

Effect of wood decay fungi on termite feeding behavior

–Feeding deterrents derived from the wood decayed by *Fibroporia radiculosa*–

ヤマトシロアリの摂食行動に対する木材腐朽菌の影響 —*Fibroporia radiculosa*腐朽材由来の摂食抑制物質—

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1. Introduction

➤ There are competitions for nutrients between wood-feeding termites and wood-decay fungi.

➤ Pine sapwood stakes decayed by a brown rot fungus *Fibroporia radiculosa* suppressed termite feeding (Nishizawa *et al.* Annual Meeting of the Japan Wood Research Society 2010).

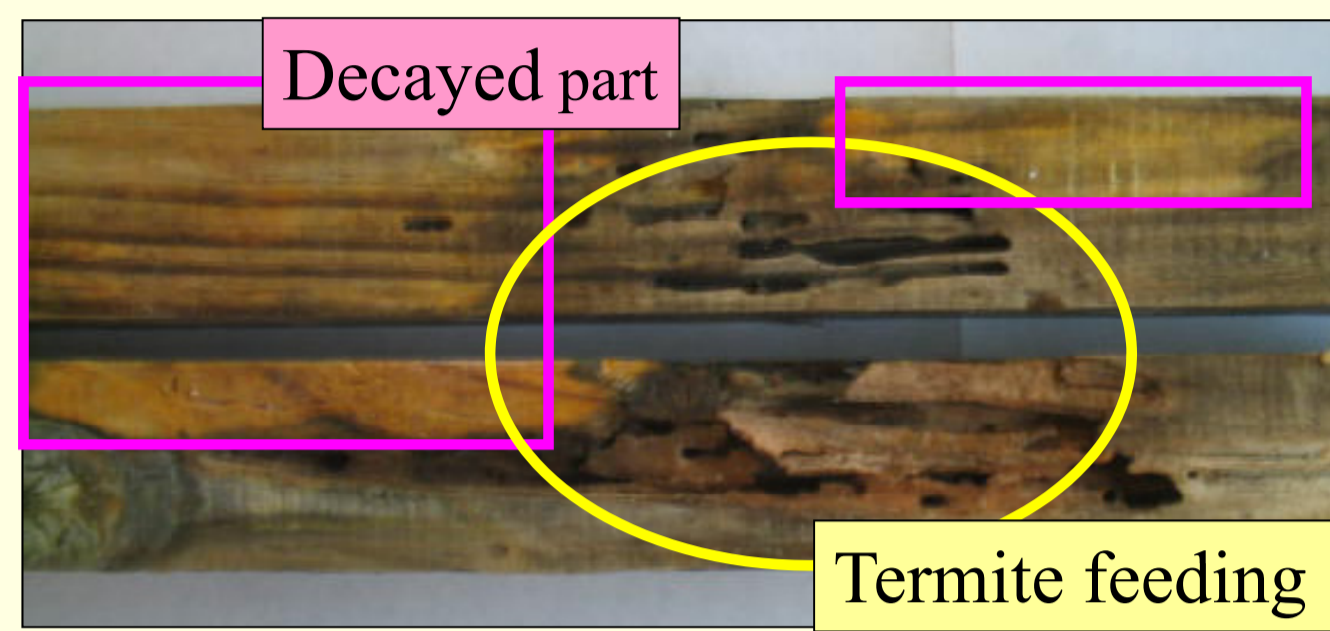


Photo 1. Termites avoided eating decayed parts of the stakes.

➤ The objective of this study is to elucidate substances in the feeding deterrence of termite produced by *F. radiculosa*.

