

GEOBIOS 2: 162-164, 1975

GROWTH OF *ZIZYPHUS JUJUBA* LAMK. GALL AND STEM TISSUES
IN CULTURE WITH CARBON SOURCES

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(Received June 12; Revised July 24, 1975)

The carbohydrate nutrition of plant tissues in *n vitro* has been reviewed by a number of workers (White, 1951; Riker and Hildebrandt, 1954; Gautheret, 1959 and Marcetki et al., 1974). Diseased tissue clones as compared to normal ones have been reported to

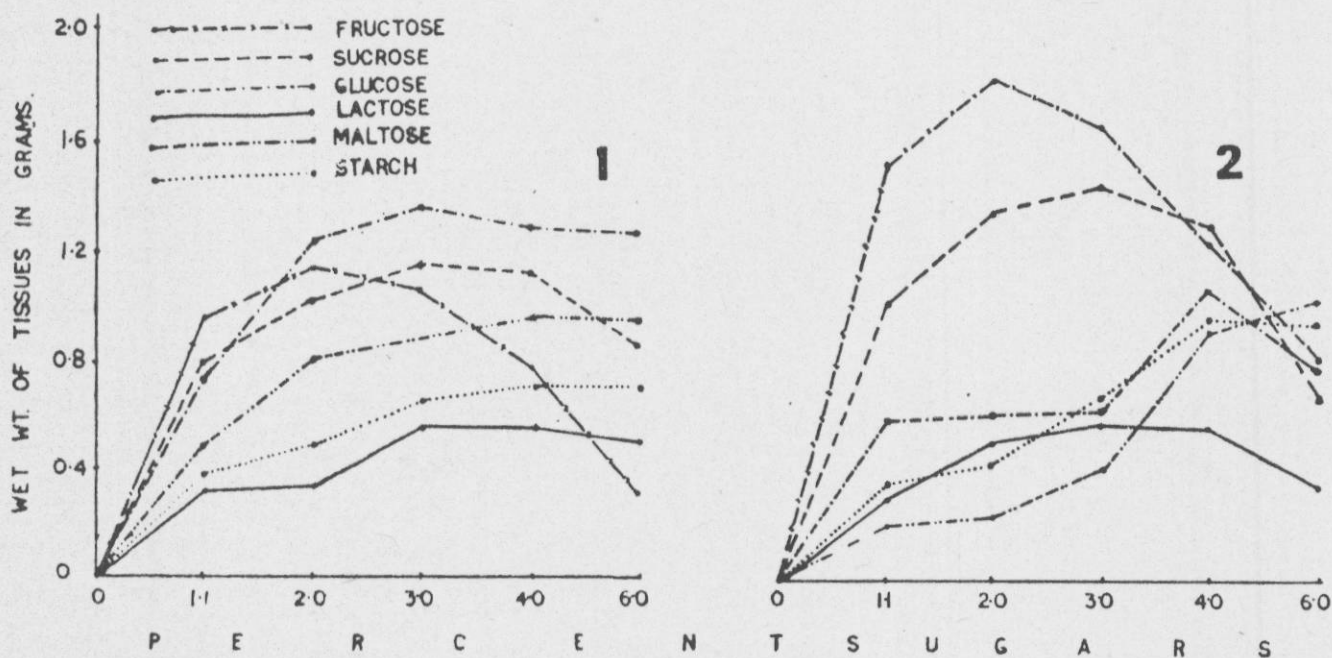
exhibit certain quantitative differences in their ability to use certain sugars (Arya et al., 1962). The object of the present work was to compare the variability in sugar requirements of gall and normal tissues of *Zizyphus jujuba*.

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The gall and normal tissues of *Z. jujuba* were isolated and grown on Murashige and Skoog's (1962) medium in a culture room at a temperature of $26 \pm 2^\circ$ and 55-60 per cent relative humidity (Vyas et al., 1974). Chemically pure D-fructose, D-glucose, sucrose, maltose, lactose and soluble starch (1.0 to 6.0 per cent) were used as carbon source for the growth of gall and normal tissues. The pH of the medium was adjusted to 5.8. Each treatment was given ten replicates. Control experiments were also set without added sugar to the basal medium. The tissue growth was measured in terms of wet weight after 30 days growth period.

The data obtained on the growth of normal and gall callus tissues of *Z. jujuba* are presented in Figs. 1

sole source of carbon. Hildebrandt and Riker (1953) reported that starch did not support the growth of tobacco, marigold and sunflower normal tissues or did it poorly. In the present studies it was found that both gall and normal tissues grew on the medium with soluble starch. This is similar to the results of Nickell and Burkholder (1950) with tissues from virus tumors of *Rumex acetosa*. *Rumex* tissues in their studies produced excellent growth on medium with 2% soluble starch. Arya et al. (1962) reported that normal tissue clones of grape stem grew better than *Phylloxera* gall tissue clones with D-fructose in the medium. However, in the present study D-fructose was found to be a superior source of carbon for gall tissue as compared to normal tissue. Risser and White (1964) reported that



Figs. 1&2. Comparative wet weight of normal (1) and gall (2) tissues on Murashige and Skoog's medium supplemented with different percentage of various sugars.

and 2, respectively. Normal and gall tissues failed to grow in medium without any carbohydrate. Normal tissue grew best in 3% D-glucose and sucrose individually and 2% D-fructose. Its growth was moderate in 3% maltose and 4% starch but was poor in lactose. Growth of gall tissue was excellent in 2% D-fructose and 3% sucrose and moderate in 4% maltose, starch and D-glucose individually. It was poor in all the concentrations of lactose. Starch and maltose when added at 6% to the basal medium was not inhibitory to the growth of both normal and gall tissues.

Gall tissue grew better than normal tissue in the basal medium supplemented with soluble starch as

best growth of spruce tumor tissue was obtained with 5% sucrose. In the present investigation it was found that with 3% sucrose in the medium, gall tissue grew better as compared to normal tissue.

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