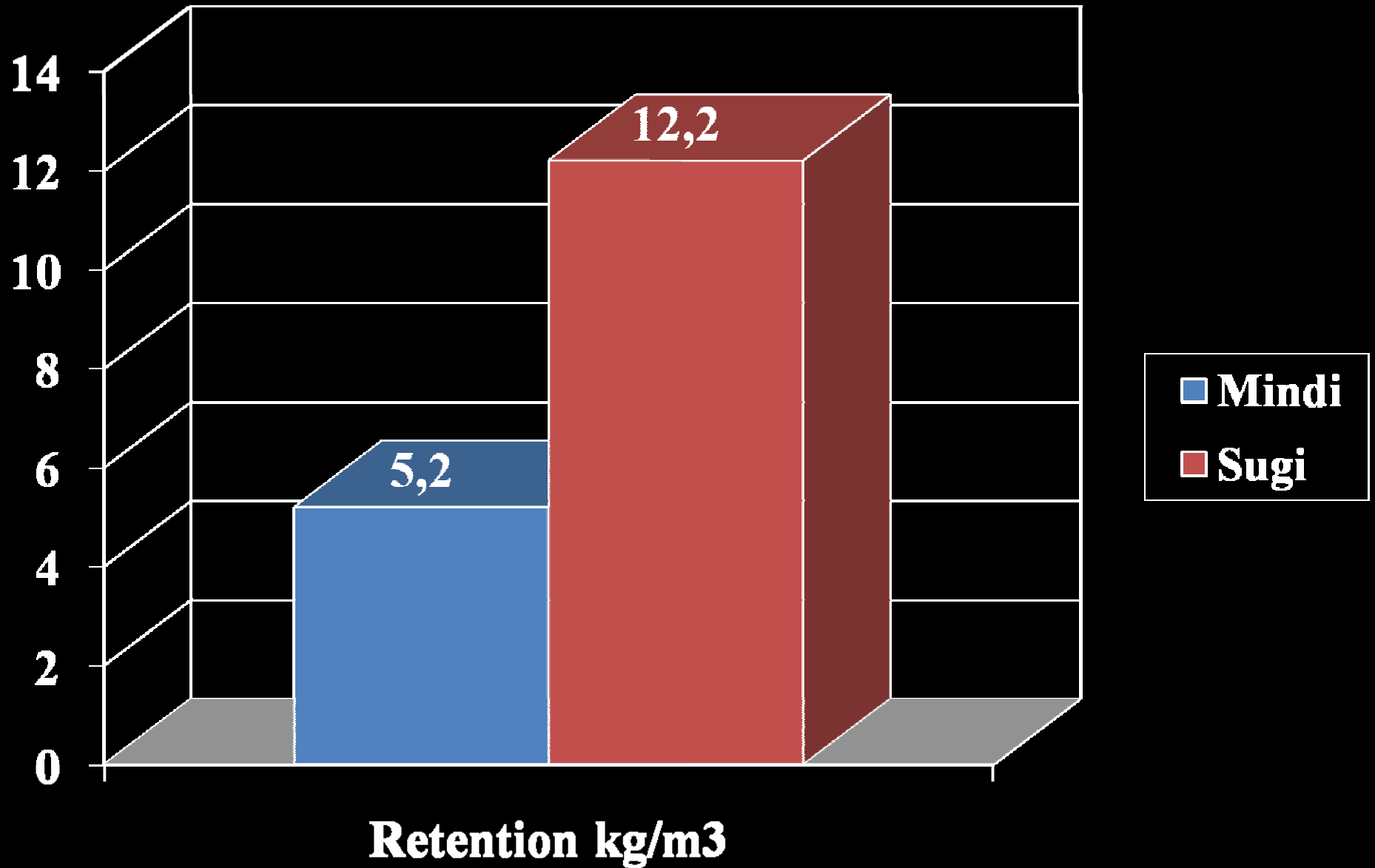
- Wood 2.5 x 2 x 0.8 (cm; L, W, T);
- Each jam pot
 - 200 g sand (7% m. c.)
 - 200 healthy & active worker termites
 - Put in the dark room for **six weeks**
 - M.C. of sand was kept
- Determined (5 replication)
 - Wood weight loss
 - Termite mortality.

