

EFFECT OF STINGLESSBEE HONEY IN SELENITE INDUCED CATARACTS

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Abstract

Melipona favosa favosa is reputed to produce an anticataract honey. Ocular cataracts are opacifications of the ocular lenses. The senile cataract is considered as belonging to public health. Other etiologies comprise diabetes, UV radiation, traumatism. In this work we used the selenite model to induce cataracts in rats, and to test the effect of *Melipona* honey eye drops. For that purpose five groups of ten pupas 12-days-old were treated. A control group (1) did not receive selenite, and another control group (2) received a daily honey drop in the right eye. Three groups were injected with sodium selenite (3), cataract control (4) honey drops, simultaneous with an injection (5) of honey drops after cataract detection. Opacifications of the lens were observed daily with a slit lamp for two weeks. Cataracts were graded in each lens. Honey eye drops did not damage the lens during the period of application (2). However, they did not prevent cataract onset as observed in group (4) but a delayed progress was detected in 20% of group (5). The selenite model affected the calcium metabolism of the lens, and caused fast opacifications. The observed delay of opacification in the right eye compared to the left eye of the same rat was caused by honey but further analyses are required to suggest a mechanism that operated only in 20% of the rats.

Introduction

The stingless bees were used even since the Mayas, to treat eye diseases. Those bees belong to the order Hymenoptera, and the family Apidae, but unlike the commercial bees of the *Apis* genus, they belong to the subfamily Meliponinae (CAMARGO and MENEZES PEDRO, 1992; CRANE, 1992). Among the 500 species of meliponinae, the honey produced by *Melipona favosa favosa* has the popular attribute of healing ocular cataracts when applied as an eye wash.

The crystalline opacification has various etiologies, such as diabetes, exposure to UV rays, and traumas. The senile cataract is a problem of public health, and there are no drugs for treating it; nevertheless, it is treated with success by surgical implants of intra-ocular crystallin (KADOR, 1983; HARDING, 1992; WEST and VALMADRID, 1995).

The model of selenite induced cataract is very fast, and produces opacifications by inducing lenticular proteases that alter the calcium metabolism (SHEARER *et al.*, 1997). Previous studies in ovine crystallin cultures have detected the protective effect of a flavonoid metilate in opacifications induced *in vitro* by calcium esters (VIT and JACOB, 1998). Honeys contain flavonoids, that have their origin in the plants the bees visit (VIT and T. BARBERÁN, 1998), but it was not studied yet if they can cause protection in some types of cataract.

In this study we measure the effect of topical applications of *Melipona favosa favosa* honey in selenite-induced cataracts.

Material and methods

The experimental cataracts were produced by injecting sodium selenite, according to the technique described by SHEARER *et al.* (1987). With the aim in view of measuring the effect of honey eye wash, five groups of ten Wistar rats 12 days old each were treated. The control group (1) did not receive selenite or honey, while the honey control group (2) received topical applications into the right eye. Three groups were treated by injections of sodium selenite. One of them was the experimental cataracts control (3), other received the selenite injection together with the honey eye wash (4), and other received the eye wash after the cataract being detected. The ocular crystallin opacifications were observed during two weeks.

The used *Melipona* honey was personally recollected by extracting the cells in a hive and keeping them in the freezer up to their use.

Diagrams were made up for categorizing the cataract progress, that were observed by means of a split lamp, where there were considered eight stages: (1) Incipient vacuoles. (2) Vacuoles in patches. (3) Striations in the suture, caused by swollen fibers. (4) Ecuatorial tack. (5) Ellipsoidal uncoupling from the cortex. (6) Translucid nucleus and striated cortex. (7) Milky opaque nucleus and cortex without striations. (8) Cloudy nucleus and cortex. Each and every day observations were effected in both eyes.

Results and discussion

The *Melipona favosa favosa* honeydrops applied as an eye wash did not cause alterations of the ocular crystalline in the honey control group (2), of the kind observable by means of the split lamp.

Nevertheless, the studied topical application of honey could not prevent the cataract development in the group where it was applied at the same time with the selenite injection (4). In its turn, a retardation was noticed in the cataract progress, in 20% of the rats in the group that received honey for the selenite-induced opacification to be treated (5). This is a preliminary study whose description hardly allows to suggest this line can be continued to obtain a significative representation of the honey anti-cataract effect. The retarded cataract percentage is very low, but perhaps by retarding the etiologic agent a more slow cataract may be reproduced, to better simulate the human cataracts progress, and be more susceptible to the honey treatment. In any case, the retardation noticed in the right eye opacification progress, that was honey treated, as compared to the left eye of the same rat, with no treatment, would be worth continuing the study for solving a possible action mechanism.

As such, is recommendable to go forth in both studying the *in vivo* model, and studying the composition of the flavonoids that are present in the stingless bees honey, as possible active principles in the treatment with honey eye wash of the ocular cataracts. We only dispose of some preliminary studies about the luteoline predominance in the phenolic extracts of the stingless bees honey, as compared to *Apis mellifera* honeys produced in Venezuela (VIT and TOMÁS-BARBERÁN, 1998); nevertheless, the floral preferences could make other structural changes to appear in the flavonoids.

Another approximation in studying the anti-cataract agents by means of the selenite model is the one used by HIRAOKA and CLARK (1995), that consists in applying subcutaneous injections with that agent some 15 minutes before the sodium selenite. By following this protocole, in other preliminary study, there were encountered no protecting effects of the *Melipona favosa favosa* honey (CLARK, 2000). In any case, the protection that was noticed in this study seems to have been possible from the very moment of applying the honey. We are presently increasing the number of lab animals for verifying if the noticed effect could be repeated. In any case, applying honey into the eyes is painful by its higher content of acids – whose presence is hidden under the sweet taste conferred by the sugar concentrates, and it results more convincing using this remedy after diagnosing the ocular cataract, than as a preventive method.

Acknowledgements

This work could be made possible in the BIOULA facilities, by which the kind co-operation offered by its manager, Prof. Rosa de Jesús, is to be thanked for. The slit lamp was purchased with the Wellcome Trust project M/96/2571, and together with the CDHCT-ULA FA-209-97-03-A the required conditions for the present work could be gathered. Besides, there is enormously thanked for the orientation received from the Dr. Larry David of the University of Oregon, in Portland, US, for illustrating the technique of cataract inducing by selenite, who could be invited by the ULA Scientific Exchange Committee.

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