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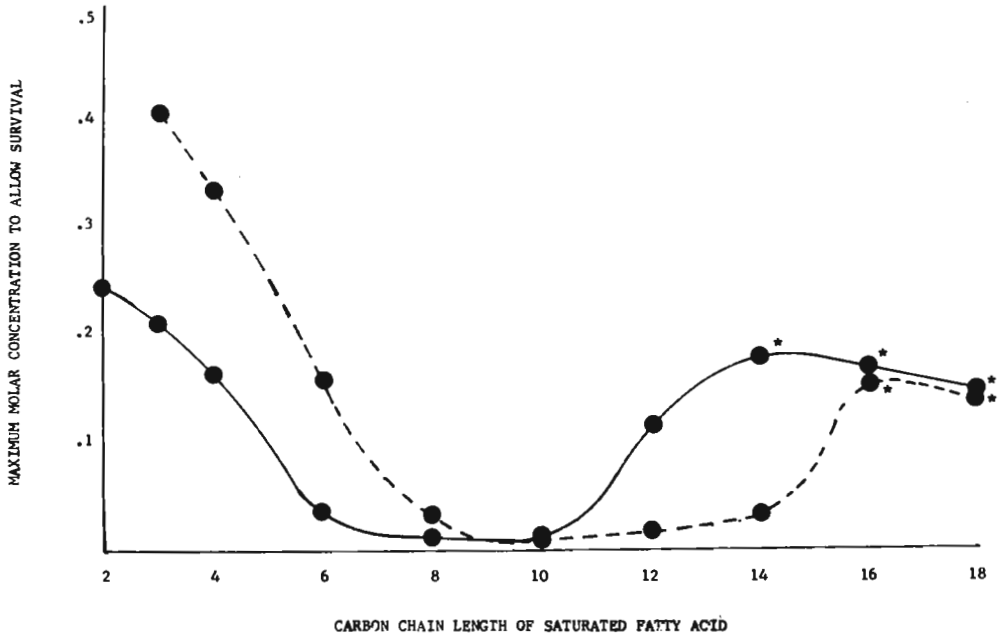
The effect of exogenous fatty acids on survival in D. melanogaster.

Various saturated fatty acids were added to a cornmeal molasses diet and the effects on the parents or progeny were recorded. The same procedure was repeated using Sang's medium C (J. Exptl. Biol. 33:45, 1956) with good agreement, ruling out any specific effect of the cornmeal molasses medium.

The accompanying graph shows the maximum molar concentration in the media to allow survival. The different effects of fatty acids from their methyl esters are also shown.

Even though both media have a reasonable degree of buffering capacity, the acid strength of short chained fatty acids (less than 6 carbons) was such that the final mixture of medium was usually lowered in pH. This pH change may account for why C_3, C_4 and C_6 methyl esters, having lost their acid groups, give much higher tolerance levels than the corresponding acids. At the other side of the curve, C_{12} and C_{14} acids are solids with low vapor pressures while their esters are liquids with relatively high vapor pressures. It appears that one of these two physical properties is responsible for the difference in tolerance levels, although specific metabolic disturbances by individual molecular species are not ruled out. In both acids and esters, C_8 and C_{10} components have very detrimental effects and the adults usually die in less than an hour after exposure. In all cases, with the two media reported, if the adults lived they proved to be fertile and the resulting progeny developed normally.



This graph shows how fatty acids and their methyl esters differentially affect the survival of D. melanogaster. * represents the maximum concentration used (no lethal effect).
----- = methyl esters
_____ = fatty acids