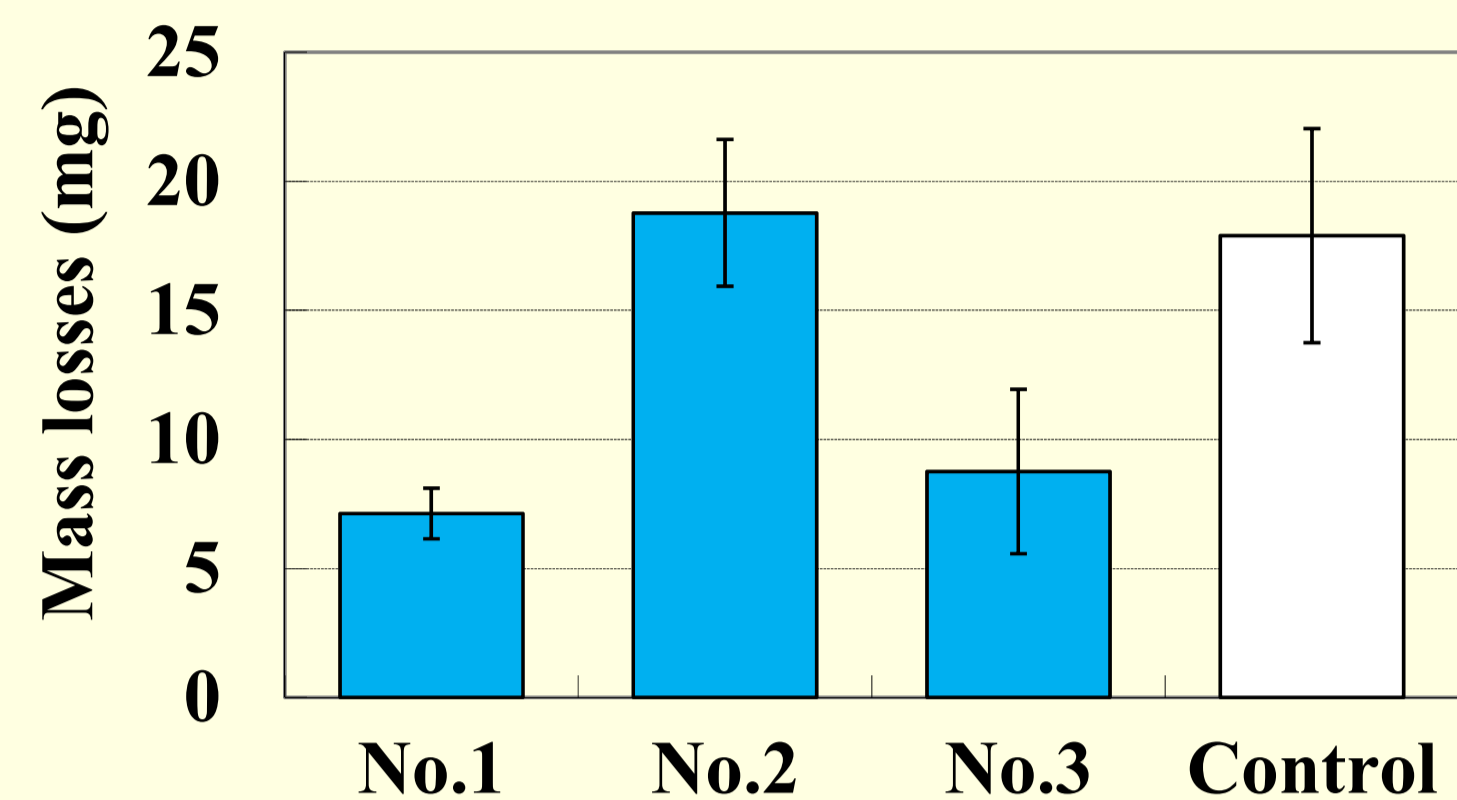


Fig. 1. Mass losses of the non-dried decayed stakes in the no-choice feeding test.

