BÖLÜM

3 D VİTAMİNİ

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GİRİŞ

Vitaminler, metabolik fonksiyonlar için sınırlı miktarlarda gerekli olan, organik moleküller veya kimyasal bileşiklerdir. Yağda ya da suda çözünen temel mikro besinlerdir. Vücutta başlıca kalsiyum ve fosforun düzenlenmesinde rol oynayan yağda eriyen vitamin, D vitaminidir. D vitamininin memelilerde ve kanatlı hayvanlarda hem doğuştan hem de kazanılmış bağışık yanıtı modüle ettiği de bilinmektedir. D grubu vitaminleri, hayvanlarda aktif olan hidroksillenmiş metabolitlerin ana kaynakları olan prohormonlar; ergokalsiferol (Vitamin D2) ve kolekalsiferol (Vitamin D3) olmak üzere bir grup vitaminden ibarettir. D2 ve D3 vitaminlerinin arasındaki yapısal farklılık C-17 yan zincirinde bulunmaktadır. Ayrıca D2 vitaminin yapısında ilave bir C-22 ila C-23 çift bağı ve bir C-24 metil grubu vardır. D2 vitamini, bitkiler, mantarlar ve omurgasızlarda bulunurken; D3 vitamini hayvansal kaynaklıdır ve genellikle güneş ışığına maruz kalan deride sentezlenir. Hayvanlar ve insanlar tükettikleri gıdalar aracılığı ile D vitamini ihtiyaçlarının ancak yaklaşık %10'unu karşılayabilirler.

Vitamin D3'ün asidik pH, yüksek sıcaklık, ışık, oksijen ve metalik iyon varlığında ($Fe^{2+,}$ Cu^{+}, Cu^{2+}) oldukça kararsız olduğu görülmektedir. Ticari vitamin D3 ürünleri karşılaştırıldığında su bazlı formülasyonlara kıyasla yağ bazlı formülasyona sahip ürünler daha stabildir. Ticari vitamin D3 üretilirken, propilen glikol ve etanol gibi organik solvent ve EDTA, sitrik asit, askorbik asit gibi antioksidatif maddelerin eklenmesi ile bahsi geçen koşullarda ürün stabilitesinin önemli ölçüde arttırılması mümkün olmaktadır. Mikroenkapsülasyon teknolojisi vitamin D3'ün çeşitli fiziksel etmenlerden korunması için uygulanabilecek alternatif bir uygulamadır. Vitamin D3'ün zein, karboksimetil kitosan, b-laktoglobulin bazlı koagulum gibi çeşitli materyaller ile yüksek verimlilikle (sırasıyla %52.2, %87.9, %94.5) mikroenkapsülasyonu mümkündür. Mikroenkapsülasyon sonucu düşük sıcaklık (4°C, 5 hafta), UV (254 nm, 15 W, 24 saat) gibi zorlu depolama koşullarında yüksek oranda stabil kaldığı, stimule edilen bağırsak içeriğinde (ph 6.8) 6 saat boyunca %80 düzeyinde korunarak; vitamin D3 ün yavaş salınımının gerçekleştiği görülmektedir. Ticari olarak üretilen vitamin D3 ürünleri genel olarak püskürtmeli kurutma ya da jelatin kaplı tanecikler şeklinde mikroenkapsüle edilmektedir. Mikroenkapsüle Vitamin D3 oda sıcaklığında oldukça stabildir. Vitamin-mineral premiksi halinde ya da yem içerisinde oda sıcaklığında 4-6 aylık sürede %20'ye kadar aktivitesini kaybettiği bildi-

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edilebilmesi için kullanımın düzeyinin birkaç kat arttırılması gerektiği söylenebilir.

Vitamin D3'ün etlik piliçlerde canlı ağırlık, yemden yararlanma ve kemik biyomekaniksel dayanımı, broyler damızlıklarda çıkım oranı, erken embriyonik ölümler, süt ineklerinde süt verimi, gebelik insidensi, plasenta retansiyonu ve metritis üzerine olumlu etkileri olduğu yapılan akademik çalışmalarda görülmektedir. Balık dışında gıda maddelerindeki vitamin D3 düzeyinin oldukça düşük olduğu bildirilmektedir. Avrupa nüfusunun %40'ında D vitamini yetersizliği olduğu bilinmektedir. Gıdalarda doğal olarak bulunan D vitamininin arttırılması, söz konusu açığın kapatılmasına katkıda bulunacaktır. Çiftlik hayvanlarında besleme stratejilerinin geliştirilmesi ile insanlar tarafından tüketilen vitamin D3 düzeyinin arttırılmasına katkı sunulması mümkün görünmektedir.

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