3. Results and Discussion

Polymer Loading (%)



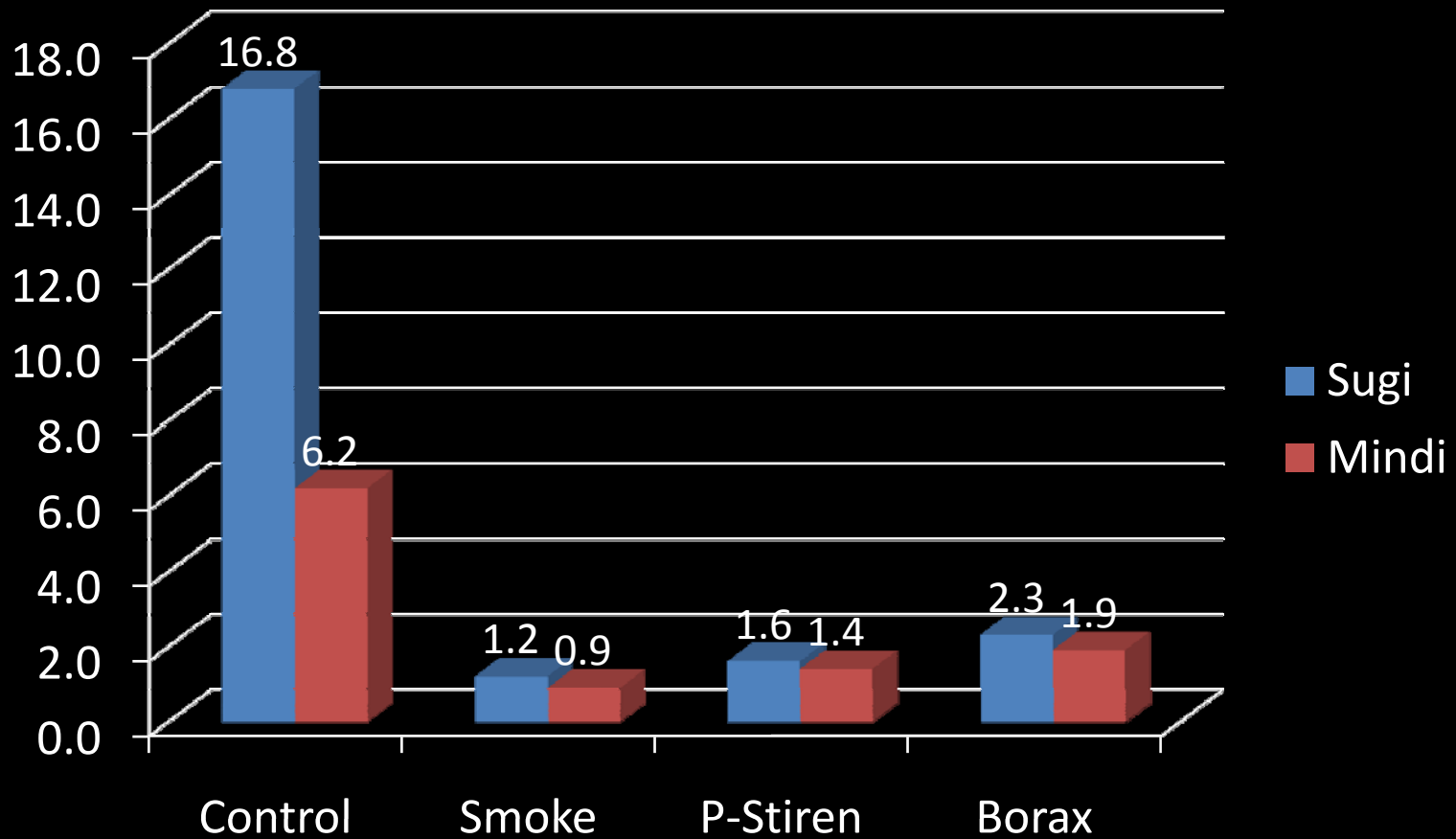
Borax Retention (kg/m³)



