ENERGY VALUE OF DIFFERENT AGRORESIDUES USED FOR CULTIVATION OF CALOCYBE INDICA (P AND C)

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ABSTRACT

Calocybe indica (Milky mushroom) was cultivated on four different agroresidues viz. paddy straw, coirpith, Wood shaving and bananatash. The energy value of substrates worked out based on cellulose, hemicellulose and lignin content revealed highest energy value of 466 K. Cal per 100 gm substrate in coirpith followed by bananatash (435 K. Cal per 100 gm), paddy straw (391 K. Cal per 100 gm) and wood shavings (380 K. Cal per 10 gm values).

India is endowed with potential renewable organic waste like crop residues, tree wastes and aquatic weeds (Gaur, 1986), mushroom species have been cultivated on a large spectrum of plant wastes (Nair, 1991). Zadrazil (1978) has established that the yield of mushroom largely depends upon the substrates used. Cellulose, hemicelluloses and lignin are the major constituents of the plant substrates on which mushroom grow. They have to degrade these polymers by producing extra cellular enzymes in order to utilize them. In this way, the capability of mushroom to grow on a particular type of substrate lies in its ability to degrade it, which in turn is decided by a repertoire of enzymes a mushroom species can produce, defines the set of substrates on which it can grow, while the comparative intensity of the activities of different enzymes decides preference for a substrate over others (Singh et al., 2001). In order to find out the energy conversion as mushroom biomass from substrates, energy value of substrate were worked out. This was done based on cellulose, hemicellulose and lignin contents.

Calocybe indica was cultivated on four different agroresidues viz., paddy straw, coirpith, bananatash and wood shavings. The energy value of different substrates used for cultivation of Calocybe indica were calculated based on cellulose, hemicellulose and lignin contents of substrates. Cellulose content was estimated using method described by Updegroff (1969) and Hemicellulose, lignin using method described by Goering and Van Soest (1970). The values obtained were multiplied with factors values 4.2, 4.2 and 7.1 K. Cal/g for cellulose, hemicellulose and lignin content respectively (Dent and Brown, 1978).

The energy value of substrates estimated based on cellulose, hemicellulose and lignin contents showed that the maximum value was observed in mushroom grown on coirpith 466 K. Cal/100g followed bananatash 435 K. Cal/100g paddy straw 391 K. Cal/100g and wood shavings 380 K. Cal/100g.

The order of contribution of lignin in different substrates was: coirpith (207 K. Cal) wood shavings (159.8 K. Cal) bananatash (138 K. Cal) and paddy straw (133 K. Cal) while cellulose ad hemicellulose together contributed to the maximum in bananatash (297.5 K. Cal) followed by coirpith (259 K. Cal) paddy straw (258 K. Cal) and wood shaving (220 K. Cal) in that order. This shows that the energy value of cellulose and hemicellulose contents in the substrate is converted as energy recovery of mushroom. In addition cellulose, hemicellulose (C : HC) ratio is also believed to play role in energy conversion process; because the mushroom cultivated in coir pith and paddy straw though had equal energy value contributed by hemicellulose and cellulose, variation in energy recovery was more in paddy straw substrates than coirpith cultivated mushrooms. In these substrates, paddy straw...
Table 1. Cellulose, hemicellulose, lignin contents and energy value of different substrates used for the cultivation of *Calocybe indica*

<table>
<thead>
<tr>
<th>Substrates</th>
<th>Cellulose content</th>
<th>Hemicellulose content</th>
<th>Lignin content</th>
<th>Energy value (A)</th>
<th>Hemicellulose value (B)</th>
<th>Lignin value (C)</th>
<th>Energy value of substrate (K. Cal/100 g substrate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paddy Straw</td>
<td>38.80</td>
<td>162.96</td>
<td>18.73</td>
<td>133.00</td>
<td>391</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coirpith</td>
<td>34.16</td>
<td>143.47</td>
<td>29.12</td>
<td>207.00</td>
<td>466</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wood shavings</td>
<td>36.79</td>
<td>154.52</td>
<td>22.51</td>
<td>159.80</td>
<td>380</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bananastrash</td>
<td>50.89</td>
<td>213.74</td>
<td>19.45</td>
<td>138.00</td>
<td>435</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

and coirpith contribution of energy by lignin was 133 and 207 K. Cal respectively (Table 1).

In *Pleurotus sajor-caju* the energy value was in the range from 275 to 300 K. Cal/100 g in mushroom cultivated on different substrates (Bisaria et al., 1987). This substrate induced changes are in conformity with the present findings. In *Pleurotus ostreatus* (316.68 K. Cal/100 g), *Morchella esculenta* (300.72 K. Cal/100g) and *Morchella conica* (304.32 K. Cal/100 g) comparatively higher values were reported by Wahid et al., 1988 while low energy value of 189.40 K. Cal/100 g was reported in *Lentinus squarrosulus* (Upadhyay and Rai, 1999) than the present study.

REFERENCES