sociedadespañola de BIOLOGÍA de PLANTAS

Fitohormonas

2023, Segovia

Libro de Abstracts

XVI CONGRESO FITOHORMONAS

METABOLISMO Y MODO DE ACCIÓN

2023, Segovia

sociedadespañola de BIOLOGÍA de PLANTAS

CSIC Consejo Superior de Investigaciones Científicas

CBGP Centro de Biotecnología y Genómica de Plantas UPM-INIA/CSIC

Excelencia Severo Ochoa 2022 - 2025

Os damos la bienvenida al XVI Simposio de *Fitohormonas: Metabolismo y modo de acción*, de la Sociedad Española de Biología de Plantas

Después de un parón por la pandemia del Covid19, el Grupo de Fitohormonas de la SEBP celebrará este año, 2023, su reunión en el Convento de Mínimos de Segovia de los días 19 al 21 de abril.

En esta edición contaremos con la conferencia invitada impartida por el Dr Alain Goossens, quien nos dará una visión de cómo las plantas han desarrollado diferentes rutas para controlar el metabolismo en respuesta a cambios durante el desarrollo y en respuesta a diferentes estímulos ambientales. De forma particular, su seminario se centrará en el papel del ácido jasmónico para controlar finamente el balance entre crecimiento y respuesta de defensa frente a patógenos.

En este simposio se han seleccionado dos conferencias plenarias y 28 conferencias orales, donde se dará la posibilidad de exponer y discutir el papel de las fitohormonas durante el desarrollo de las plantas y en respuesta a factores abióticos y bióticos de la mayoría de los laboratorios participantes. Sin duda, en este congreso tendremos la oportunidad de asistir a los últimos avances científicos y tecnológicos de los diferentes grupos que trabajan en el campo de las hormonas vegetales de forma directa o, de manera indirecta, por la vinculación de las mismas en el proceso fisiológico de estudio.

En esta edición, cabe resaltar la gran participación de investigadores jóvenes y el haber incluido por primera vez la posibilidad de presentar pósters en formato digital con el fin de organizar un congreso más sostenible y dinámico. Agradecemos al Comité científico su trabajo a la hora de seleccionar las exposiciones orales teniendo en cuenta su calidad y para que estuviesen representadas las diferentes temáticas de estudio relacionadas con las fitohormonas. El Comité científico también seleccionará las presentaciones orales y los pósteres más destacados, que serán premiados al final del simposio.

Esperamos que este simposio sea del agrado de todos los asistentes y que tenga una repercusión positiva en vuestras investigaciones.

Un fuerte abrazo del comité de organización

Comité organizador

Juan Carlos del Pozo Benito (CBGP, INIA/CSIC), Andrea Chini (CNB, CSIC) y Luis Oñate (UPM)

Comité científico

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Effect of exogenous treatments with encapsulated salicylic acid on *Arabidopsis thaliana* development

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Environmental stresses are the main consequences derived from climate change that affect crop production and plants development. In response to these unfavourable conditions, plants undergo changes at morphological, physiological and biochemical level, improving their tolerance mechanisms to stress. Salicylic acid (SA) participates in plants acclimation and its role on plant responses to biotic and abiotic stresses is well documented. However, the mechanism by which exogenous SA protects plants and its interactions with other phytohormones remains elusive. SA effect, both free and encapsulated (using silica and chitosan capsules), on *Arabidopsis thaliana* development was studied. The effect of SA on roots and rosettes was analysed, determining plant morphological characteristics and hormone endogenous levels. Free SA treatment affected the length, growth rate, gravitropic response of roots and rosette size in a dose-dependent manner. This damage was due to the increase of root endogenous SA concentration that led to a reduction in auxin levels. The encapsulation process reduced the deleterious effects of free SA on root and rosette growth and in the gravitropic response. Encapsulation allowed a controlled release of the SA, reducing the amount of available hormone and plant uptake, mitigating the harmful effects of the free SA treatment. Although both capsules are suitable as SA carrier matrices, slightly better results were found with chitosan. Encapsulation appears as an attractive technology to deliver phytohormones when crops are cultivated under adverse conditions. Moreover, it can be a good tool to perform basic experiments in phytohormone interactions.

