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### Stimulatory Effect of Wasabi Leafstalk Extract (*Wasabia japonica* MATSUM.) on Bone Calcification: Interaction with Bone Anabolic Factors in Mouse Calvaria Tissue *in Vitro*

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The stimulatory effect of wasabi leafstalk extract (*Wasabia japonica* MATSUM.) on bone calcification was compared with the anabolic effect of insulin, insulin-like growth factor I (IGF-I), 17 $\beta$ -estradiol, and genistein. Mouse calvaria tissues were cultured for 48 h in a serum-free Dulbecco's modified Eagle's medium (high glucose, 4.5%). The presence of wasabi leafstalk extract (25  $\mu$ g/ml) caused significant increases in bone calcium content. The combination of 10<sup>-10</sup> M 17 $\beta$ -estradiol and 15  $\mu$ g/ml wasabi leafstalk extract had an additive effect on bone calcium content, while the increasing effect of phytoestrogen genistein (10<sup>-9</sup> or 10<sup>-7</sup> M) on this content was not significantly greater in the presence of the same amount of the extract. Insulin (10<sup>-8</sup> or 10<sup>-7</sup> M) had a significant effect on bone calcium content, and the combination of both 10<sup>-8</sup> or 10<sup>-7</sup> M insulin with 15  $\mu$ g/ml wasabi leafstalk extract had an additive effect. Such an effect was not seen in the case of IGF-I (10<sup>-8</sup> M), however which increased bone calcium content. The present study demonstrates that wasabi leafstalk extract has an enhancing effect on the anabolic action of 17 $\beta$ -estradiol or insulin, which regulates bone formation and calcification *in vitro*.

**Keywords:** [wasabi leafstalk](#), [bone calcification](#), [17 \$\beta\$ -estradiol](#), [insulin](#), [IGF-I](#), [genistein](#)



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