



# To check the effect of dietary supplementation of “*Murraya koenigii*” (Curry leaves) on Alzheimer’s disease using *Drosophila melanogaster* as a model organism.

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## Abstract :

Many herbal plants are used for to cure various human diseases and are also known as medicinal plants. *Murraya koenigii* (curry leaves plant) is one of the medicinal plant that possess some neuroprotective properties. In the present study, we used *Murraya koenigii* in 1mg concentration to study the neroprotective effect of this plant on Alzheimers' disease flies in *Drosophila melanogaster*. *Drosophila melanogaster* is one of the oldest model organism used in Biological research. Alzheimer's diseases genes are available with flies. We used *Oregon R*<sup>+</sup> (control) and *GMR- $\beta$ <sub>42</sub><sup>K52</sup>*; *GMR- $\beta$ <sub>42</sub><sup>K53</sup>* (AD model in *Drosophila*) flies for experimental purpose. The flies were fed on *Murraya koenigii* mix diets and examined for phototaxis, locomotor activity, developmental assay, body weight etc. It was observed that supplementation of *Murraya koenigii* in 1mg concentration increases the phototaxis and locomotor activity of AD flies. Thus, the present study suggested the neuroprotective potentials associated with *Murraya koenigii*.

Herbal plants possess vital ingredients which are used for the synthesis of therapeutic medicines to cure several diseases like neurodegenerative diseases, diabetes, cancer etc. Neuroprotective plants were used to treat Alzheimer's disease, it is a neurological disorder in which the death of brain cells and causes memory loss and cognitive decline. This disease was studied in *Drosophila melanogaster* as a model organism because the fundamental aspects of cell biology are quite similar in humans and this flies.

Fly stains used: *Oregon R*<sup>+</sup>, *GMR- $\beta$ <sub>42</sub><sup>K52</sup>*; *GMR- $\beta$ <sub>42</sub><sup>K53</sup>*