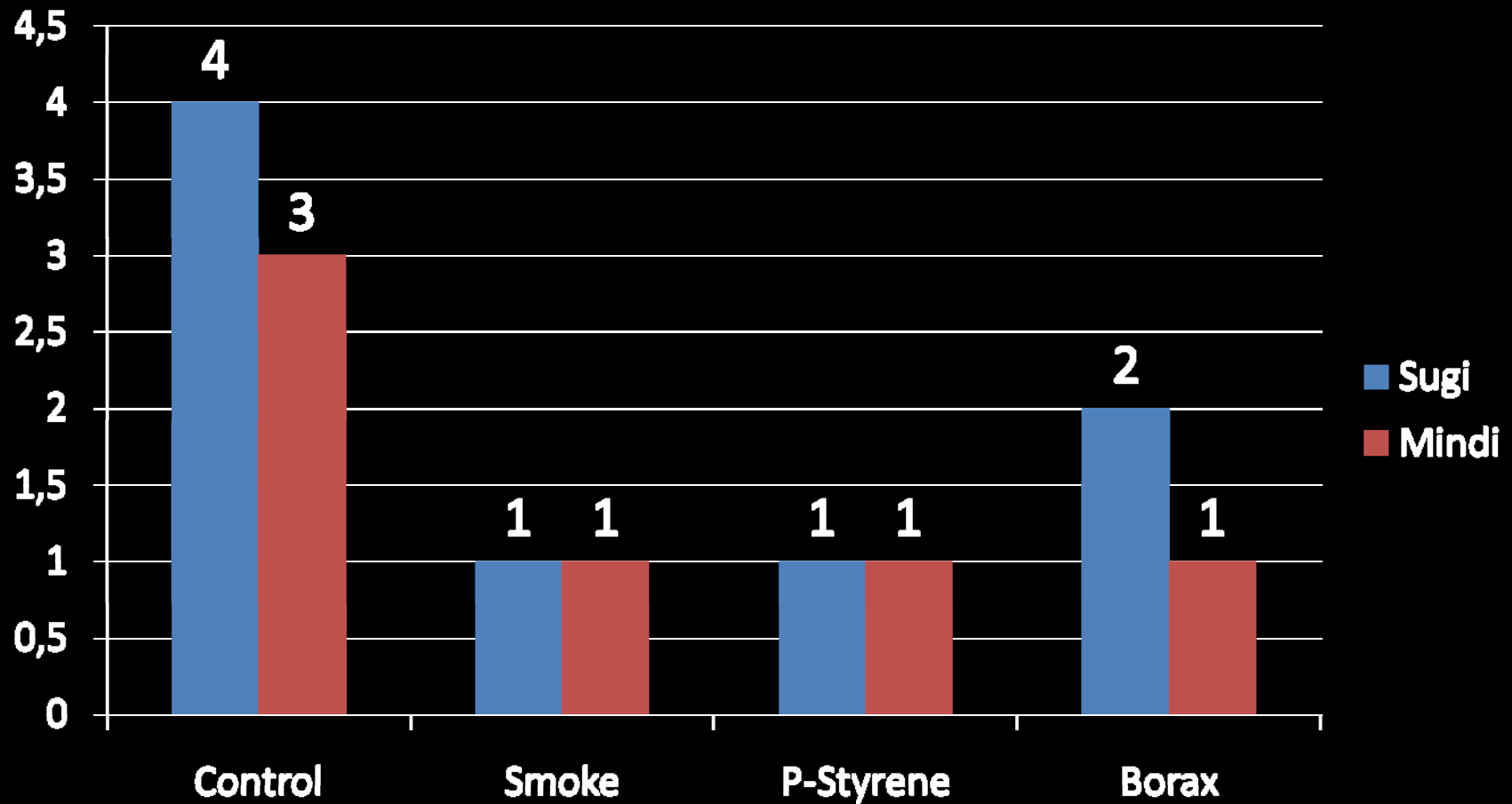
3. Results and Discussion

3.1 Dry Wood