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# **Enzymatic hydrolysis of sheep wool to obtain a plant fertilizer**

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Abstract: In our study, enzymatic hydrolysis techniques of sheep wool were applied in order to define the optimal hydrolysis conditions to obtain a product that can be used as a culture medium for the multiplication of microorganisms, with a potential effect in improving agricultural production, plant health and restoring soil biodiversity. Hydrolysates obtained both by alkaline (chemical hydrolysis), as well as catalysed by lipases and proteases (enzymatic hydrolysis) were tested by disk diffusion method on agar media as a qualitative method for establishing the quality of inhibitor / nutrient of the products obtained by the different hydrolysis techniques. Culture media formulations using as substrate the enzymatic hydrolysates of sheep wool were used for cultivate two types of microorganisms known to have positive effects on agricultural production, plan health, soil biodiversity (bacteria from the genera *Rhizobium* and *Bacillus*). The obtained results demonstrate that, applying the enzymatic hydrolysis method, keratin hydrolysates can be obtained from raw sheep wool and from sheep wool thermally pretreated by pelletizing. Keratin hydrolysates preserve their nutritional qualities if are stored at low temperatures (by freezing) and lose their nutritional qualities, if they are conditioned by dehydration at the water evaporation temperature.

Key words: keratin hydrolysates, *Bacillus, Rhizobium*, sheep wool

#### Introduction

Wool a by-product from sheep productions, has lost its economic value in the last decades in Romania. The focus of this research is to develope a biotechnolgy able to convert this by-product into valuable products for the economy.

#### **Materials and methods**

## **Results and discussions**





Figure 1. Enzymatic hydrolysis

## **Conclusions**

obtained by hydrolysates Keratin applying the described methodology applied to sheep wool, not only that does not inhibit the development of tested microorganism, but can be used as culture media to grow the tested microorganisms.

Figure 2. Bacillus licheniformis bacteria on solid medium with discs impregnated with wool hydrolysates

![](_page_0_Picture_18.jpeg)

Figure 3. *Rhizobium trifolii* bacteria on solid medium with discs impregnated with wool hydrolysates

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