Developmental assay

Locomotor assay

Methodology

Phototaxis assay

Phenotypic assay

## Results

### •Developmental assay:

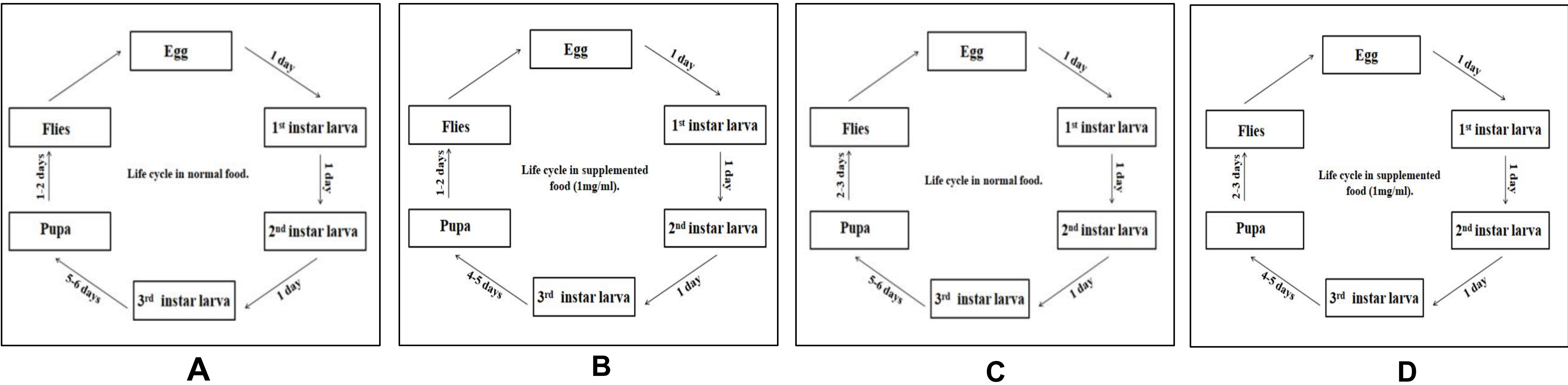
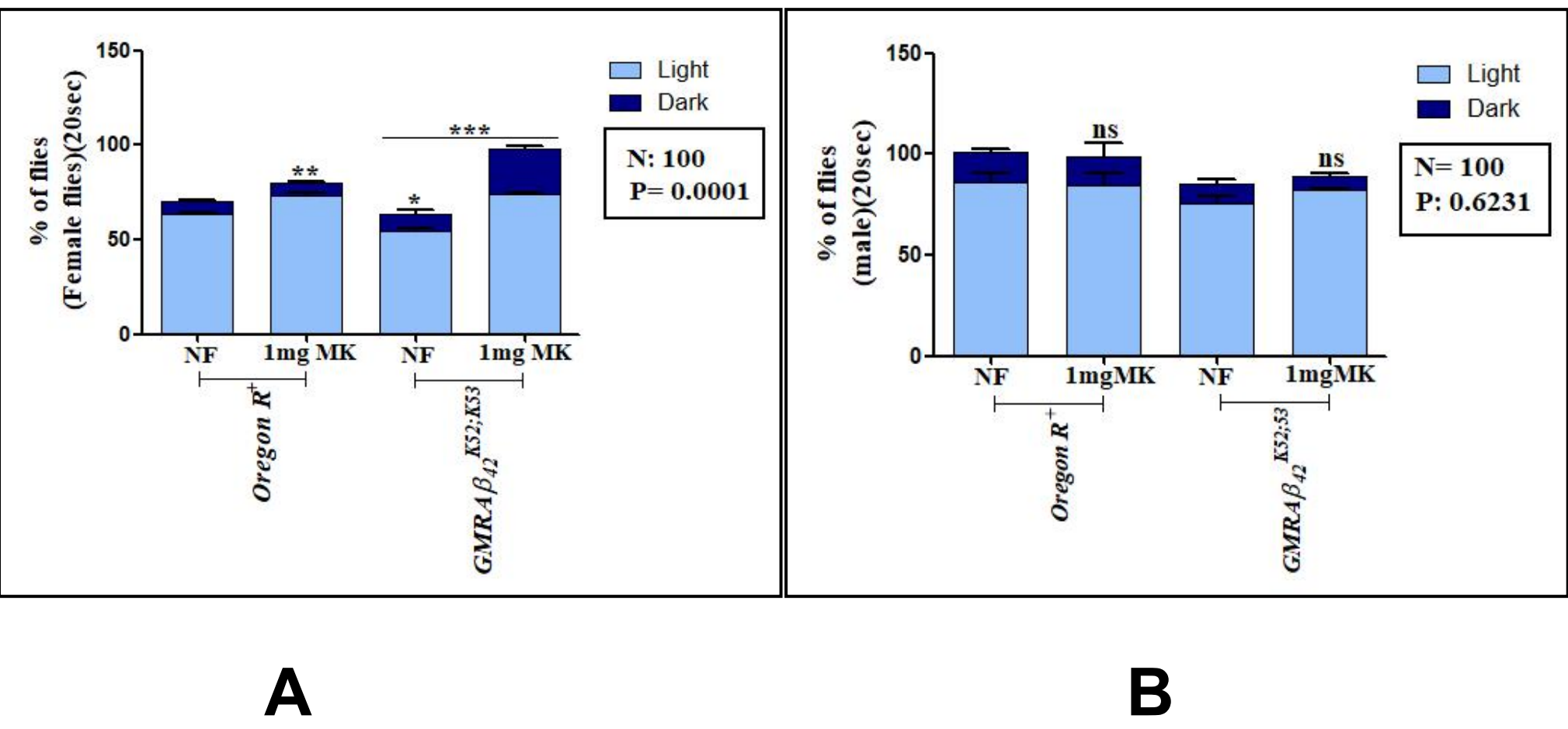


Fig 1: The life cycle of *Drosophila melanogaster* (A,B) (*Oregon R*<sup>+</sup>) and (C,D) (*GMR- $\beta$ <sub>42</sub><sup>K52</sup>*; *GMR- $\beta$ <sub>42</sub><sup>K53</sup>*) in Normal food and 1mg *Murraya koenigii* supplemented food.