Termite Test

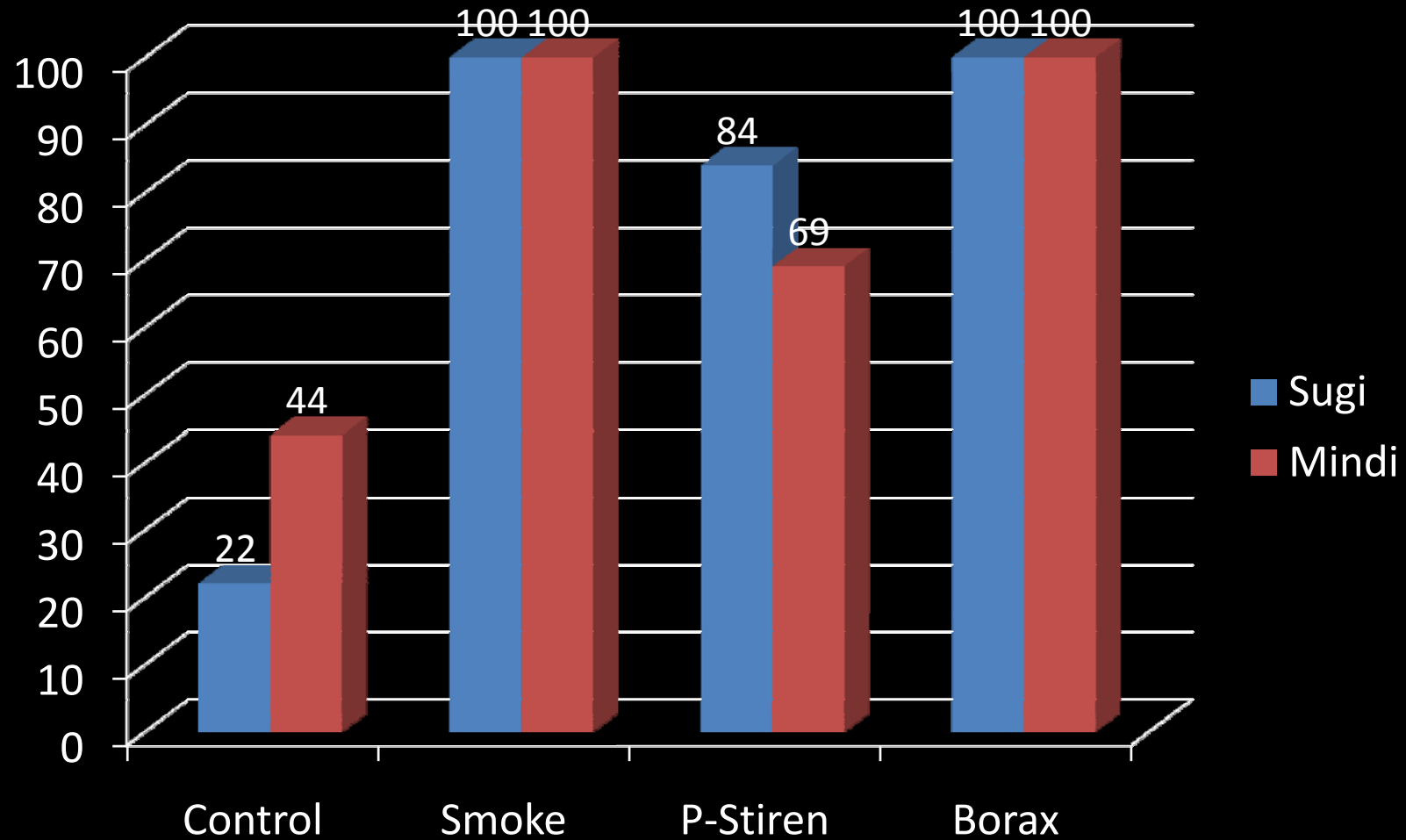
DWT, Wood Weight Loss (%)