2. Feeding test of the wood decayed under the laboratory condition

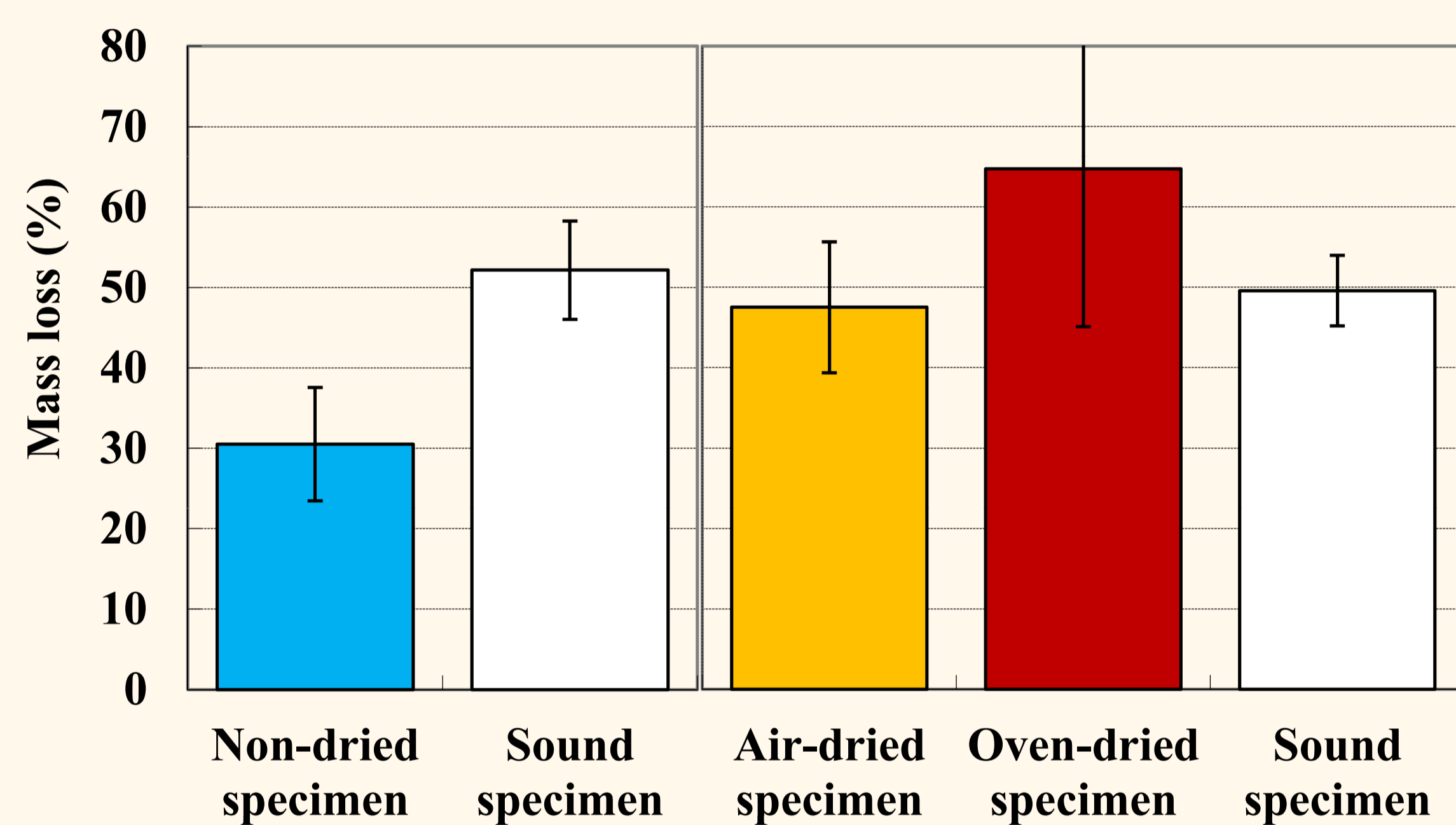


Fig. 1. Mass losses of the wood decayed by *F. radiculosa* under the laboratory condition in the no-choice feeding test.

Colored bars: decayed specimens, open bars: sound specimens (control), error bars: standard deviations, *: significant difference from control ($P < 0.05$).

✓ It was confirmed that the feeding deterrence was caused by *F. radiculosa*.

