

# Exploring the Osteogenic Potential of Microalgae Methanolic Extracts

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## INTRODUCTION & AIM

People are living for longer periods, which in association with poor nutrition and sedentarism increases age-related metabolic diseases such as osteoporosis.

Microalgae promote cell growth, as well as proliferation and regeneration of bone tissues (osteoconductive), encourage the growth of fibroblasts and cells similar to osteoblasts, and inhibit osteoclast-like cell growth.

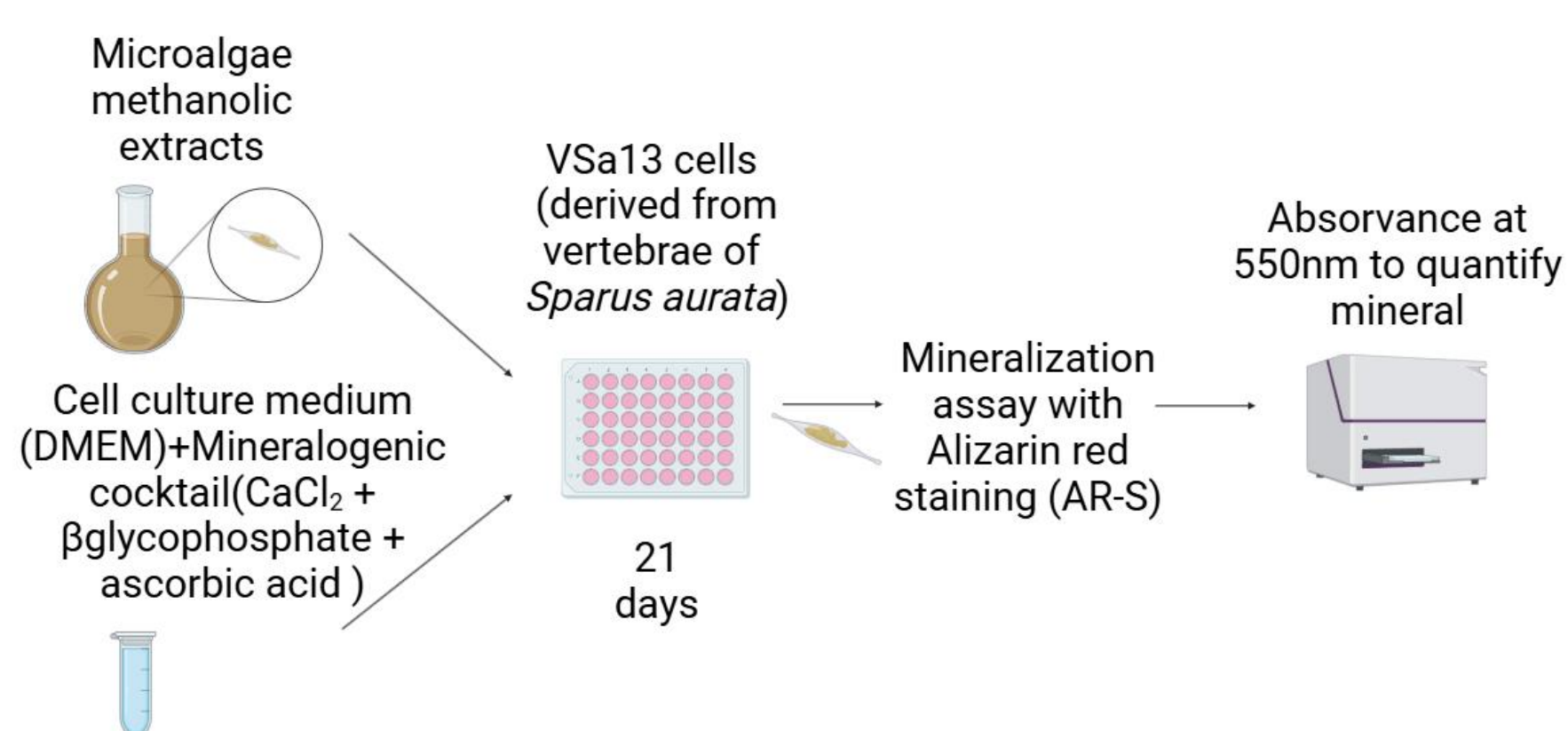
Methanolic extracts of *Chlorella* sp., *Dunaliella salina* and *Phaeodactylum tricornutum* were screened for osteoactive compounds using zebrafish operculum assay and gilthead seabream vertebrae derived VSa13 cell line.

