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苜蓿丝氨酸蛋白水解酶及青贮时对蛋白降解作用的研究

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摘要:

本研究以苜蓿 (Medicago sativa) 绿汁发酵液形式模拟青贮的发酵过程, 探讨了苜蓿中丝氨酸蛋白酶的特性及其在苜蓿青贮过程中对蛋白的降解作用。在制作苜蓿绿汁发酵液前通过添加丝氨酸蛋白水解酶抑制剂(PMSF)并设置对照组来分析其在形成非蛋白氮各组分中的作用。结果表明, 苜蓿中的丝氨酸蛋白酶最适pH值为6.6, 最适温度为45℃; 添加5 mmol/L的PMSF可以完全抑制酶活性。在苜蓿青贮的发酵过程中, 与对照相比, 抑制剂极显著 (P<0.01) 地增加了苜蓿绿汁发酵液中可溶性蛋白含量; 极显著 (P<0.01) 降低了苜蓿绿汁发酵液中非蛋白氮各组分的含量。结果说明, 在苜蓿青贮过程中丝氨酸蛋白水解酶对蛋白水解形成非蛋白氮的作用较小。

关键词: 苜蓿青贮; 丝氨酸蛋白酶; 非蛋白氮; 蛋白质降解

Characterization of serine endopeptidases in alfalfa and its role on protein degradation of silage

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Abstract:

Characteristics of serine endopeptidases in alfalfa (Medicago sativa) and its role in protein degradation of silage were investigated by using the previously fermented alfalfa juice (PFJ) in this paper. The role of serine protease on the formation of non protein nitrogen (NPN) during proteolysis of fermented alfalfa juice was determined by adding the serine protease inhibitors PMSF in PFJ. The results of this study indicated that the optimum pH and temperature of alfalfa serine endopeptidases were 6.6 and 45℃ respectively; adding 5 mmol/L PMSF could completely inhibit the activity of serine protease. In alfalfa silage fermentation process, compared with control (no PMSF), PMSF significantly (P<0.01) increased the soluble protein content and decreased (P<0.01) NPN content of each component in the fermented alfalfa juice(FJ). The study suggested that serine endopeptidases did not play a main role on the formation of NPN during proteolysis process of ensiled forages.

Keywords: alfalfa silage serine endopeptidases non protein nitrogen protein degradation

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