DWT, Resistance Class



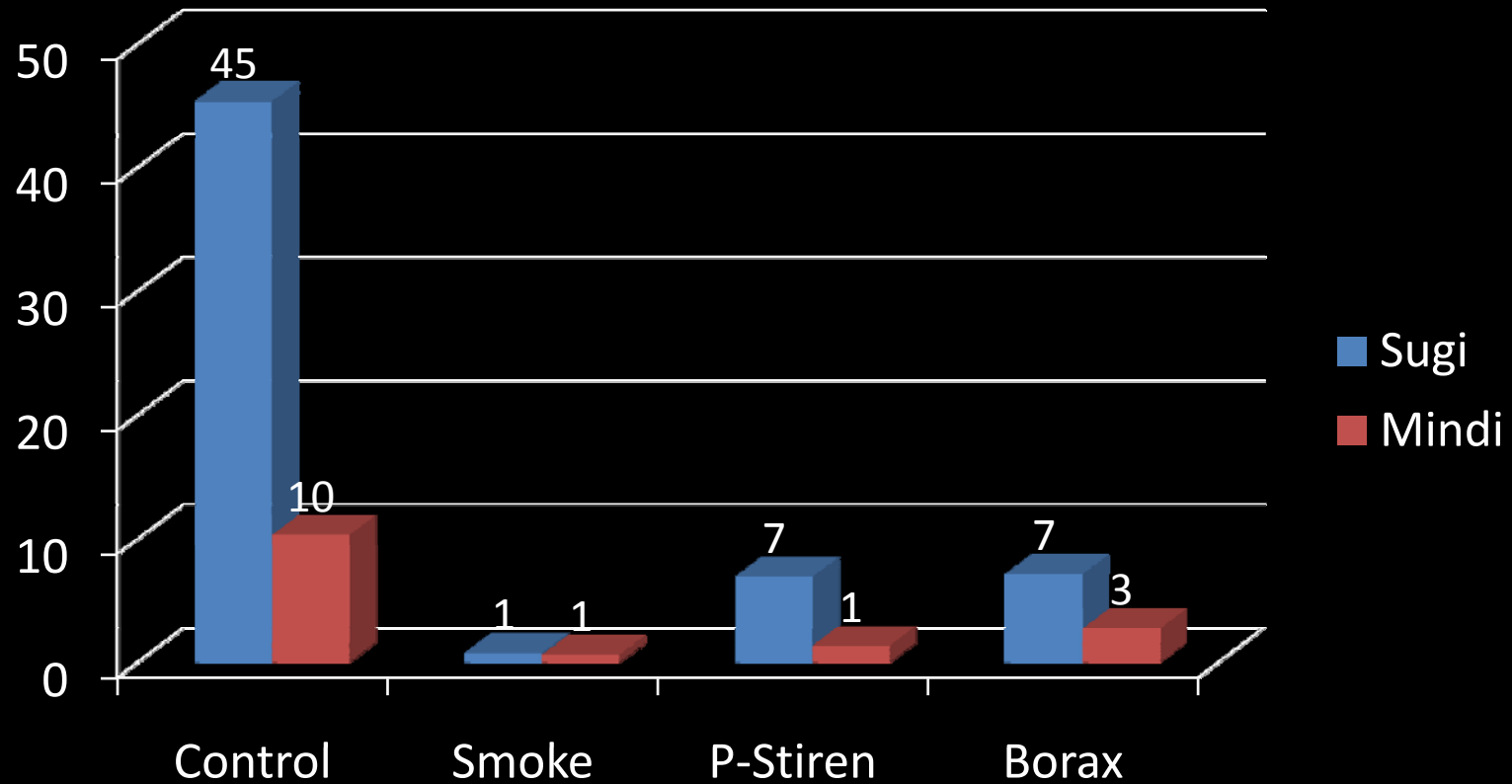
DWT, Termite Mortality (%)



