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THE POSSIBILITY OF CYTOKININS PRODUCTION FROM REGULAR DRY BAKERY YEAST (*SACCHAROMYCES CEREVISIAE*)

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ABSTRACT

This study tested the viability of yeast to produce the growth regulators, including Cytokininsfree and linked. The results showed the possibility of producing Cytokininsby using regular yeast bread quantities appropriate and economically viable, was shown in the results.

KEYWORDS: Cytokinins, Regular Dry Bakery Yeast, *Saccharomyces Cerevisiae.*

INTRODUCTION

Plant growth regulators such as gibberellins and cytokinins were important biotechnological and economical products. They were commonly used in agriculture, viticulture, gardens and horticulture (Rademacher, 2015). Cytokininswere a large group of important diterpenoid acids among commercial phytohormones (Karakoç and Aksöz, 2006). They were endogenous hormones functioning as plant growth regulators and influencing a range of developmental processed in higher plants including stem elongation, germination, dormancy, sex expression and fruit senescence (Takahashi et al., 2012). The cytokininswere naturally produced by higher plants, fungi bacteria regulate plant growth and development. They were typical secondary metabolites in microorganisms; however, they acted as endogenous hormones in higher organisms such as plants. Over the past 20 years, many gibberellins had been defined using modern analytical techniques and 126 cytokinins had been identified in plants, fungi, and bacteria (Rodrigues et al., 2012).

Cytokininscytokinins was the main product of gibberellins in fungi and bacteria. It was a terpenoid hormone that was an important phytohormone regulating plant growth and development. It was used in agriculture, nurseries, green houses, viticulture, cosmetic sectors and beer industry (Hasan, 2002). Currently, cytokinins was largely produced by submerged fermentation of the fungus *Gibberellafujikuroi* on an industrial scale. It was also synthesized by several bacteria, such as *Azotobacter*, and *Azospirillium* in culture medium and from wild strains of fungi such as *Sphaceloma sp*., *Phaeosphaeria sp*., and *Neurospora sp*. (Sridevi and Mallaiah, 2008). Production of cytokininswas considerably influenced by cultural conditions.

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Some of the important factors in obtaining high yields of the cytokininsincluded pH, temperature, incubation time and conditions such as optimization of the fermentation media. There was no current research indicated to cytokinins production and quantities of the regular dry bakery yeast (*Saccharomyces cerevisiae*), but it should be noted that the yeast was a natural source of cytokinins that had implications for stimulating the growth in the plant (Rodrigues et al., 2012).

MATERIALS AND METHOD

Production of cytokininswas examined in dry bakery yeast (*saccharomyces cerevisiae*) for determination the levels of this plant growth regulator by used a spectrophotometer. it was extracted and determinedcytokininsdepending on the method used in (Ergün et al., 2002) modified already from (Unyayar et al., 1996). As it was shown in Figure 3.4, were taking 1gram of dry yeastwas added to 60 ml of extraction solutionconsisting of methanol: chloroform: ammonium hydroxide (2n) in the lineage (12:5:3) ml respectively, and saved it under the freezer temperature of 6—until the subsequent analyzed. This combination was added 25 ml of distilled water, then separated into two layerslower consisting of the chloroform (neglected not contained the hormone) and higherrepresentd the aqueous phase (water. Methanol), was conducted the following modifications: PH was adjusted to 2.5 with 1N NaOH or 1N HClthen extracted three times with Ethyl acetate (15 ml), every time the upper layer which represented ethyl acetate (which contain adcytokinins freely), for the lower layer of water, it had adjusted the pHto 7 andextracted three timeswith Ethyl acetate, It was taken the lower layer, The pH was adjusted to11 hydraulically analyzed for an hour at a temperature of 70 ° C .

It was taken the aqueous phase, the pH was adjusted to 7and extracted three times with Ethyl acetate, neglected the upper layer and took the lower layer, PH was adjusted to 2.5 and extracted three times with Ethyl acetate. It was taken the upper layer which lt represented Ethyl acetate (Containedcytokininsas linked) neglected the lowerlayer. It took ethyl acetate layer containing the hormoneas of free and associated. lt was evaporated for the purpose of obtaininga residuum represened the hormone each sample was added 3 ml methanoland analysis by UV-VIS spectrophotometer deviced for the purpose of measuring the quantities. Cytokinins was measured at wave length 254 nm and calculated the concentration of growth regulator to the demodulator in reference to the standard curved for gibberellic acid.