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UNIVERSITAT JAUME I

sociedad española de BIOLOGÍA de PLANTAS

INTRODUCTION

Environmental stresses are the main consequences derived from climate change that affect crop production and plants development. In response to these unfavorable conditions, plants undergo changes at morphological, physiological and biochemical level, improving their tolerance mechanisms to stress. Salicylic acid (SA) participates in plants acclimation and its role on plant responses to biotic and abiotic stresses is well documented. However, the mechanism by which exogenous SA protects plants and its interactions with other phytohormones remains elusive. SA effect, both free and encapsulated (using silica and chitosan capsules), on *Arabidopsis thaliana* development was studied. The effect of SA on roots and rosettes was analysed, determining plant morphological characteristics and hormone endogenous levels.

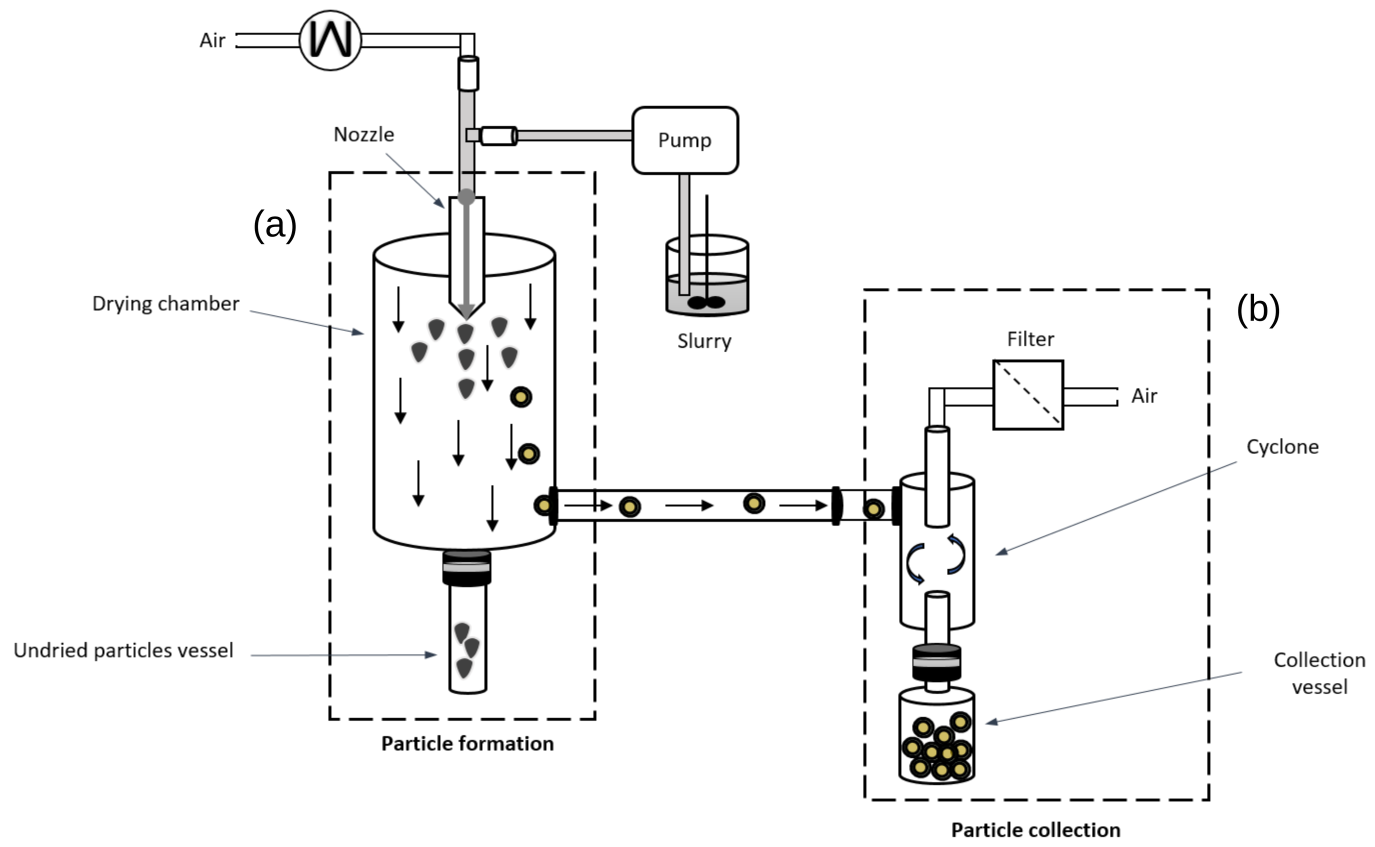

Fig. 1. Schematic diagram of the spray dryer. (a) Encapsulated slurry pumped and particles dried, (b) Recollection of dry particles.

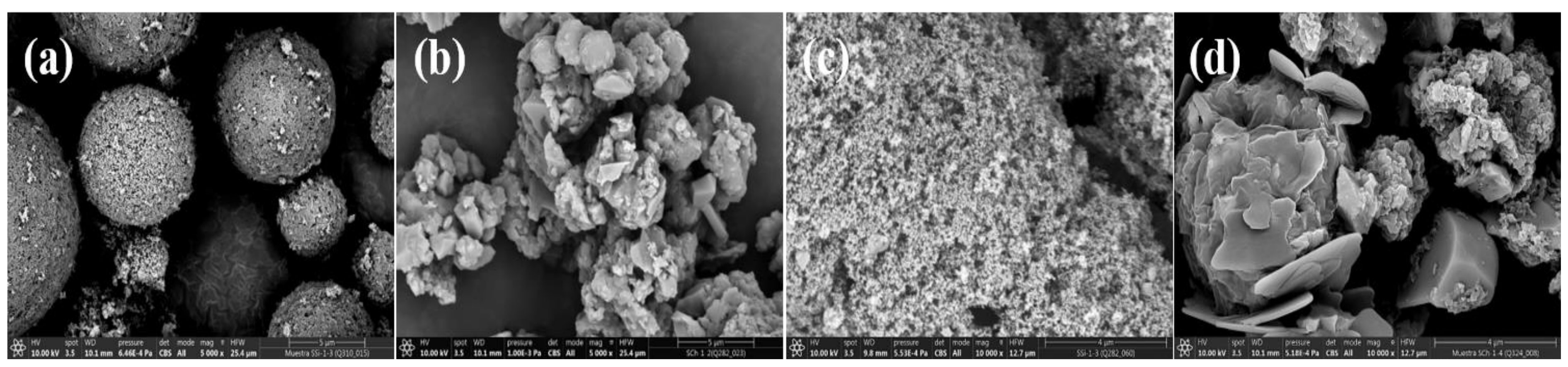

Fig. 2. Scanning electron microscopic (SEM) images of the encapsulated samples prepared with silica and chitosan, Si:SA (1:0.25) (a-c) and Ch:SA (1:0.5) (b-d) , respectively. (a-b) 5000x magnification and (c-d) 10000x magnification.