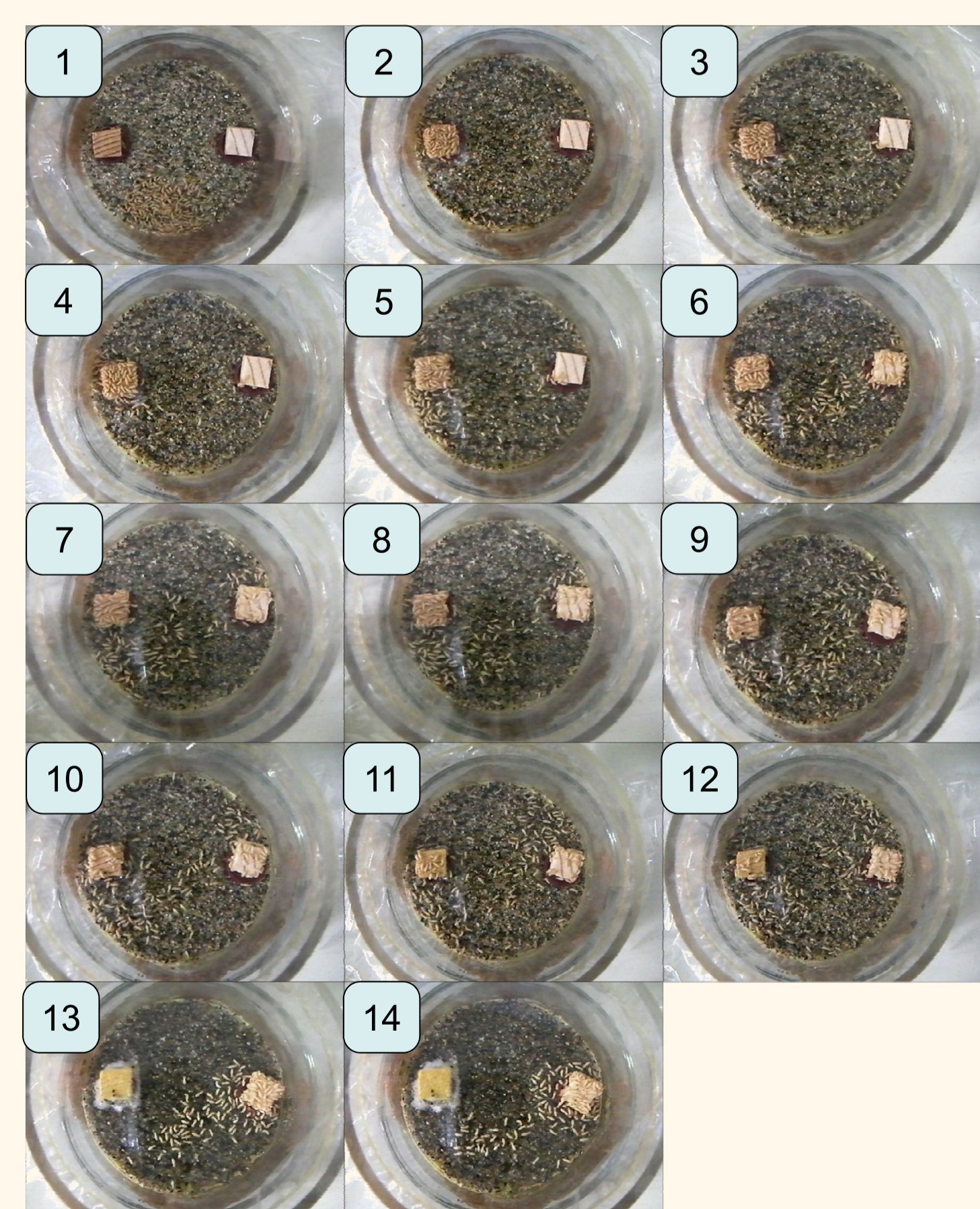


Photo 2. Feeding behavior of termites to the specimens prepared from the wood decayed under the laboratory condition at immediately after introduction (1) and every 12 hours after introduction (2-14).

● Termites kept away from the non-dried specimens prepared from the decayed stakes.

Japanese red pine blocks decayed by *F. radiculosa* were prepared under the laboratory condition. Medium: 1/3 diluted PDA, Temperature: 27°C, Period: 4 months

Decayed wood blocks were divided into three groups as follows;

- Non-dried : Holding moisture and living fungus
- Air-dried : Dried at room temperature
- Oven-dried : Dried at 60°C for 48 h
- Sound : Without the fungal and termite damage

