Hypoglycaemic activity of extracts from soft corals of Andaman and Nicobar coasts in rats

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The ethylacetate extract of soft corals collected from Andaman and Nicobar Coasts were screened for hypoglycaemic activity in fasting rats. Rats were divided into 5 groups. Group I received 0.5 ml of 5% gum acacia suspension (control). Group II received the extract of Cladiella australis (CAS), at a dose of 250 mg/kg. Group III received the extract of Simulalia new species (SNS), at a dose of 75 mg/kg. Group IV received the extract of Lamadlia new species (LNS), at a dose of 400 mg/kg and Group V received the extract of 250/MF-CBR-13 at a dose of 250 mg/kg. All extracts were administered orally. Blood samples, collected before the administration of test extracts and also at 2, 4, 6, and 8 hr after treatment, were analysed for glucose content. The percentage blood glucose reduction from that of control was also calculated. A very promising hypoglycaemic activity was observed in rats with CAS at 8 hr (42.3%), with SNS at 4 hr (28.34%) and 6 hr (40.6%), with LNS at 6 hr (32.38%) and with MF-CBR-13 at 6 hr (20.25%).

Alcoholic extracts of somemarine organisms namely Aplysia benedicti (mollusca), Parazoanthus species, Stoichactis giganteum (coelenterata) etc. are described in literature as effective to produce hypoglycaemic activity. Particularly a substance isolated from Simulalia species of soft corals identified as 4-O-beta-D-arabino pyranoside-2, 3, triacetate (a farnessyl arabinoside) was shown to possess a related activity. There are no reports regarding the hypoglycaemic or related activities of organisms (soft corals) selected for our work. Hence in our study soft corals collected from Andaman and Nicobar coasts were extracted with ethylacetate and the extracts were screened for hypoglycaemic activity following the method described by Holland et al.

The following drugs, the ethylacetate extracts of soft corals of Cladiella australis (CAS), Simulalia new species (SNS), Lamadlia new species (LNS), and MF-CBR-13 were used in our study. Albino rats of either sex weighing 125 to 200 g (B. N. Ghosh and Co, Calcutta) were used as experimental animals.

The animals were fed uniform diet and it was withdrawn 18 hrs before the administration of test extracts. Albino rats were divided into 5 groups each containing not less than 5 animals. Group I served as control and received 0.5 ml of 5% gum acacia suspension. Group II received the extract of CAS at a dose of 250 mg/kg. Group III received the extract of SNS, at a dose of 75 mg/kg. Group IV rats received the extract of LNS, at a dose of 400 mg/kg and Group V received the extract of MF-CBR-13, at a dose of 250 mg/kg. One fourth to half of the approximate LD50 of each extract was used as a dose to study their hypoglycaemic activity. Since the extracts were not soluble in water, they were suspended in 5% gum acacia and were administered orally to animals.

Blood samples were collected from the tail vein of the rat by cutting the tip of the tail. Blood samples were collected before the administration of test extract and at 2, 4, 6, and 8 hrs after treatment into small cups containing a small quantity of a mixture of potassium oxalate and sodium fluoride for preventing coagulation. Blood samples were analysed for glucose by Nelson method as modified by Somogyi and generally referred to as Nelson-Somogyi method. By this method, only glucose and not other reducing substances like glucuronic acid and glutathione are estimated.

From the glucose concentration of the blood samples collected at each time interval the percentage reduction in blood glucose was calculated as compared to the initial values. Average percentage of blood glucose reduction in control and other groups are given in Table 1. The results were compared with control group.

Very high hypoglycaemic activities were observed in rats with CAS (250 mg/kg) at 8 hr (42.3%) with SNS (75 mg/kg) at 4 hr (28.34%) and 6 hr (40.6%).
with LNS (400 mg/kg) at 6 hr (32.38%) and with MF-CBR-13 (250 mg/kg) at 6 hr (20.25%) respectively.

The blood glucose level is maintained mainly by insulin and glucagon which are secreted from \( \beta \) and \( \alpha_2 \) cells of the endocrine portion of pancreas. Insulin produces lowering of blood glucose while glucagon raises it. Another hormone namely somatostatin secreted from \( \delta \) cells of pancreas has indirect influence. It inhibits the secretion of both insulin and glucagon\(^b\).

Insulin plays a crucial role in lowering blood glucose level by enhancing glycogenesis in liver and muscles. Lowering of blood glucose level is also produced by extra pancreatic action of certain principles by enhancing tissue uptake of glucose in muscles at cellular level. Several factors like G.I.T hormones, blood glucose, amino acids, fatty acids and muscarinic receptor stimulants are known to influence insulin release which, in turn, lowers blood glucose level\(^6\). Since extracts CAS, SNS, LNS and MF-CBR-13 were found to produce lowering of blood glucose, they might be either enhancing the secretion of insulin, like some of the above agents or they might be enhancing the uptake of glucose at cellular level similar to the extra pancreatic action of biguanides. They might also be inhibiting the glucagon secretion or the activity of the sympathoadrenal system which increase blood glucose level. The results indicate that the extracts contained compounds that produce direct or indirect hypoglycaemic action. Further studies on these extracts for the isolation of pure compounds with hypoglycaemic activity and their mechanism of action are highly warranted.

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References