

Cultivation of Reishi Mushroom (*Ganoderma lucidum*)



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INTRODUCTION

Reishi (*Ganoderma lucidum*) is pharmacologically as well as commercially the most important medicinal mushroom in the world with current global trade of about 2 billion dollars; trade in India has crossed Rs. 100 crores annually through imports from Malaysia and China.

Reishi is reported to possess a plethora of very significant medicinal values- anticancer, anti-HIV, antiheart attack (cholesterol lowering as well as anti-angiogenic), Hepato- and nephroprotective, hypoglycemic (anti-diabetes), antioxidants etc. In Chinese and Japanese systems of medicine Reishi is almost a panacea.

Recently, the National Research Centre for Mushroom made a breakthrough in developing the cultivation technology of Reishi, which is described here. Farmers and entrepreneurs can take up the production of this mushroom and harvest rich dividends.

Strains: True-to-the-type genuine DNA-fingerprinted exotic cultures are available in the NRCM's Mushroom Gene Bank; Korean, Thai and American cultures are excellent.

PRODUCTION SYSTEM

Reishi can be grown by the farmers seasonally in the low cost growing rooms preferably polyhouses and also in the environmentally-controlled cropping rooms by the industrialists. As the mushroom is intended to be used exclusively as medicine, it has to be grown organically; seasonal farmers have to put up polycover on the aside top and sides of the thatched huts and utmost hygienic conditions



Pin heads of Reishi

have to be maintained to prevent diseases and pests as no toxic chemical is to be used for controlling the same.

Reishi is grown on the saw dust of the broad-leaved trees (mango, poplar, coconut, sheesham). Sawdust, obtained from the saw mills, is amended with 20% wheat bran and is wetted to a level of 65% moisture. Calcium sulphate (gypsum) and calcium carbonate (Chalk powder) are added to get a pH of 5.5. The mixed substrate (700 g dry wt; 2.1 kg wet)



Cap formation and growth

is filled in polypropylene bags the mouth of which is then plugged with cotton after putting a plastic ring exactly like wheat grain spawn pack of mushrooms in polybags.

The bags are then sterilized in autoclave at 22 p.s.i. for 2 hrs. After cooling, the substrate is spawned with wheat grain or saw dust spawn @ 3% on the dry weight basis, as it is comparatively a slow growing fungus. Spawn-run (incubation) is done at 28-35 °C in the closed rooms (high carbon dioxide) and darkness. After the complete spawn run (bags white all over), which takes about 25 days, polythene top is cut at the level of the substrate totally exposing the top side and proper conditions for fruiting or pinning (temp. 28 °C, 1500 ppm CO₂, 800 lux light, 95% RH) are provided.

Once the pins have grown up enough to form the cap which is indicated by the flattening of the whitish top of the pinhead, humidity is reduced to 80% RH and more fresh air is introduced (1000 ppm CO₂). Once the cap is fully formed, which is indicated by yellowing



Mature spore shedding Reishi

of the cap margin (which is otherwise white), temperature is lowered to 25 °C and RH is further reduced to 60% for cap thickening, reddening and maturation of the fruitbodies.

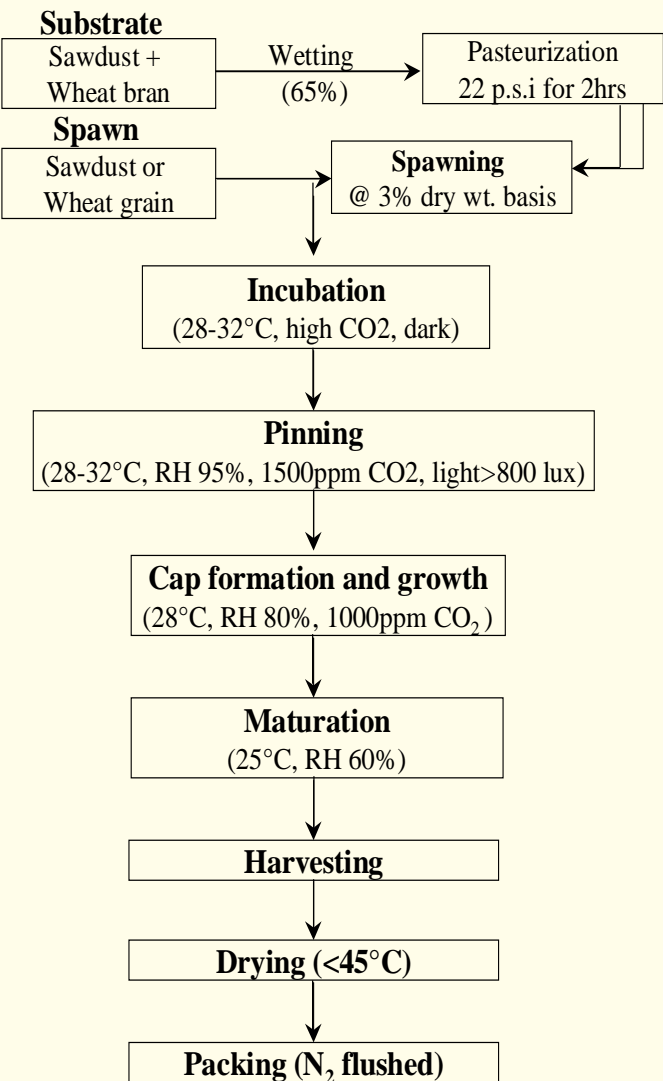
Full maturity is indicated, when the cap is fully reddish brown and spores are shed on the top of the cap (see the photograph). Harvesting is done by the tight plucking, holding the root with one hand and pulling up with another; scissors and knives can also be used but no residual bud is left after harvesting. One cycle of the growing takes 10-15 days. After harvesting the first flush, conditions for pinning are again switched on (i.e. 28 °C, 95%RH, 1500 ppm CO₂, 800 lux light) for starting and completing the second flush. Depending upon the conditions, 2-3 flushes appear and a total 25% B.E. can be achieved (250 g fresh mushroom from one kg dry substrate). One crop takes about four months.

Harvested mushrooms, after washing with water, are dried at low temperature (<50 °C) in the cabinet driers, preferably at 35 °C in the dehumidifying cabinet drier. Freeze drying is, however, the best. Reishi mushroom has very high dry matter (45% i.e. 450 g dry from 1 kg fresh).

MARKETING

Reishi is used as medicine and not as food because it is bitter and corky hard. Any one growing it has to find the market which is basically herbal medicine and food supplement (nutraceuticals) sector. Manufacturers of herbal medicines and food supplements can process, pack and trade it in various forms- capsules, tablets, liquid extracts or even Reishi

Flow chart of Ganoderma production



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