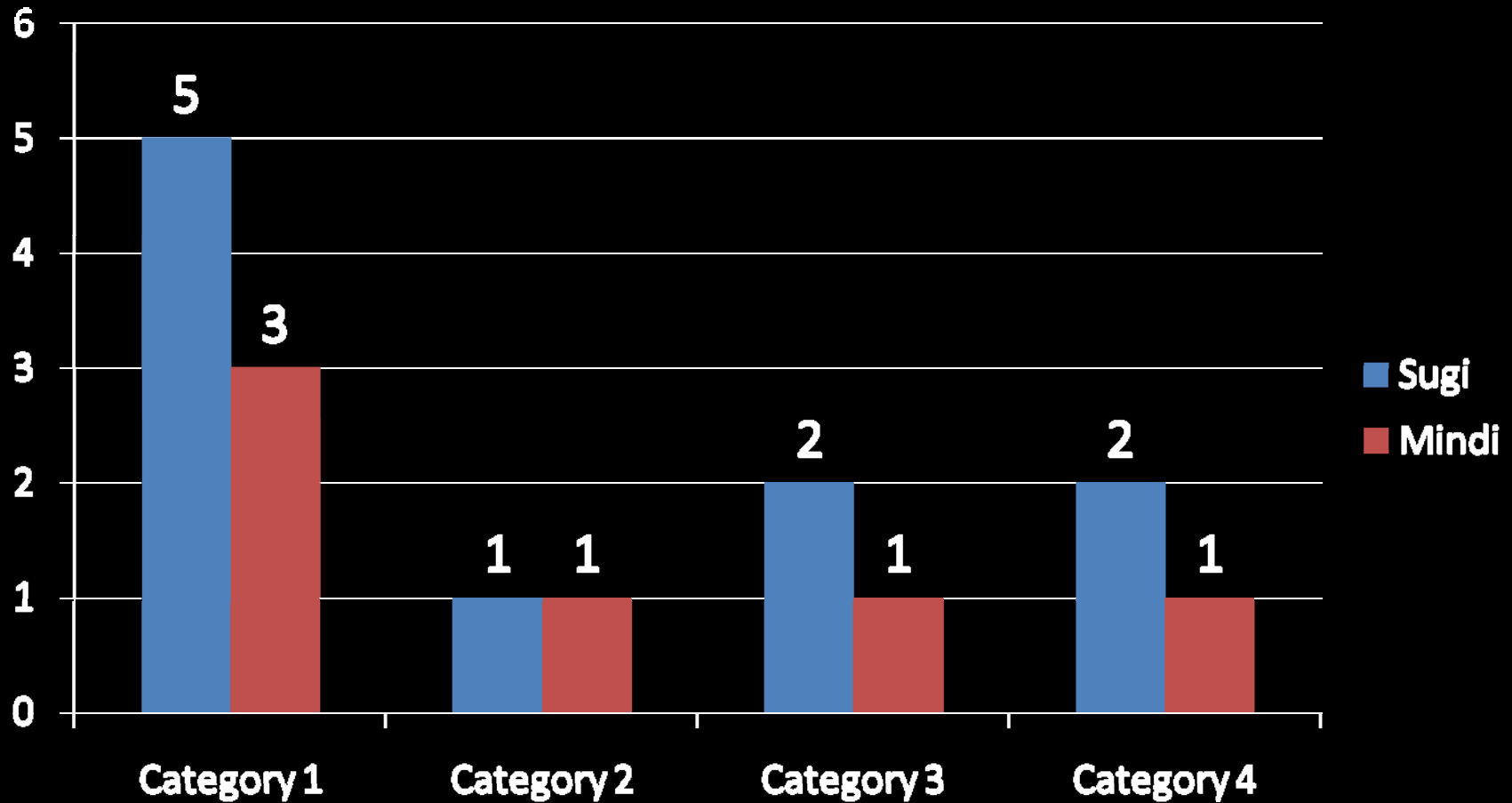
3. Results and Discussion

3.2. Subterranean