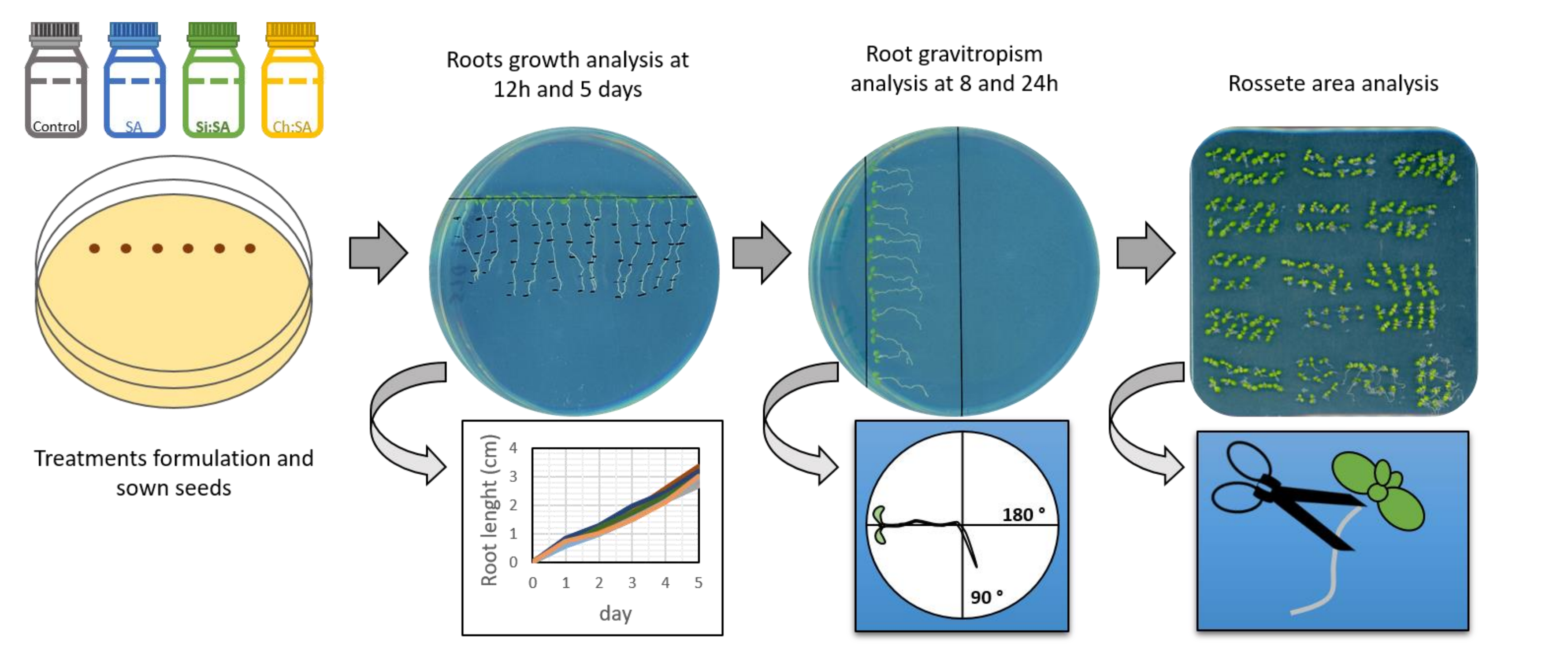

Fig. 3. Experimental method developed to determine the effect of free and encapsulated SA (Si:SA and Ch:SA) in Arabidopsis thaliana plants.

RESULTS AND DISCUSSION

Free SA treatment affected length, growth rate, gravitropic response of roots and rosette size in a dose-dependent manner. This damage was due to the increase of root endogenous SA concentration that led to a reduction in auxin levels. The encapsulation process reduced the deleterious effects of free SA on root and rosette growth and in the gravitropic response. Encapsulation allowed for a controlled release of the SA, reducing the amount of hormone available and the uptake by the plant, mitigating the deleterious effects of the free SA treatment.