## METHOD

### Microalgae rich in bioactive compounds:



### In vitro trial:



### In vivo trial:

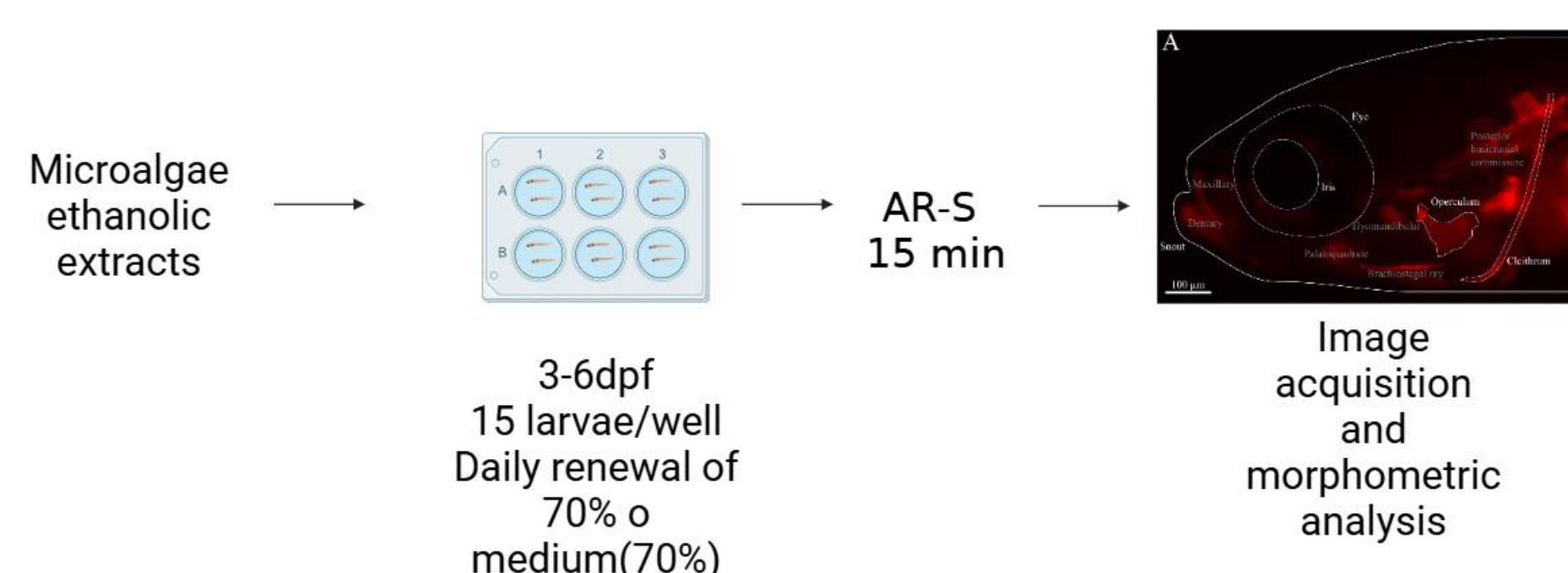


Figure 1: *P. tricornutum*, *D. salina* and *Chlorella* sp. were tested at 10, 31.6 and 100 µg/ml. In vitro trial evaluated the extracellular matrix mineralization of VSa13 cells, and in vivo trial evaluated the operculum mineralization capacity of zebrafish larvae.