→ No-choice feeding test

3. Feeding deterrence of *n*-hexane extract from the decayed stakes

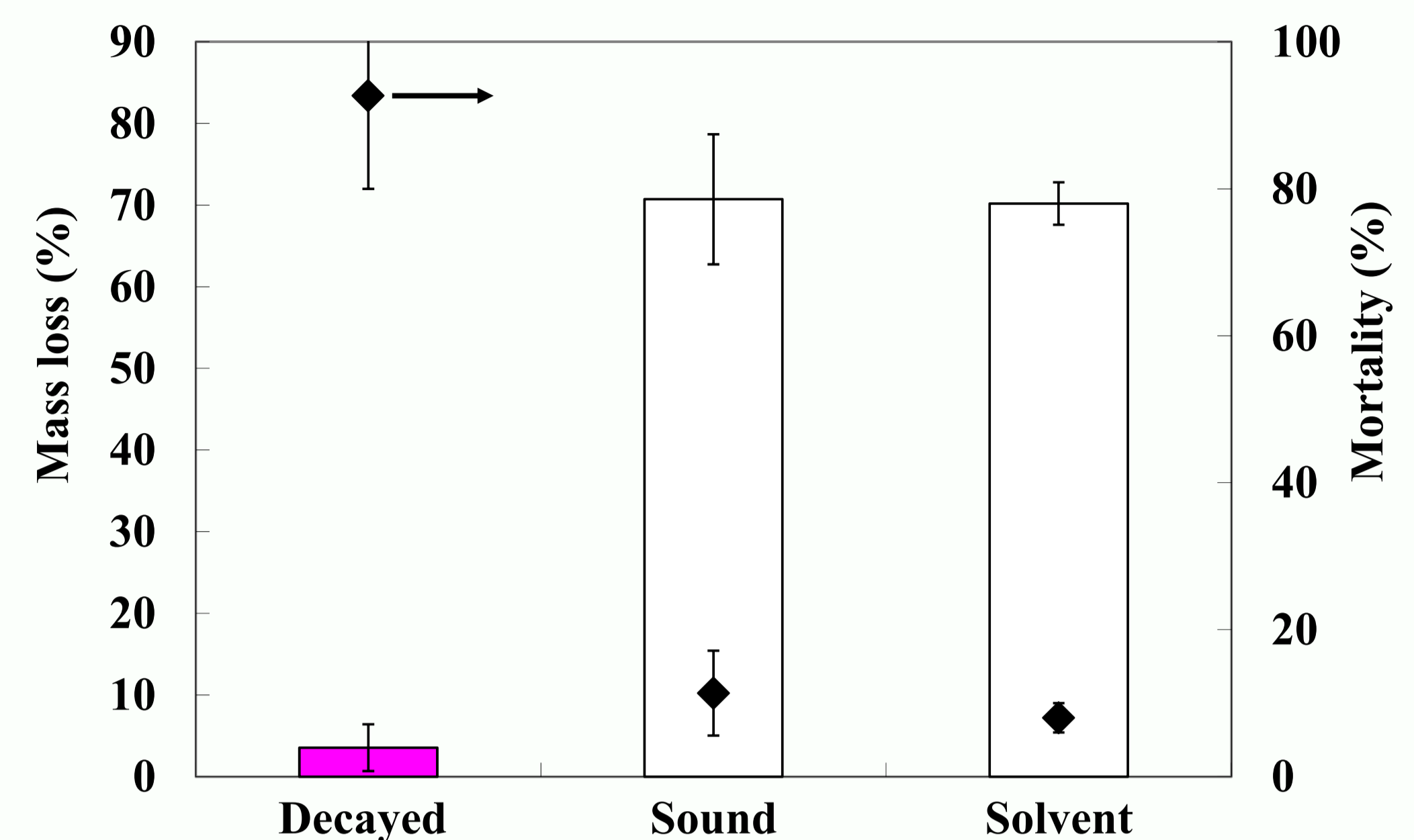


Fig. 3. Mass losses of paper disks immersed with *n*-hexane extract from the stakes and mortalities of termites after 10 days exposure in no choice feeding tests.

Bars: the mass losses, diamonds: the mortalities of termites, error bars: the standard deviations, *: significant difference from control ($P < 0.05$). The mortality of termites under the starvation condition was 52.0%.

✓ The extract from the stake decayed by *F. radiculosa* contain some termite feeding deterrents as well as any constituents have the potential to kill termites.