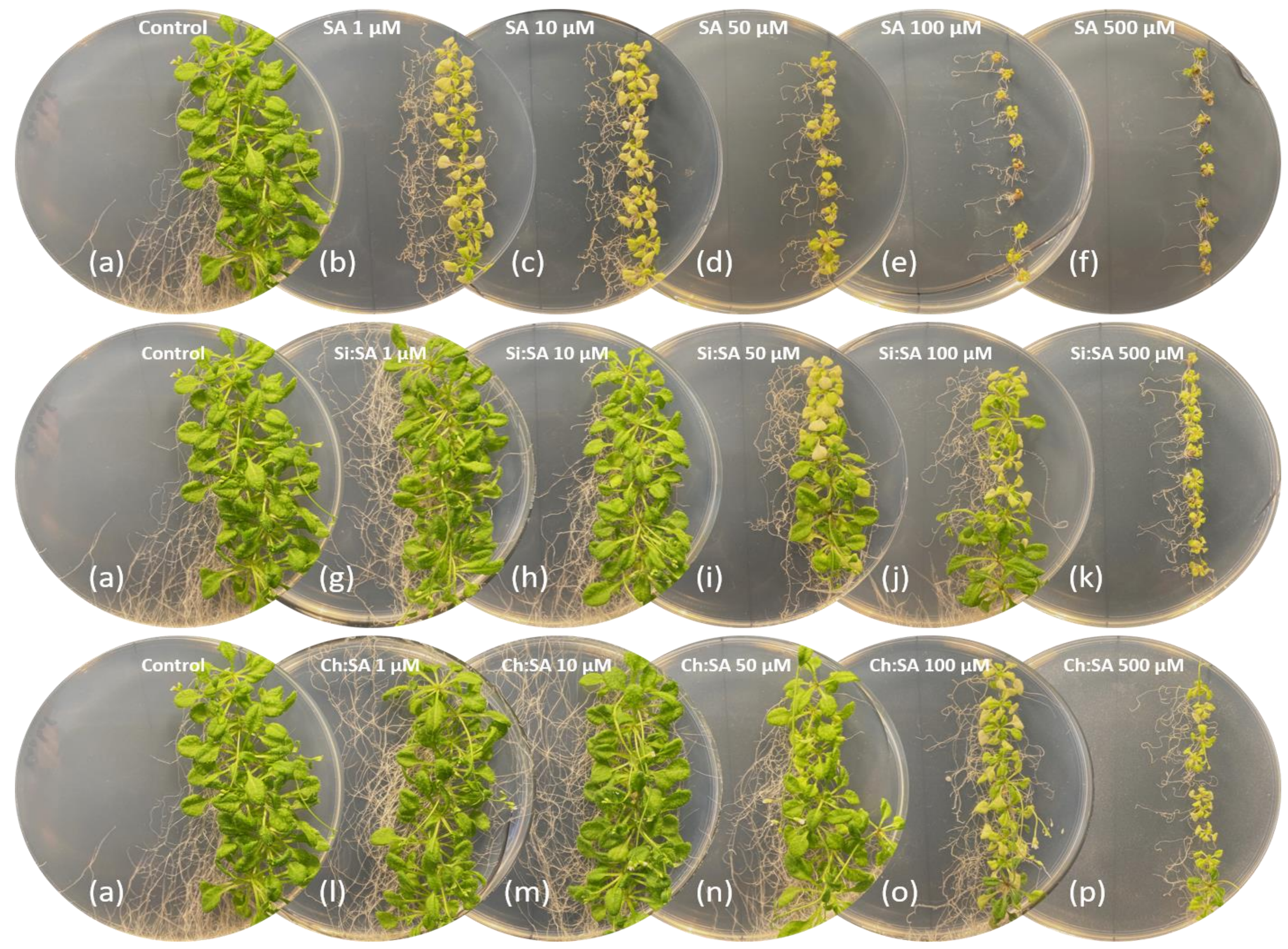

Fig. 4. Effect of free SA, Si:SA and Ch:SA on plant performance in Col-0 Arabidopsis plants. 5-day-old plants were transferred to media containing the different SA treatments and pictures were taken 28 days later.

