Technique Notes

A highly nutritive medium for rearing *Drosophila.*

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There is already available a plentiful number of medium recipes in specialised literature and lab manuals for rearing *Drosophila* (*e.g.*, Markow and O'Grady, 2006). The choice of the medium, however, is an important decision since there is not a single medium recipe that will be adequate for all the species for a researcher aiming to study diversity, neither for all the wide variety of research purposes. Different species have different ecologies and dietary requisitions or preferences, and some of them simply will not rear adequately in some recipes, or it will be impossible to obtain good material needed to accomplish the objectives of the study. Therefore, especially for studies not dealing with *D. melanogaster* or other common and generalist species, normally several recipes might be tested and adjusted to obtain better results.

The recipe described below was developed and tested in order to raise some species difficult to grow in the standard corn flour medium (Marques *et al.*, 1966) in the *Drosophila* laboratory of *Universidade Federal do Rio Grande do Sul* (Porto Alegre, Brasil). In comparison to the Marques *et al.* (1966)'s medium, it proved to be more successful for raising several species, such as *D. bromeliae*, *D. bromelioides* (*D. bromeliae* species group), and *D. fumipennnis* (*D. willistoni* species group).

After that, this recipe is also being successfully adopted in the same laboratory for studies on cytogenetics, especially those on polytene chromosomes. These studies need well fed third instar larvae to obtain good squashes from salivary glands cells, for description of karyotypes and chromosomal polymorphisms, for obtaining high quality photomicrographs to elaborate reference photomaps, and to be used in other techniques such as hybridization *in situ*. The recipe described here was successful for obtaining good polytene chromosomes preparations for species as *D. willistoni* and *D. nebulosa* (*D. willistoni* species group). This medium was chosen from a range of attempts with other recipes for establishing crosses between females and males of *D. nebulosa*. This methodology, in species little generalist and prolific, tends to be extremely laborious since the majority of crosses render few larvae for cytogenetic analysis. Thus, this culture medium showed better success in encouraging females to oviposit, and also to ensure good nutrition for offspring.

The recipe uses common and accessible ingredients and equipment, is cheap, and of easy preparation and handling.

Mixture 1:

640 mL of distilled water
24 g of rye flour
22 g of dry yeast
6 g of agar
2 g of methylparaben

Mixture 2:

160 mL of distilled water
110 g of banana
38 g of corn syrup

Cooking:

- Measure all ingredients and prepare mixtures 1 and 2.

- Heat mixture 1 in a stove or a microwave oven, stirring some times to prevent clumping. Let it boil, stir the mixture, and boil again.
- Separately, prepare mixture 2 in a blender.
- After boiling mixture 1 twice, add the blended mixture 2 and heat again, stirring some times. Let it boil three times.
- Remove it from the heat source and transfer it to clean vials.
- Let the medium cool for some hours, protected from dust and other contaminants.

After the medium is cool, it is advisable to scratch the surface with a clean spatula to stimulate oviposition and add a previously sterilised folded piece of filter paper, to control excessive moisture and provide a perching and pupation site.

The mixture of simple and complex carbohydrate sources results in a highly nutritive medium, fulfilling dietary requisitions for more exigent species and allowing the development of well-fed third instar larvae for salivary glands preparations. Karo® and Yoki® were successfully used as corn syrup. Methylparaben (Nipagin®) is a mold inhibitor. In this recipe ethanol is not used (as some recipes advise to improve mold inhibition) to avoid high concentrations of ethanol in the medium, which some species may not tolerate. In spite of this, as the recipe is boiled several times, proliferation of mold has not been a problem. The prepared vials with medium can be stored for a few days.

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References: Marques, E.K., M. Napp, H. Winge, and A.R. Cordeiro 1966, Dros. Inf. Serv. 41: 187; Markow, T.A., and P.M. O'Grady 2006, Drosophila – *A Guide to Species and Identification Use*, Elsevier.

A comparison of feeding rate methods in *Drosophila melanogaster* indicates that consumption is influenced by body size.

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Abstract

Dietary restriction, a decrease in nutrient intake without malnutrition, has been shown to increase life span in many species and is highly linked to feeding behavior. Although *Drosophila melanogaster* is an excellent model organism to study the effects of dietary restriction on life span and associated traits, measuring feeding rate in this organism is particularly challenging. Several methods have been used to estimate feeding rate in *Drosophila melanogaster*, but it remains unclear which method is most precise. We examined the effectiveness of two popular methods that label media with blue dye or radioactive isotopes to quantify food uptake. We found that the radioactive label assay was more precise than the blue dye assay and likely most useful for comparing the effects of different treatments (genotypes, diets) on feeding rates. We found that the relationship between feeding rate and dietary treatment depends on the size of the fly, so we also suggest incorporating body size as a covariate in data analysis to improve the accuracy of feeding rate estimates.

Introduction

Dietary restriction (DR), reducing nutrient intake or specific components of the diet without malnutrition, is known to increase life span in a diverse range of organisms (reviewed in Katewa and Kapahi,