### •Phototaxis assay:



### •Locomotor assay

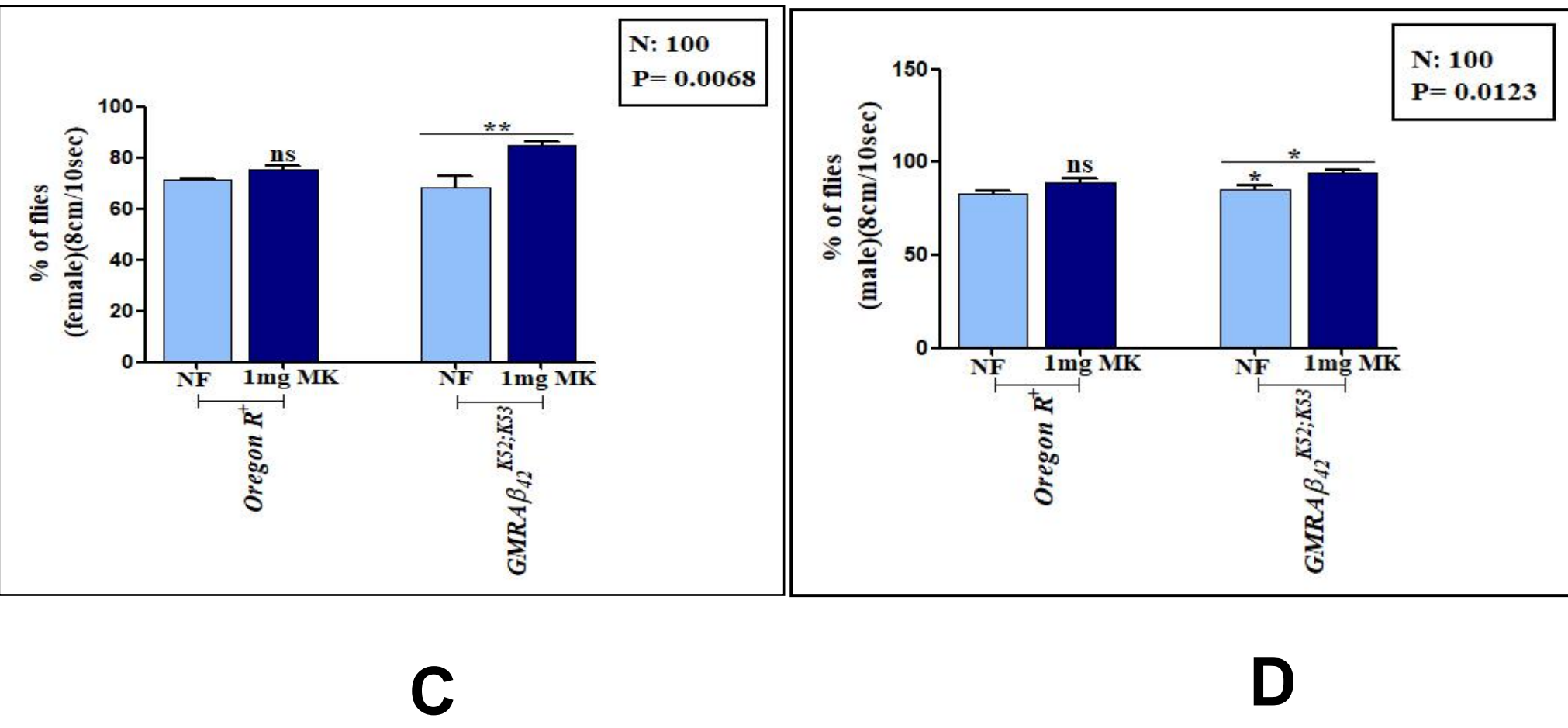


Fig 2: (A,B) Phototaxis activity A. Female flies B. Male flies of ; (C,D)Locomotor C. Female flies, D. Male flies *Oregon R*<sup>+</sup> and *GMR- $\beta$ <sub>42</sub><sup>K52</sup>*; *GMR- $\beta$ <sub>42</sub><sup>K53</sup>* in normal food (NF) and *Murraya koenigii* supplemented food (1mg MK).