Termite, Laboratory Test

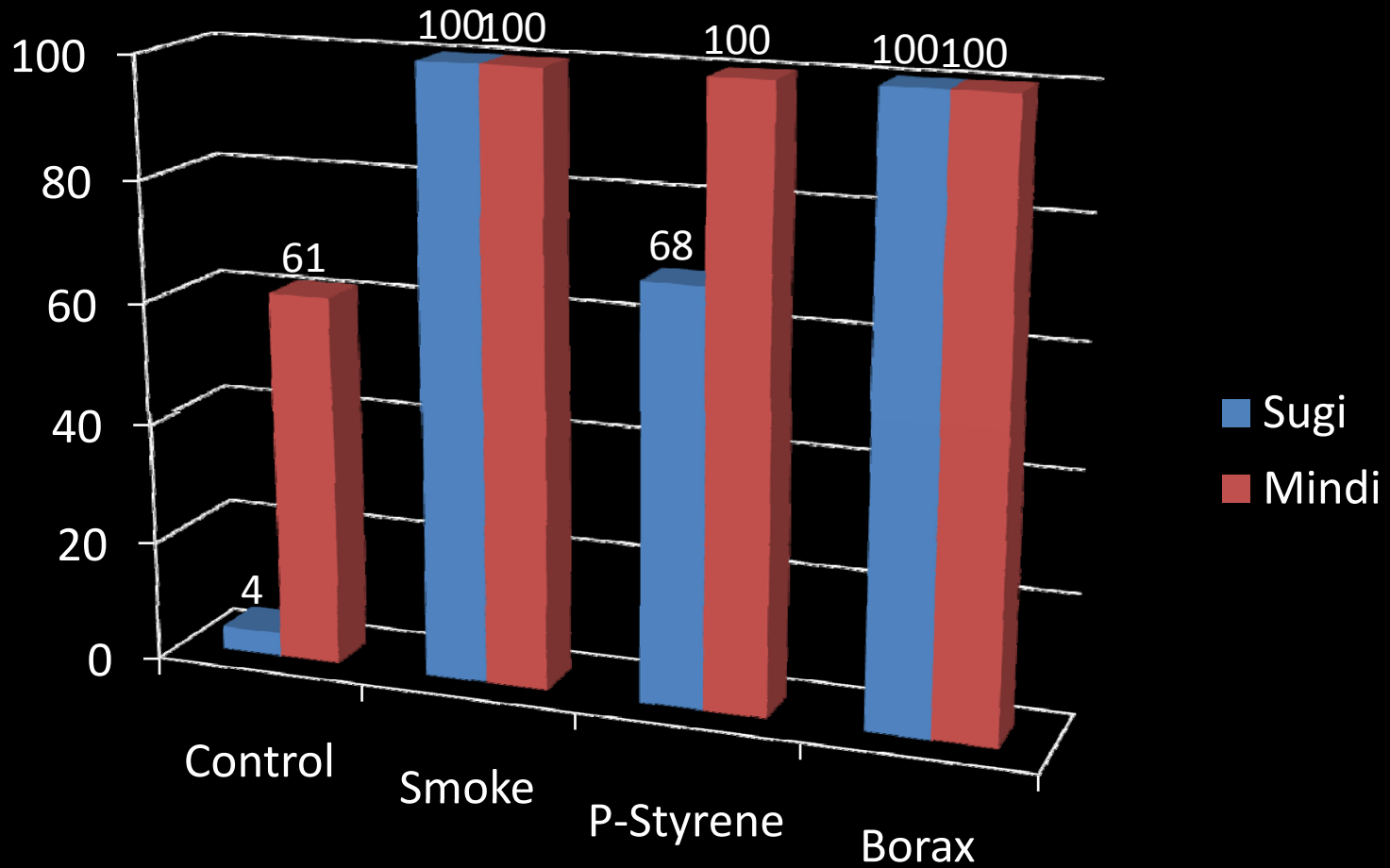
ST, Wood Weight Loss (%)



