RESERCH ON THE INFLUENCE OF APIDIET IN ACRILAMIDE-INDUCED HEPATOPATHY IN WISTAR RATS ON SOME HEPATIC ENZYMES

C.V. Andriţoiu 1,2,3, V. Andriţoiu 1, Diana Ciubotariu 4, M. Popa 2

1 APITHERAPY MEDICAL CENTER OF BĂLĂNEŞTI-GORJ; 2 DEPARTMENT OF NATURAL AND SYNTHETIC POLYMERS, ,,GHEORGHE ASACHI” TECHNICAL UNIVERSITY OF IAŞI; 3 ,,VASILE GOLDIŞ” WESTERN UNIVERSITY OF ARAD 4 DEPARTMENT OF PHARMACOLOGY, ,,GRIGORE T. POPA” MEDICINE AND PHARMACY UNIVERSITY OF IAŞI

Summary
In the present experiment, we have assessed for the influence induced by apidiet in in acrylamide-induced hepatopathy in rats. The objectives of the experimental study were to investigate the following biochemical parameters: aspartate aminotransferase (ASAT), ALT (alanine transaminase), alkaline phosphatase (ALP), and GGT (gamma glutamyl transpeptidase) in the conditions of chronic hepatic toxicity induced by acrylamide. In order to reduce the influence of factors affecting progression of hepatic lesions, we have administrated apidiet products. Toxic hepatopathy was experimentally induced administrating of acrylamide (water solution, 50mg/L concentration) by gastric gavaj. Administration of apidiet plus royal jelly in group which received acrylamide proved to be efficient in maintaining the enzymatic parameters within normal limits. So, administration of apitherapy products in case of subjects affected by toxicity determined by aliments compound proved efficient.

Key words: apitherapy, acrylamide, hepatic enzymes calin.apitherapy@yahoo.com

Introduction
Professional exposure to acrylamide may take place in all stages of its preparation and use process (preparation of acrylamide monomers, use of polyacrylamide, preparation of polyacrylamide gels) (***, European risk assessment). Professional exposure might be caused by the inhalation of acrylamide dust, powder of vapours (solid substance slowly sublimates at room temperature). The exposure level is maximal during the process of production of the monomer, while late stages of polyacrylamide production determine minimal risk, as acrylamide is fixed on the polymeric matrix (***,CERHR, 2005).

Honey-bee has a positive effect in case of A hepatitis patients and also in case of mucosal atrophy cause by radio-therapy in case of malignant tumours (Stefan Bogdanov, 2007). Apytherapic products have important use in case of hepatic disease (Mateescu, 2005, Andriţoiu, 2007). Many clinical and experimental studies undoubtedly proved the benefit effect determined by pollen harvested from the bees in different chronic forms of hepatitis.

In the present experiment, we have assessed for the influence induced by apidiet in in acrilamide-induced hepatopathy in Wistar rats. In order to reduce the influence of factors affecting progression of hepatic lesions, we have administrated apidiet products.

Material and methods
We have worked on 40 Wistar rats, equally distributed into 4 groups: control group standardized food (group I), group apidiet+royal jelly (group II), group treated with acrylamide (group III), group treated...
with acrylamide and apidiet+royal jelly (group IV).

The average weight of used rats was 250g. The animals were kept in corresponding light and temperature conditions, with access to food and water. From these subjects, we have kept 3 for further tests. We mention that, in the present study, the group receiving acrylamide did not survive without therapy, thus the results obtained in case of group IV (apidiet plus royal jelly) are highly significant.

We have compared the results obtained in acrylamide+apidiet+royal jelly group with the results of the two control groups (control group with standardised food and control group with apidiet and royal jelly).

Toxic hepatopathy was experimentally induced administrating of acrylamide (water solution, 50mg/L concentration) by gastric gavaj. Animals were sacrificed by thiopental anaesthesia, 1mL/100g bw, using 0.01% concentration solution. After thiopental anaesthesia, we have punctured the cord with a Vacuette®-harvesting system, in order to obtain blood necessary for biochemical analysis of the enzymatic profile.