### Phenotypic assay:

#### •Eye phenotype

Control 1mg/ml MK

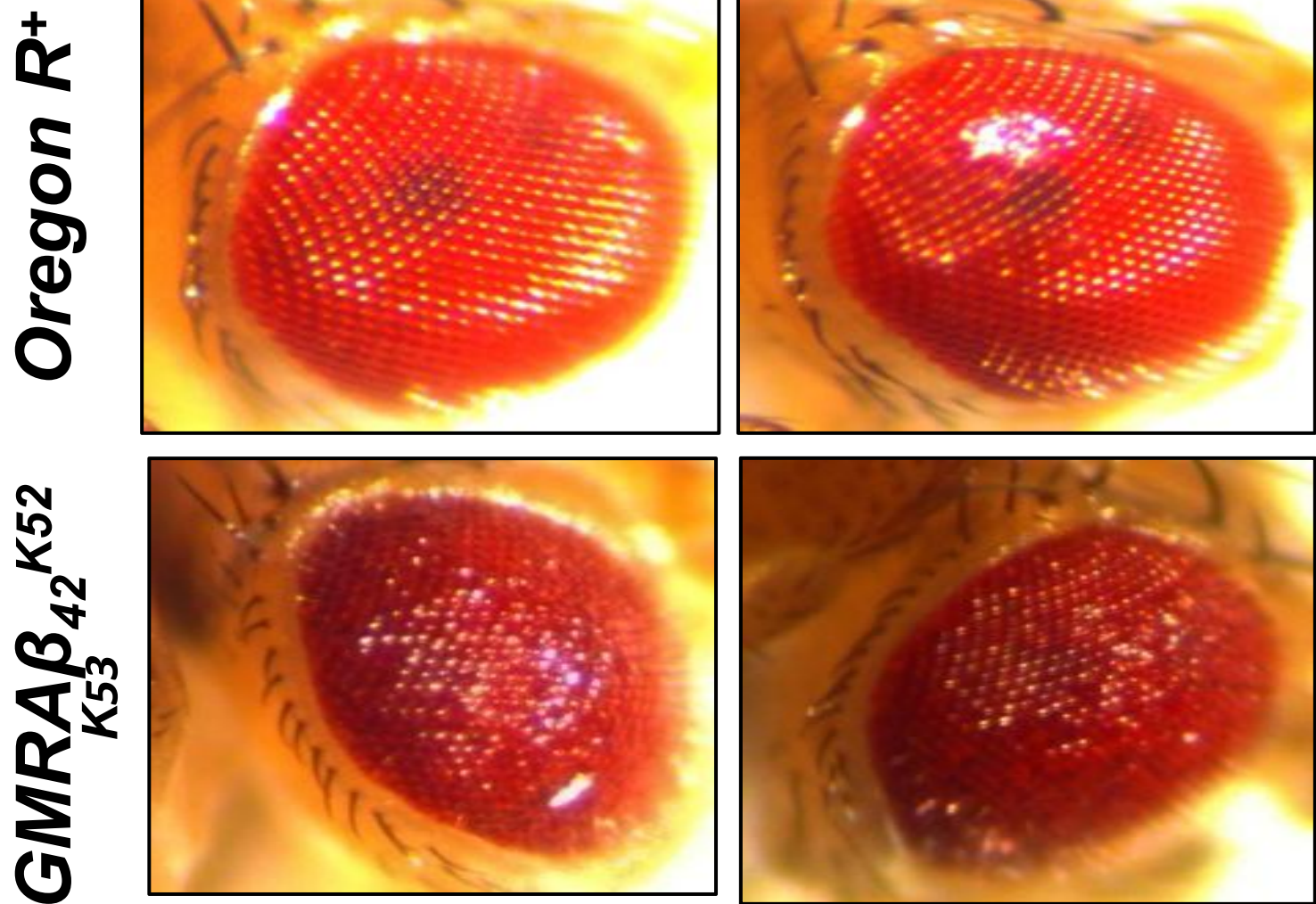


Fig 11: Eye images of *Drosophila* of *Oregon R*<sup>+</sup> and *GMR- $\beta$ <sub>42</sub><sup>K52</sup>*; *GMR- $\beta$ <sub>42</sub><sup>K53</sup>* in normal food and *Murraya koenigii* supplemented food (1mg/ml MK).

