Anti-Obesity Effect Of Mushroom *(Ganoderma Lucidum)* 
On Experimentally Induced Obese Rats

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**ABSTRACT**

This experimental study was done to determine whether Ganoderma Lucidum (GL), a renowned medicinal species, has an effect on body weight in an obese animal model induced by the administration of a fatty mixture diet. The study was carried out in the department of Pharmacy, Jahangirnagar University and National Mushroom Development and Extension Center (NAMDEC) with 36 rats were divided into 3 groups as follows. The Control group (C) received normal/basal laboratory diet, experimental group (E) was fed fatty mixture diet and mushroom fed group (M) received 5% powder of GL with fatty mixture for 28 days. 5% powder of GL administration significantly reduced body weight in obese rats than group E. The present study suggests that GL may serve as a new potential natural product for the prevention of obesity.

**Key Words:** Ganoderma Lucidum (GL), Obesity

**Introduction**

At the present time, obesity is an important health problem. Half or more of the adult population is now identified as overweight (body mass index or BMI > 25 kg/m² - 30 kg/m²) or obese (BMI ≥30 kg/m²) in no less than 11 member countries of the Organization for Economic Cooperation and Development (OECD)¹. Obesity is one of the significant risk factors for metabolic syndrome, which include hypertension and hyperlipidaemia, potentially leading to type - 2 diabetes, cardiovascular disease, and nonalcoholic fatty liver disease²,³. Recently, it was reported that several food components have an anti - hyperlipidaemia effect in vivo. For example, isohumulones⁴, bitter acids derived from hops and sesame, a sesame lignan⁵, improve lipid metabolism in rodents. Also, several types of mushroom - *Pleurotus Ostreatus*⁶, *Grifola Frondosa* (maitake)⁷, *Flammulina Velutipes*⁷, *Lentinus Edodes* (shitake)⁸, *Ganoderma Lucidum⁹* showed lowering effect of cholesterol synthesis or cholesterol absorption or by enhancement of fecal cholesterol excretion.

Mushroom is one unique food abundant in essential macro and micronutrients, highest in dietary fiber and water, less calorie producing, low carbohydrate content and good sources of protein and fat. *Ganoderma Lucidum*, known as the "Mushroom of immortality" in Japan has been used for a wide range of health benefits. A number of laboratory studies have shown anti - neoplastic effect of fungal extracts or isolated compounds against some types of Cancer¹⁰. It has also been found to inhibit platelet aggregation and
Fatty Mixture

Cholesterol and cholic acid were obtained from the market in powdered form which was manufactured by "LOBA Chemic". A mixture of 1% cholesterol, 0.25% cholic acid and standard laboratory diet was administered on rats as fatty mixture diet for 28 days.

Materials and Methods

36 Long Evans rats, weighing between 120 - 140 gms were used as testing animals for 28 days. They were kept in cages in an animal house at 23 ± 2º C under 12 hour light - dark cycles. They had free access to fresh diet and drinking water during the experimental period. Rats were divided in 3 groups. Each group was composed of 12 rats: i) Rats that were fed a basal diet (Group C), ii) Rats that were fed an additional Fatty mixture diet (Group E) and iii) Rats that were fed Fatty mixture diet + 5% powder of GL (Group M). Mushroom (GL) were cultivated and harvested in culture laboratory of National Mushroom Development and Extension Center (NAMDEC), Savar, Dhaka. The fruiting bodies of mushroom were dried in oven and crushed into powder. The powder was mixed with the basal diet.

The composition of the basal diet for rats was as follows (g/100g):

Wheat flour - 50; rice powder - 11; casein (non fat) - 8; egg white - 10; soybean oil - 1; table salt - 0.5; vitamin mixture - 0.25 and mineral mixture - 0.25. The composition of vitamin mixture in the diet was as follows (gram/100g vitamin mixture):

retinyl acetate - 9.5 X 10-4; cholecalciferol - 1.2 X 10-3;  - tochoferol acetate - 0.05; thiamin hydrochloride - 2.4; nicotinic acid - 12; riboflavin - 2.4; D - calcium pantothenate - 9.6; pyridoxine hydrochloride - 1.2; folic acid - 9.5 X 10-2; vitamin K - 0.25; cyanocobalamine - 9.5 X 10-3; inositol - 47.95 and ascorbic acid - 24.0. The composition of mineral mixture added to diet was as follows (g/100g of mineral): calcium gluconate - 28.5; K2HPO4 - 17.3; CaCO3 - 26.0; MgSO4 - 12.6; KCL -12.6; CuSO4 - 0.06; FeSO4 - 0.3; MnSO4 - 0.55; NaF - 2.5 X 10-4 ; KI - 9 X 10-4; sodium molybdate - 3 X 10-4; SeO2 - 3 X 10-4; CrSO2 - 1.5 X 10-3.

Table 1: Effect of Ganoderma Lucidum on Body Weight Gain in Different Rat Groups

<table>
<thead>
<tr>
<th>Groups</th>
<th>Initial Body Weight</th>
<th>Final Body Weight</th>
<th>Weight Gain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>132.6 ± 1.87</td>
<td>139.5 ± 1.83</td>
<td>6.917 ± 2.620</td>
</tr>
<tr>
<td>Experimental</td>
<td>130.7 ± 1.94</td>
<td>148.3 ± 2.21</td>
<td>17.667 ± 2.943</td>
</tr>
<tr>
<td>Mushroom</td>
<td>131.2 ± 1.37</td>
<td>141.7 ± 1.42</td>
<td>10.50 ± 1.970</td>
</tr>
</tbody>
</table>

Results are shown in Mean ± Standard Error (S.E.). Significant at P  0.05

Table 2: Wt. gain in Control and Experimental groups

<table>
<thead>
<tr>
<th>Groups</th>
<th>Weight Gain</th>
<th>p value</th>
<th>Control vs Exp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>6.917 ± 2.620</td>
<td>0.006</td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>17.667 ± 2.943</td>
<td>0.05</td>
<td></td>
</tr>
</tbody>
</table>

Wt. gain is expressed in Mean ± Standard Error (S.E.). 't' - test has been done. Significant at P  0.05
and happiness. It is believed that certain triterpenes and polysaccharides may account for the multiple activities of Reishi. Thus, considerable time and effort has gone into the isolation and characterization of these compounds.

Ganoderma lucidum contain approximately 400 different bioactive components, which mainly include triterpenoids, polysaccharides, nucleotides, sterols, steroids, fatty acids, amino acids, soluble proteins, oleic acid, anergosterol peroxide and inorganic ions (Mg, Ca, Zn, Mn, Fe, Cu, Ge etc). Two new lanostane triterpenes, methyl lucidenate N and t - butyl lucidinate B, reduced TG accumulation significantly15.

Some research indicates that the GL mushroom, an ancient remedy known to some health practitioners, can aid weight loss. Scant studies exist that conclusively prove the efficacy of GL as a weight loss tool or as a means to travel obesity. One study published in the “Journal of Microbiology”, in 2004 found that a compound extracted from Ganoderma reduced glucose levels in test animals and suggested that GL might be effective in the oral treatment of diabetes and obesity16.

Dr. Taro Tamura of Kinki University, reported - “Since GL can eliminates obesity, overweight people do not need to worry about their obese figures and the figure conscious women do not need to suffer the pain and ill effects of starvation diets and weight loss drugs”.

Conclusion

The present study suggests that GL may serve as a new potential natural product for the prevention of obesity.

Acknowledgement

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### References


