**水禽雷氏桿菌發酵培養最適條件之研究**

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**摘要**

為解決水禽雷氏桿菌症(RA)不活化菌苗使用搖瓶培養所得菌數低，導致產量受限問題，本研究利用液體發酵槽透過不同參數控制與營養物添加等條件進行培養測試，找出高收穫菌量且免疫原性不改變之最佳發酵培養條件，以符合大規模量產需求。試驗結果顯示，發酵槽培養所獲得之活菌數最高可達5.5 x 10^10 CFU/mL，3種血清型菌株較搖瓶震盪培養平均可增加2 ~ 3.75倍活菌量，添加營養物培養又可增加1.43 ~ 1.7倍菌數。以去年生產10萬劑計算分析，提高菌量後可減少2.2倍培養基使用量，加上離心方式改良，共可節省2倍器械準備與後續洗滌、以及3.08倍濃縮處理之時間和人力消耗。此外，發酵槽試製菌苗保存27個月後於鴨隻免疫效力測試結果發現，對第1和2型RA感染仍具良好保護效果，唯攻毒第6型菌時無法引起鴨隻過半數死亡，致該型本次尚難評估。研究結果將應用於本所商品化RA菌苗之製程改良，可望降低菌苗生產成本提升市場競爭力。

**Study on Culture Conditions in a Fermenter**

**for Production of *Riemerella anatipestifer***

Chao-Fang Yu

**Abstract**

The study aimed to improve production process for large scale production of *Riemerella anatipestifer* bacterin. Various control parameters and nutrients addition were tested in a fermenter. The results showed that the optimized fermentation process has enhanced 2-3.75 fold productivity in contrast to incubator shaker, and additional nutrients supplemented in a fermenter has increased 1.43-1.7 fold more the number of bacteria. From manufacturing 100,000 doses of trivalent RA bacterin, production by fermentation has decreased 2.2-fold culture medium uses and speeded up 2-fold preparation time as well as greatly cut down manpower consumption. With improvement in centrifugation, it has also saved 3.08-fold purification time. In addition, the bacterin manufactured in a fermenter stored in a refrigerator for 27 months could still provide enough protection against serotype 1 and 2 challenges in ducks. The study finding would apply to commercial bacterin production to lower production cost and promote market competition of vaccine in waterfowl industry.