

( )

\*

( // : // : )

(PEG)

CNCPS

PEG

PEG

B1 A

(P< / )

C B3

(P< / )

B2

C

(P< / )

PEG

(P< / )

PEG

(P< / )

)

(Huber, 1980)

(

(Foroughameri,

.Germany)

.1997)

/ / / /  
/ / / /  
/ / /

(Foroughameri,

.1997; Fazaeli, 2005)

)

(Lyophilized)

(

(Polyethylene glycol-

PEG)

.(AOAC, 1990)

.(Makkar, 2003)

(NDF)

(ADF)

Van Soest et

( ) al. )

(

.(Thomas, 1977)

.(Deriaz, 1961)

( )

(Tilley

)

and Terry, 1963)

(

(Merck Schuchardt, Hohenbrunn,

(Greenberg & Shipe, 1979)

( ) A

(1993) Makkar & Singh

(Folin Ciocalteu)

) (Tannic acid)

(

(1982) Krishnamoorthy et al.

(PVPP)

B<sub>1</sub> A

(Makkar, 2000)

(B<sub>1</sub> )

(1996) Licitra et al.

(NDIN)

(Makkar, 2000)

(Van Soest et al., 1991)

(2000) Makkar

Van Soest et al.

(1991)

(2000) Makkar

(Rhodanine)

(Free gallic acid)

(Gallotannins)

C

(2000) Makkar

B<sub>3</sub>

CNCPS

CNCPS

(Licitra et al., 1996)

(Sniffen et al., 1992)

C B A

(NPN)

A

B

B<sub>1</sub>

B<sub>3</sub>

B<sub>2</sub> B<sub>1</sub>

( )

B<sub>2</sub>

$$Y_{ij} = \mu + T_i + e_{ij}$$

B<sub>3</sub>

T<sub>i</sub>

μ

Y<sub>ij</sub>

e<sub>ij</sub>

C

×

(ADIN)

PEG

PEG

SAS

GLM

.(SAS, 1996)

(P< / )

.(P> / )

$$Y_{ijk} = \mu + A_i + B_j + AB_{ij} + e_{ij}$$

.(P< / )

/

A<sub>i</sub>

μ

Y<sub>ij</sub>

e<sub>ij</sub>

AB<sub>ij</sub>

B<sub>j</sub>

(P> / )

.(Steel & Torrie, 1982)

.(P< / )

/

/

.(P< / )

/

( )

/

.(P< / )

.(P< / )

( )

SEM

/	b	b	a	b	( )
/	/ c	b	/ b	/ a	
/	/ a	/ a	/ a	/ a	
/	/ c	/ c	b	/ a	
/	/ a	/ b	/ c	/ b	
/	c	b	a	b	
/	c	b	a	b	
/	/ b	/ b	/ a	/ b	
/	a	b	b	c	

:SEM

(TT)

.(P> / )

.(P< / )

(TP)

.(P> / )

(P< / )

.(P< / )

...

:

(PEG) (P< / ) (CT)

PEG PEG (P< / ) (Protein precipitable / phenolics- PPP)

(P< / ) / (P< / ) /

(P< / ) PEG (P> / )

PEG (P< / ) PEG

) ( ) (

b /	a	b /	a	b
a /	b	a /	a	a
c /	c	b /	a	b
d /	d	c /	a	b
/	/	/	/	/

:SEM /

SEM

) ( ) PEG (

PEG × PEG SEM +PEG -PEG +PEG -PEG +PEG -PEG +PEG -PEG

*	*	*	/						
*	*	*	/						
*	*	*	/						
*	*	*	/	/	/	/	/	/	/

.PEG

+PEG PEG

-PEG

:SEM /

:NS /

\*

### CNCPS

/ /

A

(P< / )

(

CNCPS

) A

(P> / )

/

(McDonald et al., 1991)

(Van Soest, CO<sub>2</sub> NDF ( ) Van Soest .1994)

pH

(P < / )

(P > / )

(P < / )

( ) B<sub>2</sub>

) C

(P < / ) (

(McDonald et al., 2002)

(McDonald et al., 2002)

( ) CNCPS					
C	B <sub>3</sub>	B <sub>2</sub>	B <sub>1</sub>	A	
b	a	a	b	b	
a	a	b	b	b	
c	b	a	a	a	
d	b	a	a	a	
/	/	/	/	/	SEM

:A :SEM /

:B<sub>2</sub> :B<sub>1</sub>

:C :B<sub>3</sub>

(Kornsteiner et al., .2006)

(Haslam, 1998)

(Yahaya et al., 2002)

(Wong, 1973)

(McDonald et al., 1991)

... :

(1995) Reed

) .( )

PEG (

.(Makkar, 2003) PEG .(Reed, 1995)

PEG

(Terril et al., 1994; Getachew et al.,  
.2001; Baba et al., 2002) .(Terril et al., 1994)

(NPN)

B<sub>1</sub>

(Makkar & Singh, 1993)

(

(McDonald et al., B<sub>1</sub> . (Ben Salem et al., 2005)

.1991; McDonald et al., 2002)

B<sub>2</sub> ( )

B<sub>2</sub>

(B<sub>1</sub> NPN) (Balogun et al., 1998)

.(McDonald et al., 1991)

(Proteolysis)

.(Alipour & Rouzbehan, 2007)

C B<sub>3</sub>

C .(McDonald et al., 1991)

C

(McDonald et  
Merck ) PEG .al., 1991)

(Schuchardt, Hohenbrunn, Germany

(Chamberlain &

.Wilkinson, 2000)

( )

PEG ( )

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