RESULT AND DISCUSSION

The results showed a good percentage of the cytokininsin regular dry bakery yeast (*Saccharomyces cerevisiae*), Demonstrating the ability of regular dry bakery yeast in the production of this hormone in the free associated form. The concentration of free cytokinins was 382 mcg/ml associated cytokinins reached 417 mcg/ml while the total cytokinins 799 mcg/ml at a wave length 254 nm Figure 7.1. There were no recent studies had shown indicated the presence ratios of this hormone in the regular dry bakery yeast (*Saccharomyces cerevisiae*), but one of the older studies indicated to the existence of Auxin. it was subtracted by regular dry bakery yeast (*Saccharomyces cerevisiae*) in the culture medium, (Robinson, 2012) Pointed out. The amount of Auxin were found in growth medium, it exceeded the amounts had been drawn directly from the yeast cells. The amounts of Auxin were increased with the rise of sucrose concentration in the growth medium and lt decreased with increasing concentration of peptone, that the highest percentage of Auxin reached 119.82 mg/ml when there was a concentration of 10% sucrose, either added peptone, it led to increase rate of Auxin. This study was the first one would suggest to cytokinins production by using the

regular dry bakery yeast. As we mentioned earlier, it was the regular dry bakery yeast a natural source for Cytokinins, that lts timulated cell division and expansion as well as protein synthesis, amino acids, and chlorophyll (Fathy and Farid, 1996). The fungus had the ability to produce the growth regulators, have indicated (Hasan, 2002) that all fungal isolates of the genera *Fusarium* had the ability to produce cytokininsand IAA, while lt isolated of the other genera, such as *Aspergillus*, *Penicillium,* and*Rhizopus*.lt did not have the ability to produce the IAA but it coud produce GA_3. Also that the *Pseudomonas* bacteria isolated from the remnants of olive oil processing had the ability to production cytokininslt was reached the maximum amount of produced 285.06 mg/ml. after 72 hours in the culture medium. the production cytokinins of these bacteria were betterthan the production of fungus *Gibberellafujicuroi* which. Gave the best productivity in 30 °c for 72 h at ph 7 on a rotary shaker and in the dark (Karakoç and Aksöz, 2006).

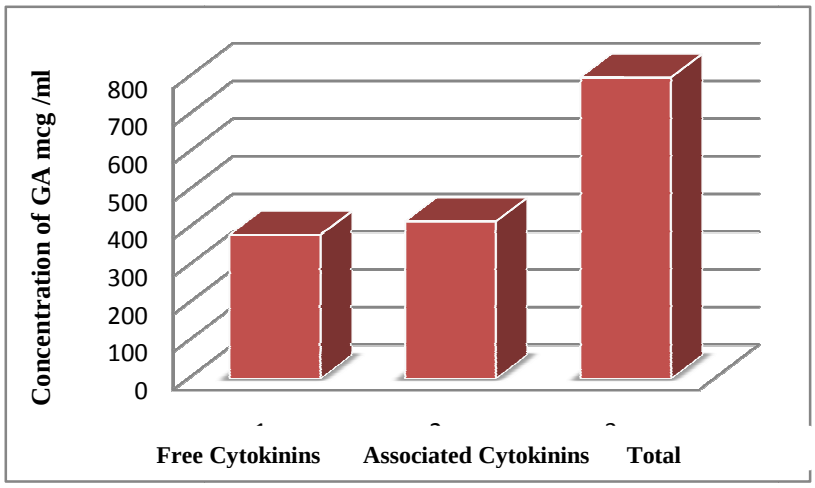

Figure 1. The concentration of free, associated and total Cytokinins in the culture medium ofregular dry bakery yeast (*Saccharomyces cerevisiae*)

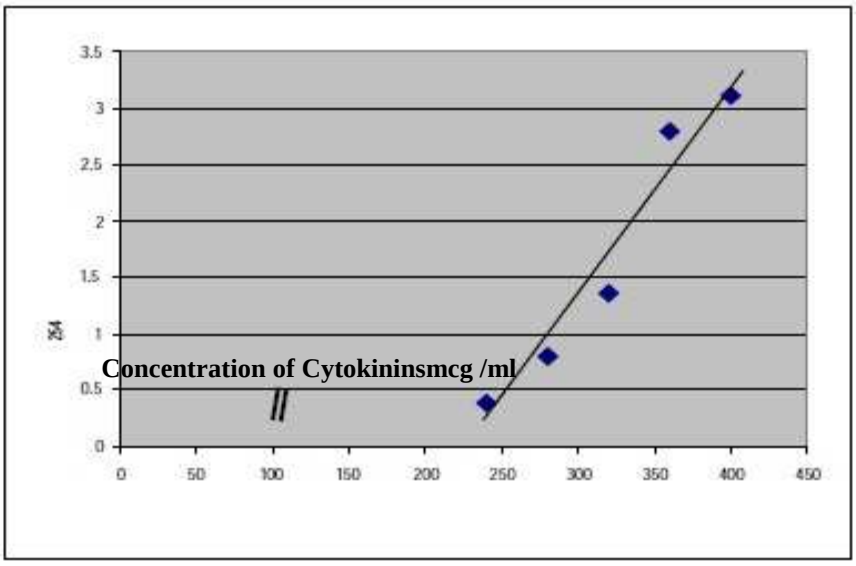

Figure 2.The standard curved of Cytokininsat wavelength 254 nanometers (nm)

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