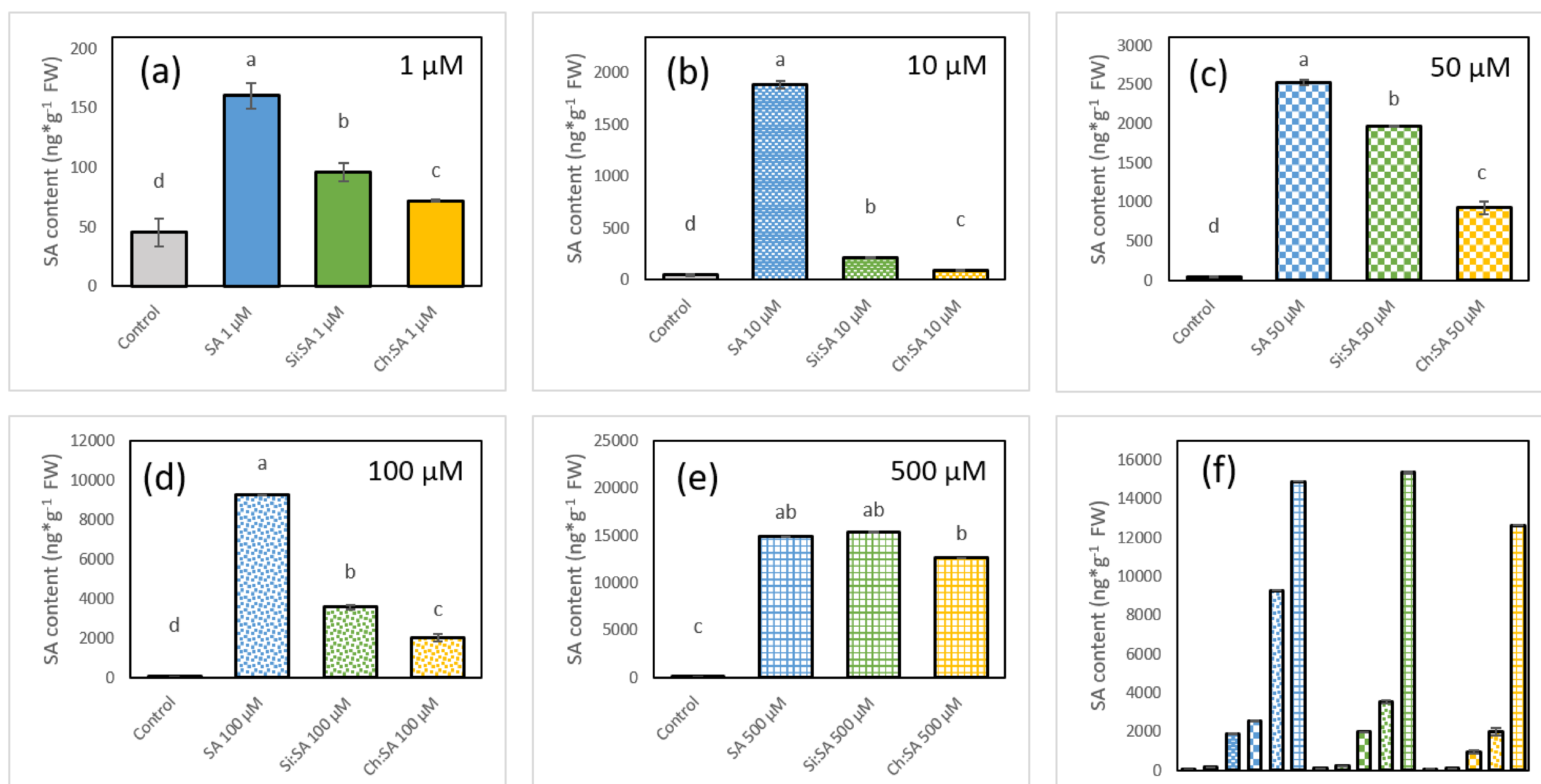

Fig. 5. Effect of free SA, Si:SA and Ch:SA on endogenous SA levels in roots of Col-0 Arabidopsis plants. 5-day-old plants were transferred to media containing the different SA treatments and plant hormones measured 28 days later. Graph (f) depicts SA levels in the three treatments at all doses, and graphs (a), (b), (c), (d) and (e) compare SA levels among the treatments at each dose. Different letters indicate significant differences among treatment groups at p≤0.05.

CONCLUSIONS

1. SA encapsulation, either with silica or chitosan, results in a controlled release of SA and reduces the negative effects suffer by plants during treatments.
2. Encapsulation appears as an attractive technology to deliver phytohormones when crops are cultivated under adverse conditions, and it can be a good tool to perform basic experiments in phytohormone interactions.

ACKNOWLEDGMENTS

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