The decayed stake was freeze dried and ground in a mortar. Wood powder was extracted with *n*-hexane. Paper disks were immersed with extract to adjust same retention in the stake.
→ No-choice feeding test

4. Fractionation of the extract by paper chromatography

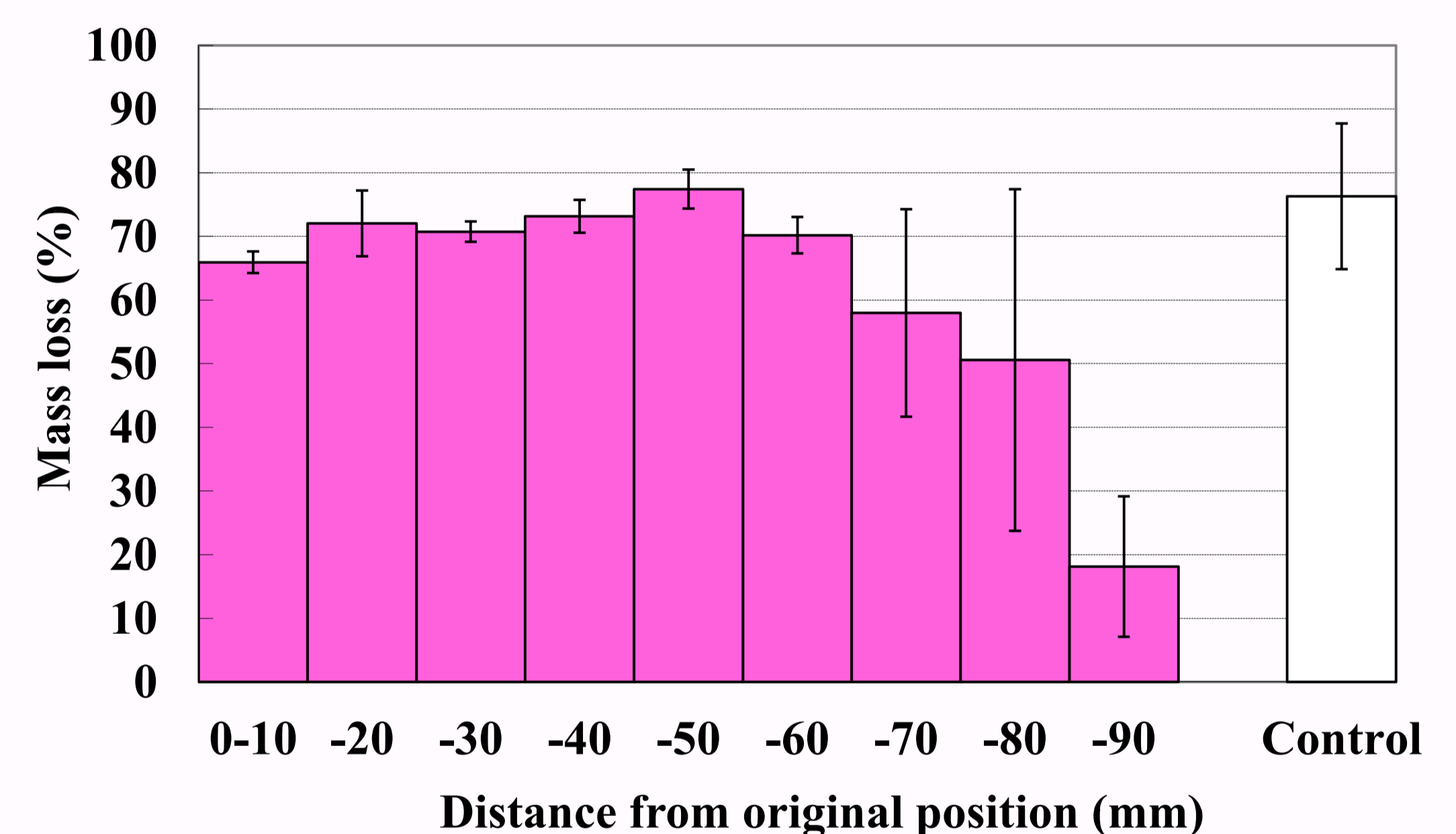


Fig. 4. Mass losses of each divided-filter paper portion fed by termite in the no choice feeding.

✓ The developed filter paper distance of 80 to 90 mm from original line was suppressed termite feeding.

Developing solvent: *n*-hexane and ethyl acetate (1:3)

Developing distance: 90 mm

The developed area of the filter paper was cut into 9 equal parts from the original position to the top position.

→ No choice feeding test

➤ Wood decayed by *F. radiculosa* suppressed termite feeding at the non-dried condition.

➤ Some constituents of *n*-hexane extract of the stakes decayed by *F. radiculosa* suppressed termite feeding.

➤ It is necessary to conduct more investigation to determine termite feeding deterrents.