ST, Resistance Class



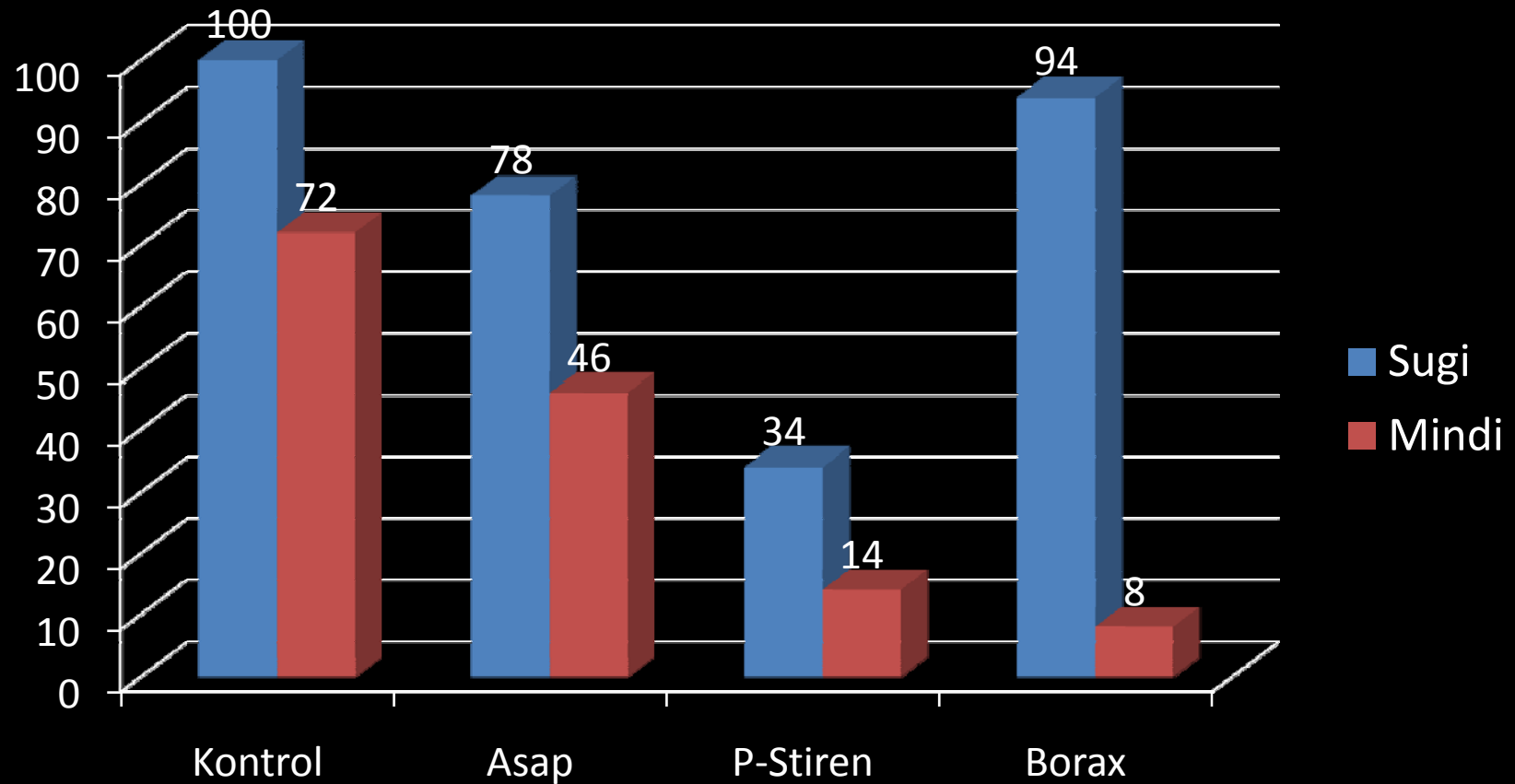
ST, Termite Mortality (%)



3. Results and Discussion

3.3. Graveyard Test

Attack Degree (%)



CONCLUSIONS

- Mindi had better resistance than sugi.
- Smoked, Polystyrene, Borax >> Control
- Laboratory test:
 - Smoked wood > Polystyrene; Borax
- In-ground test
 - Polystyrene & Borax > Smoked wood

Thank You