#### • Body weight

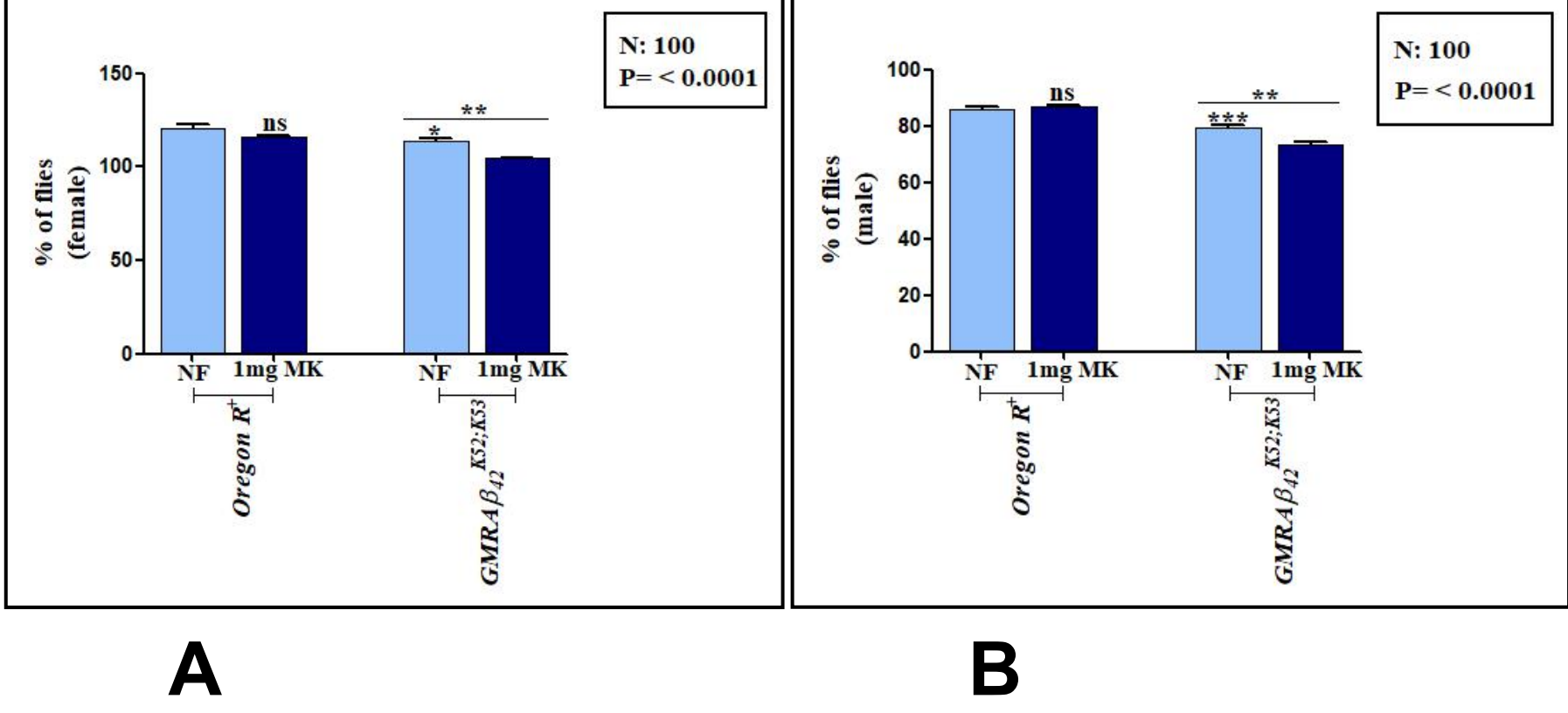


Fig 3: Body weight of (A) Female *Drosophila* flies and (B) Male *Drosophila* flies of *Oregon R*<sup>+</sup> and *GMR- $\beta$ <sub>42</sub><sup>K52</sup>*; *GMR- $\beta$ <sub>42</sub><sup>K53</sup>* in normal food (NF) and *Murraya koenigii* supplemented food (1mg MK).

### •Changes in the number of *Drosophila* flies after the supplementation of *Murraya koenigii*:

Genotype	Food type	2 <sup>nd</sup> instar larva		Pupa		Flies	
		Date	No. of larva	Date	No. of pupa	Date	No. of flies
<i>Oregon R</i> <sup>+</sup>	Normal food	24.1.19	25	31.1.19	15	2.2.19	24
	1mg/ml food	24.1.19	25	31.1.19	17	2.2.19	25
<i>GMR-<math>\beta</math><sub>42</sub><sup>K52</sup></i> ; <i>GMR-<math>\beta</math><sub>42</sub><sup>K53</sup></i>	Normal food	24.1.19	25	31.1.19	14	2.2.19	25
	1mg/ml food	24.1.19	25	31.1.19	17	2.2.19	24

Table 1: Number of developing larva into adult *Drosophila* flies.

## Conclusions

In this study, we got following conclusion on the effect of supplementation of *Murraya koenigii* (1mg/ml) :

- Life cycle of AD flies shortens by 1 day and body weight decreases.
- Increases the phototaxis behaviour and locomotor activity of AD flies.
- There is no visible change in eye phenotype of AD flies.

Thus, supplementation of *Murraya koenigii* showed therapeutic less effect in rescue of Alzheimer's symptoms in the AD flies.

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**References-** nhp.gov.in/introduction-and-importance-of-medicinal-plants-and-herbs\_mtl Panchal, K. and Tiwari, A.K., 2017. *Drosophila melanogaster* “a potential model organism” for identification of pharmacological properties of plants/plant-derived components. *Biomedicine & Pharmacotherapy*, 89, pp.1331-1345.