## RESULTS & DISCUSSION

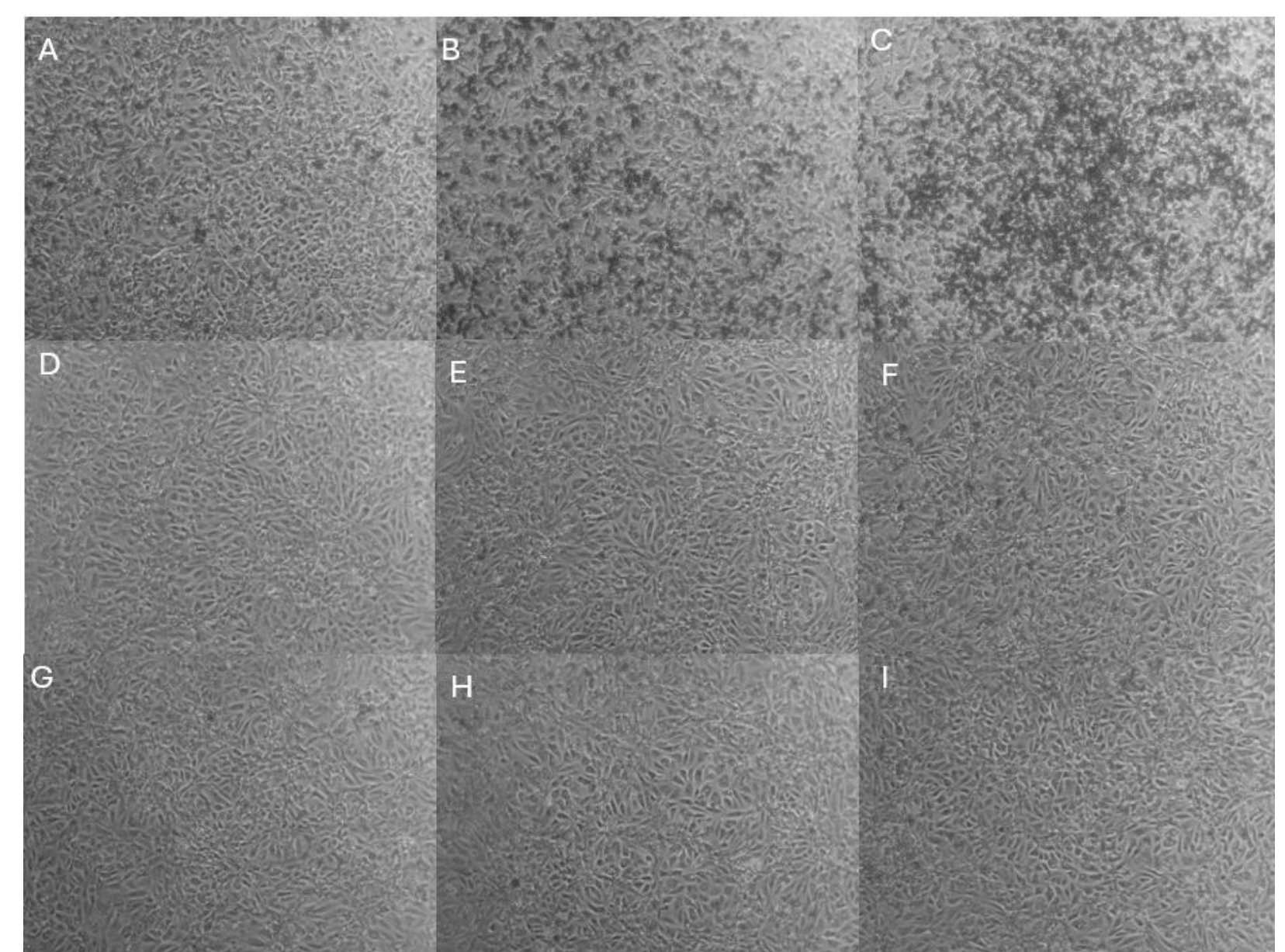
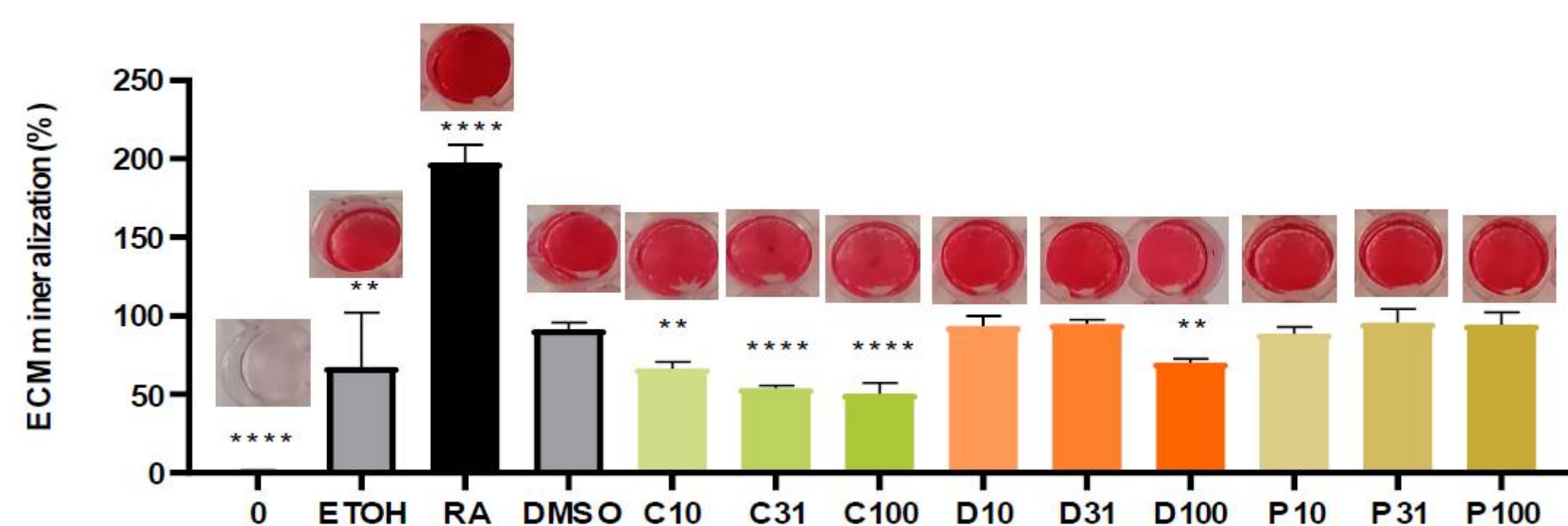
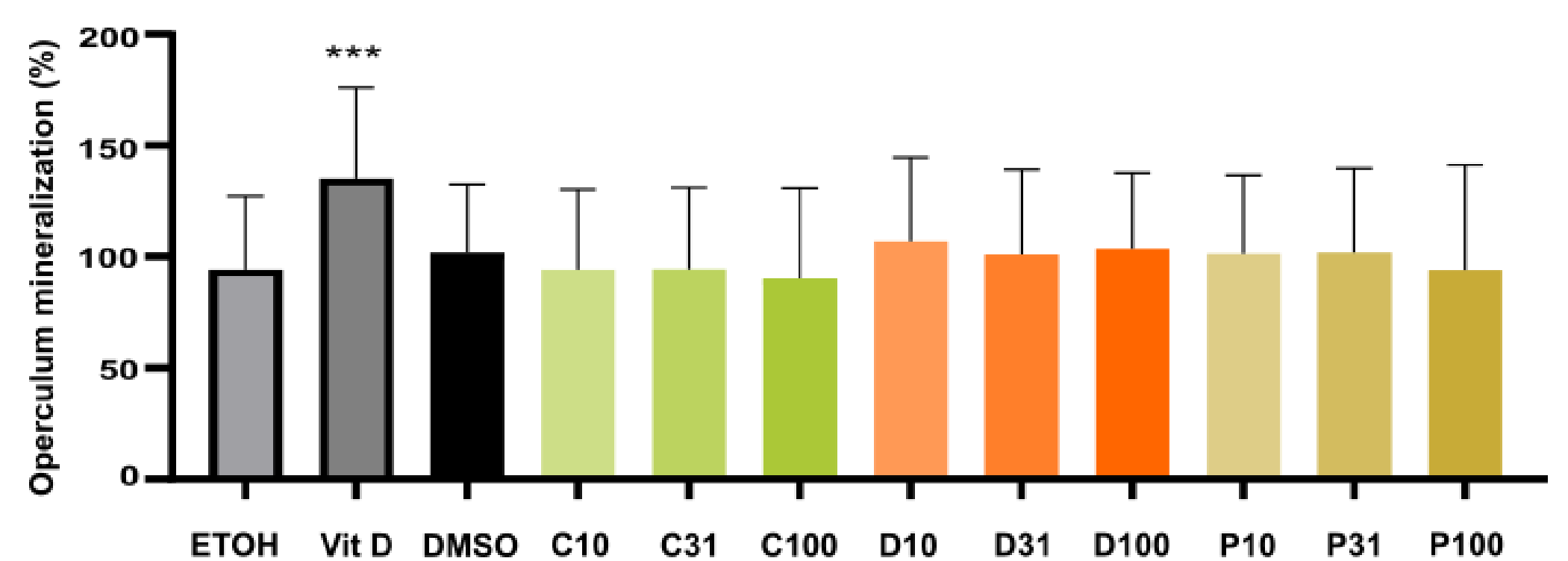


Figure 2: Effect C10,C31 and C100 = *Chlorella* sp., D10, D31, D100 = *D. salina*, P10; P31, P100= *P. tricornutum* each tested at 10, 31.6 and 100 µg/ml (A) operculum mineralization; (B) extracellular matrix mineralization of VSa13 cells and (C) cell morphology. Statistical analysis using one-way ANOVA (\*p ≤ 0.05, N=45 and N=6, respectively).

## CONCLUSION

*Chlorella* sp. at all the concentrations tested and *D. salina* at the highest concentration showed anti-mineralogenic effects on VSa13 extracellular matrix. This effect was associated with a change in cell morphology, suggesting that it may result from altered cell differentiation.

*P. tricornutum* may represent a promising source of nutrients that can potentially be used to treat or prevent osteoporosis.

## ACKNOWLEDGEMENTS

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