The apitherapy product (ApiRegy, ApiImunomod, ApiImunostim) were obtained from „Stupina SRL”. Biochemical investigation was performed using an automatic analyser (Aeroset, Abbott) and recommended commercial kits (Abbott, USA).

Results

AST

Co-administration of acrylamide and apidiet+royal jelly (group IV) determined a significant increase in AST level compared to apidiet+royal jelly group (group II) (55.28±1.49 versus 110.66±10.52, p<0.0001). Administration of apidiet+royal jelly determined a statistically significant decrease of AST compared to standardized food group (group I) (93.85±2.26 versus 55.28±1.49, p<0.0001) (Figure n. 1).

ALT

Co-administration of acrylamide and apidiet+royal jelly (group IV) determined a significant increase in ALT level compared to standardized food group (group I) (64.78±1.47 versus 57.96±9.1, p<0.0001).

Administration of apidiet+royal jelly determined a statistically significant decrease of AST compared to standardized food group (group I) (93.85±2.26 versus 55.28±1.49, p<0.0001) (64.78±1.47 versus 35.35±0.71, p<0.0001) (Figure n. 2).

Alkaline phosphatase (ALP)

Co-administration of acrylamide, apidiet and royal jelly (group IV) determined a significant decrease in GGT level over control group with standardized food, and also over control group with apidiet and royal jelly (0.23±0.11 vs. 0.57±0.07, p<0.0001 and vs. 0.45±0.05, p=0.0002). Also, there is difference between GGT level in control groups (significantly higher in group with standardized food vs. apidiet, p=0.0015) (Figure n. 3).

GGT (gamma glutamyl transpeptidase)

Co-administration of acrylamide, apidiet and royal jelly (group IV) determined a significant decrease in GGT level over control group with standardized food, and also over control group with apidiet and royal jelly (0.23±0.11 vs. 0.57±0.07, p<0.0001 and vs. 0.45±0.05, p=0.0002). Also, there is difference between GGT level in control groups (significantly higher in group with standardized food vs. apidiet, p=0.0015) (Figure n. 4).
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Discussions

Data regarding toxicokinetics in case of acrylamide are scarce. Anyway, symptoms observed in case of acrylamide intoxication indicate that this toxic is absorbed in the human body both in case of inhalation and ingestion (**IPCS.1985, ***European risk assessment). The presence of acrylamide has been detected in case of lots of food products (Lindsay, 2002). The formation mechanism of acrylamide involves Maillard reaction (Chuda et al., 2003). Taken into consideration the characteristics of Maillard reaction, as well as several experiments’ results, acrylamide formation process is influence by numerous factors: time of cooking (baking or frying) (Brathen et al., 2005; Mestdagh et al., 2006), frying temperature (Brathen, 2005) water content (Brathen, 2005), asparagina (Zyzak et al., 2003; Leufven and Lingnert, 2003; Friedman, 2003; reducting carbohydrates content, molar ratio between aminoacids and reducting carbohydrates, lypids (Yoshida et al., 2005), proteins, storage conditions (Zyzak et al., 2003; Matsuura-Endo et al., 2006; Ohara-Takada et al., 2005), agricultural effects (JAOAC).

Lesions affecting predominantly the hepatocellular level (cytotoxic lesions) are frequently evolving with increased serum transaminases levels (AST, ALT), 2-10 folds above the maximal-admitted level (usually, the increase is at least 5 folds above the maximal-admitted normal level). Gastroenterology, in general, and especially the liver and digestive tract diseases, represents one of the main application domains of apitherapy. The premise of this study was represented by clinical and paraclinical investigations, showing that the active principals from apitherapy products exhibit direct hepatic protection action, such as membrane stabilizing effect, therefore the preventive and curative action on the hepatocytes, as well as the general effect of maintaining and favouring cell metabolism. Restoration of hepatic functions, their normalizing, represents the preliminary condition for the liver to realise its metabolic and antitoxic effect (Drăgulescu, 2003).

Conclusions

Administration of standard food determined a significant increase in ALT, AST, ALP and GGT level and, in time, it might determine significant toxic hepatic
affecting. Administration of apidiet associated with royal jelly normalises the levels of the mentioned enzymes.

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