

EXPLORING THE VIABILITY OF KITHUL FLOUR AS AN ADVANCED GELLING AGENT IN PLANT TISSUE CULTURE MEDIA

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Plant tissue culture relies on a synthetic growth medium with macronutrients, micronutrients, organic supplements, growth regulators, and solidifying agents. Agar, the typical solidifying agent, constitutes 70% of the media cost. This study aims to develop a cost-effective alternative medium. In this research, a cost-effective alternative culture medium for plant tissue culture was developed, aiming to reduce the high cost associated with traditional agar-based media. The study focused on utilizing kithul flour as both a gelling agent and a nutrient source. Kithul flour was analyzed for various characteristics, including moisture content, pH value, ash content, amylose content, swelling power, and solubility. The novel growth medium was prepared by enriching MS media powder with essential macro and micronutrients, sucrose, and myo-inositol. The medium's solidification was achieved by varying the ratio of agar and kithul flour. The effectiveness of this kithul flour-based medium in supporting shoot proliferation of mustard seeds was investigated. A two-factorial experiment was conducted, with the first factor being the type of gelling agent. The six treatments included, Agar: Kithul flour ratio (T0= 5:0, T1= 1:4, T2=2:3, T3=3:2 T4=4:1 T5=0:5). The second factor was the plant species *Brassica spp.* The results indicated that the T3 treatment (3 parts kithul flour to 2 parts agar) demonstrated the most promise as an alternative to the costly 100% agar-based culture media. This kithul flour-agar blend effectively supported micro propagation and minimal growth conservation of *Brassica spp.* The kithul flour starch consistently provided a stable gel surface throughout the culture period, resulting in optimal plantlet growth in terms of shoot number, shoot length, and leaf count. Various treatments were applied, and significant differences in critical growth indicators were observed. Notably, Treatment T3 showed comparable results to T1 and T2 while outperforming other treatments. In conclusion, kithul flour, when incorporated as a gelling agent in tissue culture media, demonstrates its potential as a cost-effective and effective alternative, with promising results for plant propagation and growth conservation.

Keywords: *Gelling agent, Kithul flour, Agar, Shoot proliferation, Mustard seeds*