

An analysis of salt indices of comparative liquid fertilizer solutions and their relative percent (%) of slow release nitrogen.

Salt content of liquid fertilizers and their relative percentages of slow release nitrogen is one of the most important characteristics of liquids. It is well documented that all fertilizers contain salts. These salts will effect both the salt concentration of the soil but also increase the osmotic potential of a solution. An index of all fertilizer materials and soil amendments has long been established, giving the grower the ability not only to judge the burn potential to various crops, but also classify the fertilizer material relative to each other and show what most likely will cause injury.¹

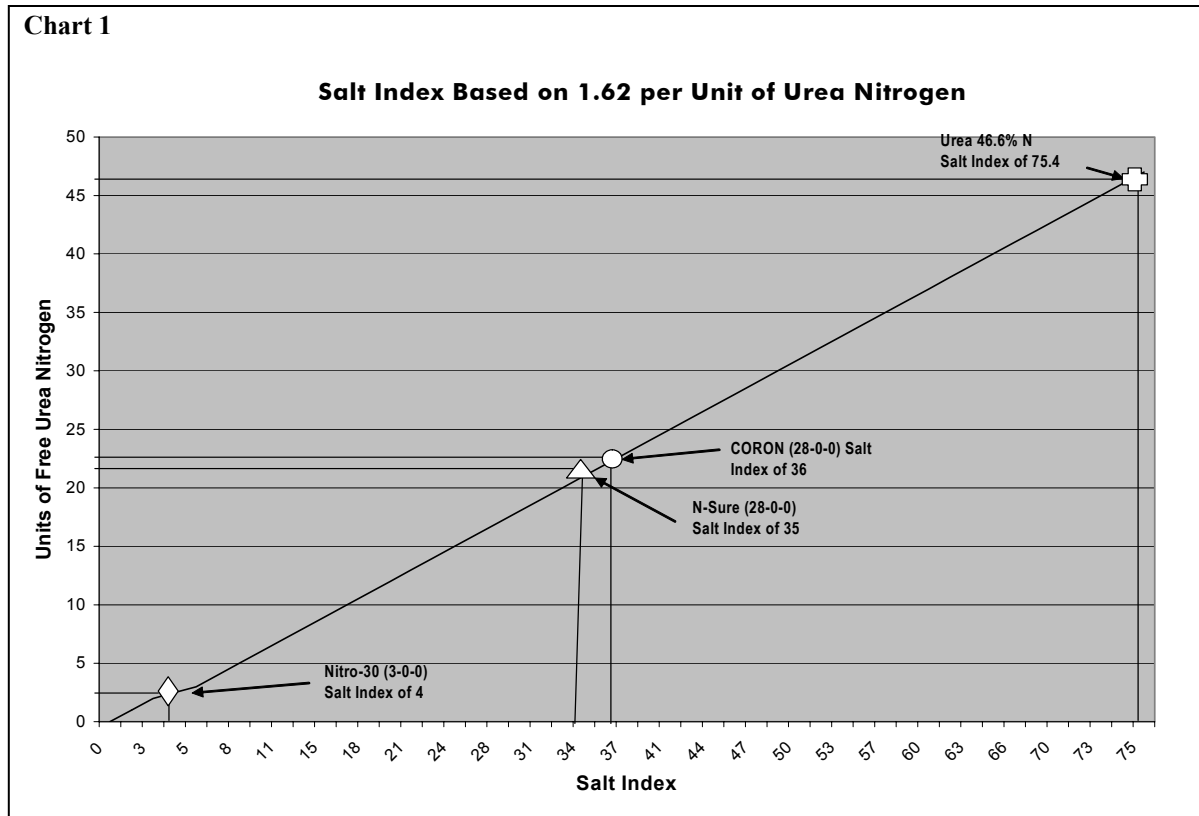
The salt index of any mixed fertilizer containing N, P and K is the sum of the partial salt index per unit of plant nutrients times the number of units due to each component in the formulation.

The liquid slow release fertilizers evaluated in Table 1 are compared on the basis of salt index since each product uses as its base raw material urea nitrogen and

have only nitrogen in their formulations. This provides a direct relationship between their respective salts indices and free urea content. (See chart 1)

Table 1. Nitrogen Sources

Material	Nitrogen Sources
N-Sure® (28-0-0)	Urea nitrogen and slowly available nitrogen from Triazone®
CORON® (28-0-0)	Urea nitrogen and slowly available nitrogen from methylene urea and polymethylol ureas
Nitro-30® (30-0-0)	Urea nitrogen and slowly available nitrogen from methylene urea



The slow release nitrogen forms contained in the reviewed products, are methylene ureas, polymethylol ureas and triazone ureas. They are long chain nitrogen molecules and have relatively undetectable salt indices. Therefore, the salt index values must be attributed to the free urea portion of the solution. Each product was evaluated for its salt index at an independent laboratory using "Soil Chemistry Analysis", Jackson p. 245. The results of these analyses are indicated below.

Table 2. Salt Index

Material	Index
N-Sure® (28-0-0)	35 ⁱⁱ
CORON® (28-0-0)	36 ⁱⁱⁱ
Nitro-30® (30-0-0)	4 ^{iv}

Based on these results listed in Table 2, the free urea units and percentage of Slow Release Nitrogen vs. free urea nitrogen can be calculated on the partial salt index of 1.618 per unit of free urea nitrogen. For example the N-sure product has a salt index of 35, divided by a partial salt index of urea will give the number of units of free urea nitrogen ($35 \div 1.62 =$

21.6 units). The calculation can then be made of the remaining slow release nitrogen contained in each product. ($28 - 21.6 = 6.4$ units of SRN) (See Chart 2)

Conclusion:

There is no universal analytical methodology for determining free vs. combined nitrogen in slow release nitrogen products of varying chemical structure, molecular weight and technology that has proven to be unreliable. Unlike other methods of determining these percentages in liquid solutions, salt index values provide a universal standard to compare products and their potential for both salt effects and slow release nitrogen content.

ⁱ Salt Index of Fertilizers, 1986, Pm-1274d, Iowa State University

Western Fertilizer Handbook, 1985, The Interstate Publishers & Printers

ⁱⁱ Midwest Laboratories, Inc. Report # 00-070-2136

ⁱⁱⁱ Midwest Laboratories, Inc. Report # 00-070-2136

^{iv} Midwest Laboratories, Inc. Report # 00-070-2136

Chart 2

